

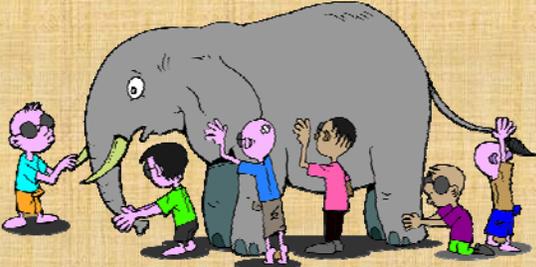
Executive Functioning and Cognitive Control Manual

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Blind Men and the Elephant

- A metaphor for our understanding of Executive Functions

Definitions: The Handbook of Executive Functions (2014), Goldstein and Naglieri



- *Baron (2004): "Executive functioning skills "allow an individual to perceive stimuli from his or her environment, respond adaptively, flexibly change direction, anticipate future goals, consider consequences, and respond in an integrated or commonsense way." (p. 135)*
- *Burgess (1997): "a range of poorly defined processes which are putatively involved in activities such as "problem-solving," ... "planning" ... 'initiation' of activity, 'cognitive estimation,' and 'prospective memory.'"*

Definitions: *The Handbook of Executive Functions* (2014), Goldstein and Naglieri



- Crone (2009): “For example, during childhood and adolescence, children gain increasing capacity for inhibition and mental flexibility, as is evident from, for example, improvements in the ability to switch back and forth between multiple tasks.” (p. 826)
- Dawson and Guare (2010): “Executive skills allow us to organize our behavior over time and override immediate demands in favor of longer-term goals.” (p. 1)

Definitions: *The Handbook of Executive Functions* (2014), Goldstein and Naglieri



- McCloskey (2011): “It is helpful to think of executive functions as a set of independent but coordinated processes rather than a single trait.” (p. 2)
- McCloskey (2006): “Executive Functions can be thought of as a diverse group of highly specific cognitive processes collected together to direct cognition, emotion, and motor activity, including mental functions associated with the ability to engage in purposeful, organized, strategic, self-regulated, goal directed behavior.” (p. 1)

Simplified Model of Executive Functions

(Goldstein & Naglieri, 2014)

- *Diamond (2006) describes three “core” executive functions that provide a base for more complex executive skills to develop. In her model, the prefrontal cortex plays a significant role in the neural circuitry required for mental health, academic achievement, and life success. These three “core” executive functions are inhibitory control, working memory, and cognitive flexibility.*



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Impulse Control: Definition

- AKA: Response inhibition
- The capacity to think before you act—this ability to resist the urge to say or do something allows us the time to evaluate a situation and how our behavior might impact it. (Dawson & Guare, *The Smart but Scattered Guide to Success: How to Use Your Brain's Executive Skills to Keep Up, Stay Calm, and Get Organized at Work and at Home*, 2016)

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Flexibility: Definition

- Cognitive flexibility is defined as the ability to switch one's thinking (cognition)(or train of thought) as an adaptation to the demands of stimuli. In neuroscience, the term is sometimes referred to as "attention switching" (GLOOM, 2017)



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Working Memory: Definition

- In general, WM involves the ability to maintain and manipulate information over brief periods of time without reliance on external aids or cues . (Best & Miller, 2010)

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Development of Executive Functions

- Nature vs Nurture
 - Genetics
 - Environment
- Timeline
 - Dawson & Guare, 2010: Developmental Tasks Requiring Executive Skills
 - Peters, 2013: Hierarchy of Social/Pragmatic Skills as Related to the Development of Executive Function



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Neural Correlates of Executive Functions

(Hunter, Hinkle, & Edidin, 2012)



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- Prefrontal cortex: inhibition, organization, goal-directed behavior, working memory, cognitive flexibility, attention
 - Orbitofrontal-behavioral inhibition, motivation, working memory, cognitive inhibition, integration of emotional information into contextually appropriate behavioral responses
 - Dorsolateral-set shifting, planning, response selection, working memory, impulse control
 - Ventral medial--initiation

Neural Correlates of Executive Functions

(Hunter, Hinkle, & Edidin, 2012)

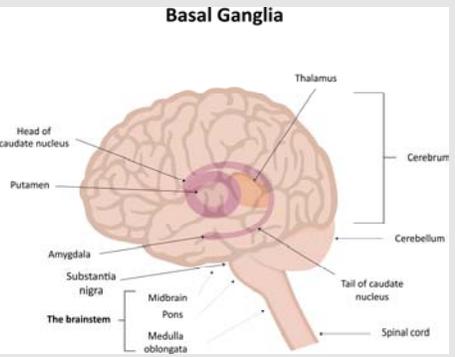


- Other cortical structures
 - Temporal lobe-inhibition
 - Parietal lobe-flexibility, goal-directed behavior, working memory

Neural Correlates of Executive Functions

(Hunter, Hinkle, & Edidin, 2012)

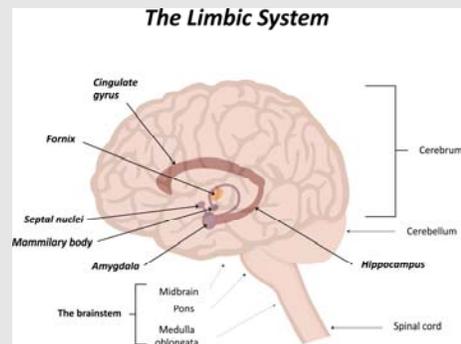
- Subcortical structures
 - Cerebellum-inhibition, cognitive flexibility
 - Basal ganglia-inhibition, sustained attention
 - Striatum (caudate and putamen)-reward detection, motor and action planning, motivation



Neural Correlates of Executive Functions

(Hunter, Hinkle, & Edidin, 2012) (Bush, Luu, & Posner, 2000)

- Limbic system-attentional control, inhibition, self-monitoring, working memory
 - Cingulate cortex-inhibition of prepotent response, linking behavioral outcomes to motivation
 - Hippocampus-memory
 - Insula-self-awareness, salience
 - Amygdala-emotional memory, emotional arousal



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General Assessment Considerations

(Sparrow, 2012)

- Key Issues with Executive Functioning Assessment
 - Nearly every test involves Executive Functioning
 - Standardization may remove aspects of Executive Functioning
 - It is challenging to isolate a single Executive Functioning Skill
 - Executive Functioning may vary by setting
 - Defining the proper peer comparison can be challenging



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General Assessment Considerations

(Suchy, 2016) (Sparrow, 2012)

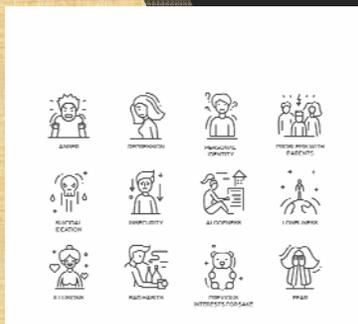
- Factors Impacting Interpretation of Assessments
 - Alertness/Arousal
 - Sleep Difficulties
 - Emotion Regulation
 - Pain
 - Hunger
 - Stress
 - Mood
 - Lack of Exercise



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General Assessment Considerations

(Suchy, 2016)



• Decision-Making Considerations

- Demographics
- Personality
- Intrinsic Resources and Task Complexity
- Complexity of Daily Life
- Temperament

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Components of a Comprehensive Assessment
(Dawson & Guare, 2010) (Goldstein & Naglieri, 2014) (Suchy, 2016)

- Informal Assessment Measures
 - Case History
 - Demographics
 - Background
 - History of success and struggles with EF
 - History of functioning in different areas

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Components of a Comprehensive Assessment
(Dawson & Guare, 2010) (Goldstein & Naglieri, 2014) (Suchy, 2016)

- Informal Assessment Measures
 - Review of Records
 - School Records (report cards, transcripts, attendance, incident reports)
 - Work/personnel file
 - Medical/psychiatric
 - Legal/Criminal

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Components of a Comprehensive Assessment

(Dawson & Guare, 2010) (Goldstein & Naglieri, 2014) (Suchy, 2016)

• Informal Assessment Measures

- Interview
 - Student/Client
 - Parent
 - Teacher
 - Significant Other



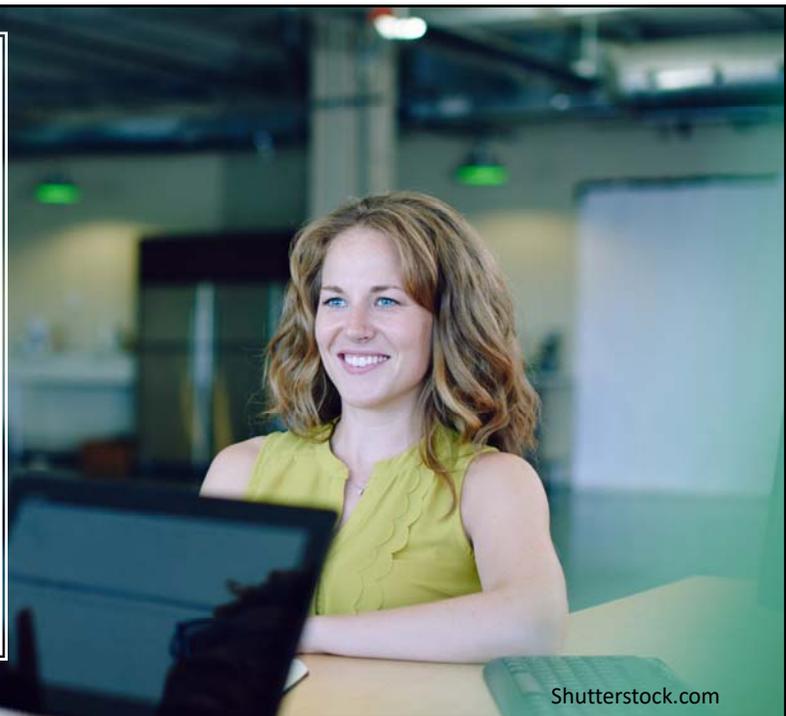
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Components of a Comprehensive Assessment

(Dawson & Guare, 2010) (Goldstein & Naglieri, 2014) (Sparrow, 2012) (Suchy, 2016)

• Informal Assessment Measures

- Interview
 - Concerns of interviewee
 - Values of interviewee
 - Current success and struggles with EF
 - Current functional abilities
 - Level of independence in different environments



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Components of a Comprehensive Assessment

(Dawson & Guare, 2010) (Goldstein & Naglieri, 2014)

- Observation
 - Classroom
 - Interactions with others
 - During “functional” tasks—ADL’s

Components of a Comprehensive Assessment

(Dawson & Guare, 2010) (Goldstein & Naglieri, 2014) (Suchy, 2016)

- Work Samples
 - Tests
 - Writing Assignments
 - Agenda pages
 - Written correspondence: emails
 - Work production: memos, reports



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Components of a Comprehensive Assessment

(Dawson & Guare, 2010) (Goldstein & Naglieri, 2014) (Sparrow, 2012)



- Behavior Checklists/Rating Scales

- Adaptive Behavior Assessment System (ABAS)
- Barkley Deficits in Executive Functioning Scale (Adult and Child versions)
- Behavior Assessment System for Children (BASC)
- Behavior Rating Inventory of Executive Functions (BRIEF)
- Behavioral Assessment of the Dysexecutive Syndrome

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Components of a Comprehensive Assessment

(Dawson & Guare, 2010) (Goldstein & Naglieri, 2014) (Sparrow, 2012)

- Behavior Checklists/Rating Scales

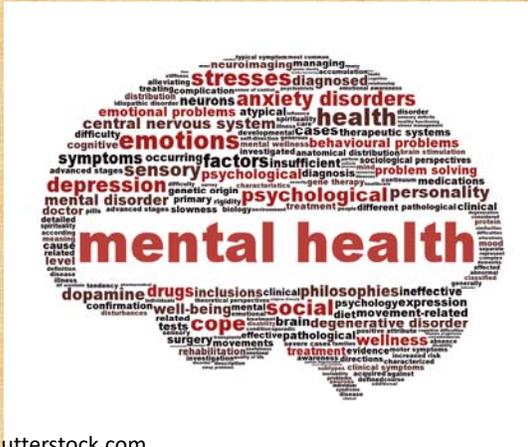
- Child Behavior Checklist
- Connor's Comprehensive Behavior Rating Scale
- Metacognitive Awareness Inventory
- Ross Information Processing Assessment
- School Function Assessment



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Components of a Comprehensive Assessment

(Dawson & Guare, 2010) (Goldstein & Naglieri, 2014) (Sparrow, 2012)



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- Mental Health Checklists
 - Brown Attention-Deficit Disorder Scales for Children and Adolescents
 - Children's Depression Inventory
 - Conner's Third Edition



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Components of a Comprehensive Assessment

(Dawson & Guare, 2010) (Goldstein & Naglieri, 2014) (Sparrow, 2012)

- Formal Assessment Measures—Comprehensive
 - Cambridge Neuropsychological Tests
 - Clinical Evaluation of Language Fundamentals-5
 - Clinical Evaluation of Language Fundamentals-5-Metalinguistics
 - Cognitive Assessment System
 - Comprehensive Test of Phonological Processing

Components of a Comprehensive Assessment

(Dawson & Guare, 2010) (Goldstein & Naglieri, 2014) (Sparrow, 2012)



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• Formal Assessment Measures— Comprehensive

- Delis-Kaplan Executive Function Scale
- NEPSY-II
- Test of Auditory Processing Skills
- Test of Information Processing Skills
- Wechsler Adult Intelligence Scale

Components of a Comprehensive Assessment

(Dawson & Guare, 2010) (Goldstein & Naglieri, 2014) (Sparrow, 2012)

• Formal Assessment Measures— Comprehensive

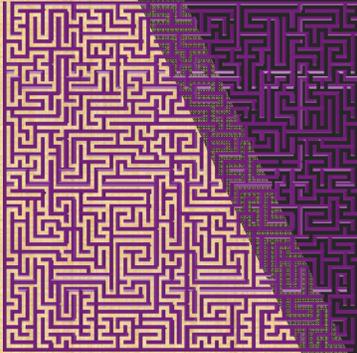
- Wechsler Individual Achievement Scale
- Wechsler Intelligence Scale for Children
- Wide Range Assessment of Memory and Learning
- Woodcock Johnson Tests of Achievement
- Woodcock Johnson Tests of Cognitive Ability



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Components of a Comprehensive Assessment

(Dawson & Guare, 2010) (Goldstein & Naglieri, 2014) (Sparrow, 2012)



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• Formal Assessment Measures-Single Tasks/Laboratory Measures

- California Verbal Learning Test
- Children's Category Test
- Conner's Continuous Performance Test
- Dichotic Listening
- Porteus Mazes

Components of a Comprehensive Assessment

(Dawson & Guare, 2010) (Goldstein & Naglieri, 2014) (Sparrow, 2012)



• Formal Assessment Measures-Single Tasks/Laboratory Measures

- Rapid Automatic Naming and Rapid Alternating Stimulus
- Rey-Osterrieth Complex Figure Test
- Ruff Figural Fluency Test
- Stroop Color Word Test
- Tasks of Executive Control



Components of a Comprehensive Assessment
(Dawson & Guare, 2010) (Goldstein & Naglieri, 2014) (Sparrow, 2012)

- Formal Assessment Measures-Single Tasks/Laboratory Measures
 - Test of Everyday Attention (Child and Adult Versions)
 - Test of Variables of Attention
 - Tower of Hanoi
 - Trail Making Tests
 - Wisconsin Card Sorting Test

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Caveat: Cold vs. Hot Executive Functions

(Zelazo & Carlson, 2012) (Peterson & Welsh, 2014) (Woltering, Lishak, Hodgson, Granic, & Zelazo, 2015)

- “Cold” executive functions: the goal-directed, future-oriented skills that are manifested during relatively decontextualized, nonemotional conditions
- “Hot” executive functions: the goal-directed, future-oriented skills that are elicited in contexts that engender emotion, motivation, and tension between immediate gratification and long-term rewards



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Clinical Basis for Treatment: Neuroplasticity

(Kleim & Jones, 2008; Elbert & Rockstroh, 2004) (Sparrowhawk, 2016)

- **Critical Periods—for Executive Functions**
 - Earliest stages occur in the first few months of life
 - Continues development through late 20's+ (myelination continues into fourth to fifth decade of life)
- **Experience-related changes in the brain**
 - Independent--prenatal
 - Expectant –first few years of life
 - Dependent—after the first few years of life



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Clinical Basis for Treatment: Neuroplasticity

(Kleim & Jones, 2008; Elbert & Rockstroh, 2004)

- **Principles of Experience-Dependent Brain Plasticity and Treatment of Executive Functions**
 - Practice Makes Perfect
 - Use It or Lose It
 - Use It and Improve It
 - Fire Together, Wire Together
 - Specificity
 - Repetition Matters

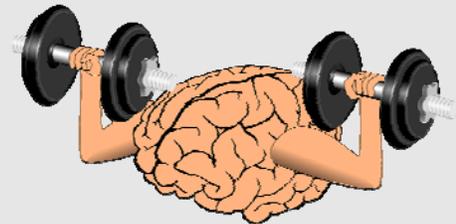


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Clinical Basis for Treatment: Neuroplasticity

(Kleim & Jones, 2008; Elbert & Rockstroh, 2004)

- Principles of Experience-Dependent Brain Plasticity and Treatment of Executive Functions
 - Intensity Matters
 - Timing Matters
 - Salience Matters
 - Transference Matters
 - Interference Matters



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General Considerations Related to Treatment

(Haskins, et al., 2014)

- Outcomes of treatment
 - Deficit remediation
 - Functional outcome

**When will treatment end?
 **What will the individual's performance look like when treatment has concluded?



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General Considerations Related to Treatment

(Haskins, et al., 2014)

- Patient Variables
 - Awareness of impacts of deficits
 - Severity of impairments
 - Emotional reactions and psychiatric issues
 - Motivation for, or resistance to, treatment



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General Considerations Related to Treatment

(Haskins, et al., 2014)

- Family Factors
 - Family relationships
 - Family stress
 - Family “buy-in” to treatment
 - Family willingness to collaborate/participate in the treatment process



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General Considerations Related to Treatment

(Barkley, 2012)

- Understand that improving Executive Functioning can be hard work
- Address arousal issues first
- Externalize information
 - Executive function prostheses
- Externally represent or remove gaps in time



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General Considerations Related to Treatment

(Barkley, 2012)

- Externalize motivation
 - Address motivational deficits
- Intervene at the point of performance in the natural setting
- Approach Executive Function deficit as a chronic condition
- Intervene at the most disrupted level



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Addressing Arousal Issues

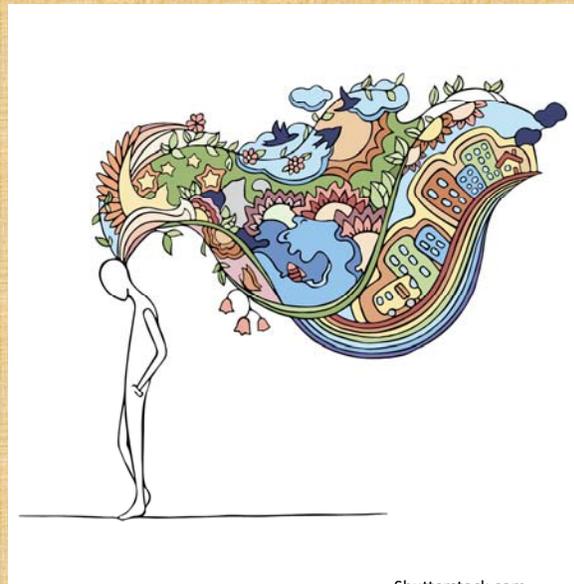


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- Six Principles of Structure (Ory, 2006)
 - Predictability
 - Concrete
 - Positive Expectations
 - Trust
 - Flexibility within Structured Choices
 - Continuity
- Organize environment
- Priming

Addressing Arousal Issues

- Sensory Integration, Sensory Modulation, and Sensory Regulation
- Mindfulness training
- Relaxation Techniques
- Brain Gym©



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Executive Function Prostheses

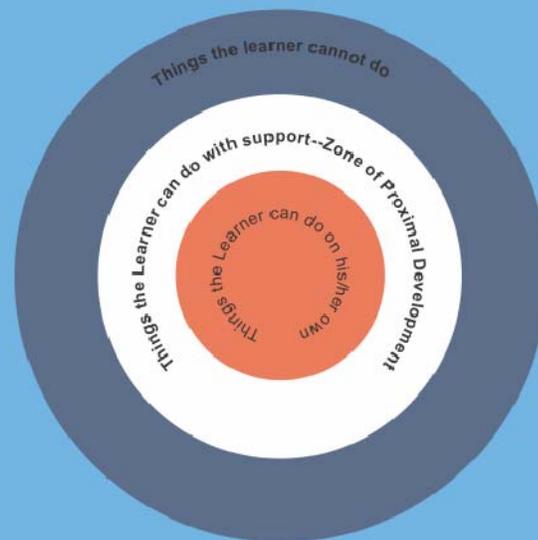
- Calendars, visual schedules, choice boards, checklists, task organizers, management tools (Hodgdon, 1995)
- Memory Journals, Tape Recorders, Post-It Software for Computers (Dawson & Guare, 2010)
- Comic Strip Conversations(Gray, 1994), Social Stories (Gray, 2010), Power Cards (Gagnon, 2016)
- Smartphones and Smartwatches



Zone of Proximal Development

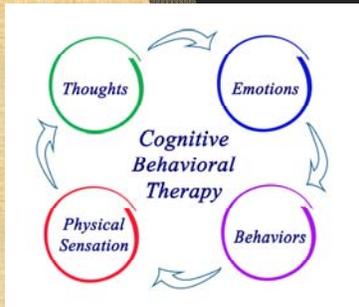
(Vygotsky, 1978) (Yeager & Yeager, 2013)

- Intervention should take place in the Zone of Proximal Development: the place where the individual is able to complete the task with support



Evidence-Based Practices and Executive Function Interventions

(Haskins, et al., 2014) (Barkley, 2012) (Dawson & Guare, 2014) (McCloskey, 2016)



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- Cognitive-Behavioral Therapy

- Cognitive-Behavioral Therapy manuals have been developed for intervening with some Executive Functions
 - Gallagher—Organizational Skills Training for Children with ADHD
 - Ramsay & Rostain-Cognitive-Behavioral Therapy for Adult ADHD: An Integrative Psychosocial and Medical Approach
 - Safran et al--Mastering Your Adult ADHD: A Cognitive-Behavioral Treatment Program Therapist Guide
 - Sibley--Parent-Teen Therapy for Executive Function Deficits and ADHD
 - Solanto--Cognitive-Behavioral Therapy for Adult ADHD
- Cognitive-Behavioral Therapy is an evidence-based practice for working with individuals with Autism Spectrum Disorders

Evidence-Based Practices and Executive Function Interventions

(Haskins, et al., 2014) (Barkley, 2012) (Dawson & Guare, 2014)



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- Skills-training (Dawson & Guare, 2014)

- Teach deficient skills
- Consider the individual's developmental level
- Move from external to internal
- Use rather than fight the individual's innate drive for mastery and control
- Modify tasks to match individual's capacity to exert effort
- Use incentives to augment instruction
- Fade supports, supervision and incentive gradually

Strategy Framework

(Hutaff & Henry, 2013)

Behavior	Modification/Accommodation	Strategy
Identify the Target Behavior (include the student)	Determine related classroom and/or home modifications or accommodations	Determine direct strategy to be taught and plan for teaching it.
Plan for monitoring and reinforcing		

Evidence-Based Practices and Executive Function Interventions



- Five Stages of Skill/Strategy Instruction (McCloskey, 2016)
 - Explain the purpose of self-regulation strategies in general and describe and discuss the specific steps of the strategy that will be taught.
 - Model the use of the strategy using language and examples that connect with the individuals.

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Evidence-Based Practices and Executive Function Interventions



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- Five Stages of Skill/Strategy Instruction (McCloskey, 2016)
 - Individuals memorize the steps in the strategy as well as any mnemonics that are used as part of the strategy.
 - Therapist/Teacher/Coach supports the implementation of the strategy by the students, scaffolding as necessary to help the individuals to master the use of the strategy.

Evidence-Based Practices and Executive Function Interventions



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- Five Stages of Skill/Strategy Instruction (McCloskey, 2016)
 - Individuals independently apply the self-regulated strategy covertly (in their own minds). Students and teacher collaboratively evaluate the effectiveness of student self-directed strategy application.



Evidence-Based Practices—Computer Programs

(Klingberg, 2010) (Jaeggi, et al., 2011) (Van der Molen, et al., 2010) (Melby-Lervag & Hulme, 2012) (Eack, et al., 2013) (Keshavan, et al., 2014)

- Effectiveness of computer programs in treating cognitive deficits has not be unequivocally established
 - May not generalize to more functional tasks
- Benefit has been noted for some programs, including the APT-III and CET in addressing in addressing some areas of functioning in some population
 - Including in individuals with ASD for CET



Evidence-Based Practices—Computer Programs

(Klingberg, 2010) (Jaeggi, et al., 2011) (Van der Molen, et al., 2010) (Melby-Lervag & Hulme, 2012) (Eack, et al., 2013) (Keshavan, et al., 2014)

- May be better to see Computerized Cognitive Training as part of an overall package of interventions (as it is in CET or APT-III)
- APT-III references functional activities that may be benefited by work with the program; these may be worked on at the same time as the APT-III
- CET incorporates a social-cognitive group curriculum with the computerized cognitive training to address both social and non-social cognitive impairments
- Good Interventions incorporate “metacognitive” and behavioral interventions (Denys, et al., 2011)

Phases of Treatment

(Haskins, et al., 2014)

- Acquisition Stage
- Application Stage
- Adaptation Stage



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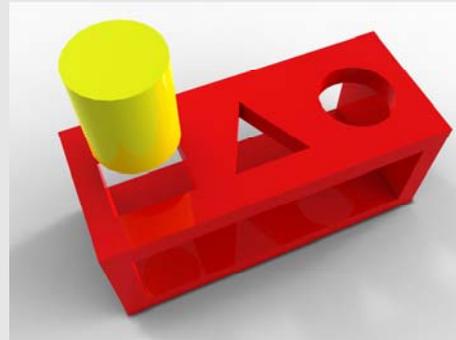
Overview of Coaching Process

(Dawson & Guare, 2010)

- Goal-Setting, Reward/Motivation, and Executive Function
 - Develop/set a goal
 - Determine reward/motivation for achieving
 - Determine obstacles to achieving the goal and ways to overcome obstacles
 - Write a plan/contract to achieve the goal
 - Track progress on achieving the goal

Reasons for Lack of Progress in Executive Function Treatment (Livanis, Mertturk, Benvenuto, & Mulligan, 2014)

- Lack of treatment integrity related to...
 - Adherence to the treatment procedures
 - Agent competence
 - Treatment differentiation
 - Problems with operational definition of executive functioning



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Interventions for Executive Function Impacts on Specific Academic Areas

- Books with specific interventions related to Math and Reading...
 - Cartwright, K. B. (2015). *Executive Skills and Reading Comprehension: A Guide for Educators*. New York: The Guilford Press.
 - Kaufman, C. (2010). *Executive Function in the Classroom: Practical Strategies for Improving Performance and Enhancing Skills for All Students*. Baltimore: Paul H Brookes Publishing Co.
 - Meltzer, L. (2010). *Promoting Executive Function in the Classroom*. New York: The Guilford Press



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Impulse Control/Response Inhibition

- The capacity to think before you act. This ability to resist the urge to say or do something allows us the time to evaluate a situation and how our behavior might impact it. (Dawson & Guare, 2016)
- Response inhibition refers to one's ability to refrain from doing things that do not contribute to one's intentions or goals. (Yeager & Yeager, 2013)
- Cognitive inhibition: the ability to suppress or ignore irrelevant or distracting information intentionally so that one can focus on the task at hand. (Cartwright, 2015)

Impulse Control/Response Inhibition

(Yeager & Yeager, 2013)

- Three interrelated processes:
 - The ability to refrain from executing one's natural (prepotent) response to a situation
 - The ability to perform "interference control" once a course of action has been initiated, and thus protect the response from disruption by competing events and responses
 - The ability to interrupt a response once it has been initiated



Impulse Control—Developmental Context

(Forgan & Richey, 2015)

4-5 years	"Can delay eating a treat; ... can keep an arbitrary rule in mind and follow it to produce a response that differs from their natural instinct" (Center on the Developing Child, 2014, p. 9)
6-9 years	Are more internal in thinking and more adept at controlling momentary impulses
10-12 years	Become more flexible in thinking and able to switch between a central focus like driving and peripheral stimuli that may need attention, such as pedestrians (Center on the Developing Child, 2014)

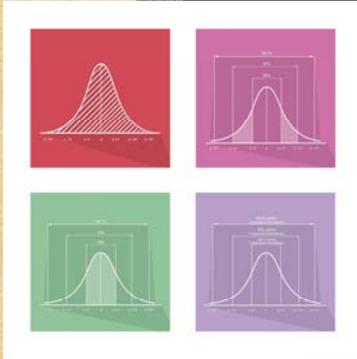
Impulse Control—Developmental Context

(Blakemore & Robbins, 2012) (Best & Miller, 2010)

Teens	<p>Increase in risk taking behavior</p> <p>Increased responsiveness to peer pressure</p> <p>Increases in "response inhibition" on "cold" EF tasks</p> <p>Prefrontal cortex and connections to other cortical and subcortical structures involved in inhibition going through significant development</p>
20's	<p>Decreased risk taking behavior</p> <p>Better able to inhibit immediate gratification for more long term goals</p> <p>Increased connections between emotion centers of brain and prefrontal cortex</p> <p>Increased awareness when making an inhibition error</p>

Assessing Impulse Control

(Dawson & Guare, 2010) (Goldstein & Naglieri, 2014) (Cartwright, 2015)



- Barkley Deficits in Executive Functioning Scale
- Behavior Rating Inventory of Executive Function (BRIEF)
- Conner's Continuous Performance Test-3rd Edition
- Delis-Kaplan Executive Function System
- NEPSY-II
- Stroop Color Word Test
- Tasks of Executive Control
- Test of Everyday Attention

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Signs and Symptoms of Impulse Control Difficulties--Elementary Classroom Behavior

(Axelrod, et al., 2012)

- Difficulty waiting
- Interrupts and disrupts group activities
- Student may call out
- Touching things or people
- Makes careless mistakes
- Displays hyperactivity
- Acting on auto-pilot without reflection
- Perseveration
- Many false starts
- Dives right into problems without pausing, reflecting, developing a strategy or game plan
- Excessive talking
- Unlikely to reflect or self-monitor
- Misinterprets directions

Signs and Symptoms of Impulse Control Difficulties--Middle School Classroom Behaviors

(Axelrod, et al., 2012)

- Calling out
- Touching objects/peers
- Invading others personal space
- Interrupting conversations
- Making careless errors -written & verbal
- Issues with directions:
 - Not reading directions
 - Misreading directions
 - Misinterpreting directions
- Misinterpreting text
- Attempting problem solving without planning
- Starting & stopping tasks repeatedly

Signs and Symptoms of Impulse Control Difficulties--High School Classroom Behaviors

(Axelrod, et al., 2012) (Guare, Dawson & Guare, 2013)

- Calling out
- Not following directions
- Inconsistent test performance
- Touching things/ other people
- Restlessness
- Over active behaviors
- Choice of fun activities over challenging or nonpleasurable ones

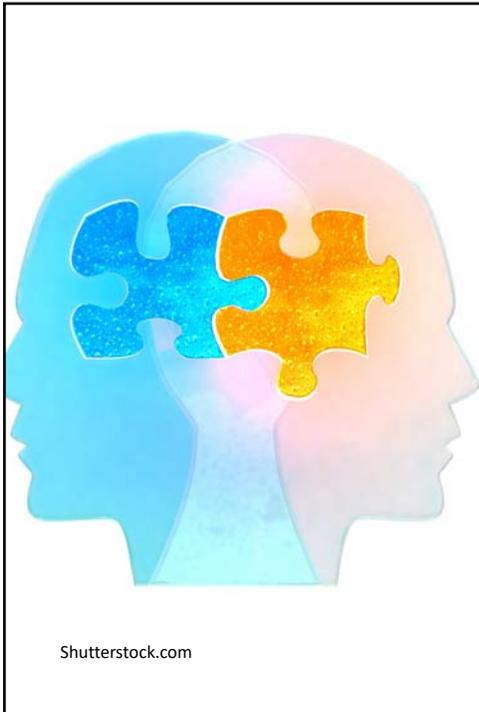
Signs and Symptoms of Impulse Control Difficulties-Adulthood

- Road rage
- Drinking
- Gambling
- Internet and gaming addiction
- Risk-taking behaviors
- Angry interactions with significant others
- Distracted driving
- Workplace issues
- Money/financial issues—difficulty delaying gratification



Impulse Control Accommodations in K-12 Classrooms (Gioia & Isquith, 2013)

- Additional structure in environment
- Limit distractions
- Careful placement in the classroom
- Sit near well-controlled peers
- Lower student-teacher ratio
- Reduced homework
- Impose response delay
- Verbalize plan of approach to task
- Develop more than one plan of approach



Working with Individuals with Significant Cognitive Deficits Who Have Impulse Control Difficulties
 (Dawson & Guare, 2010) (Dawson & Guare, 2016) (Wilkins & Burmeister, 2015) (Barkley, 2012)

- Major focus is on developing external controls for behavior
- Individual may not “internalize” strategies, and may be dependent upon “externalizing” of...
 - Information (calendars, visual schedules)
 - Motivation and reinforcement (i.e., token reinforcement systems)
 - Structure and arousal management
- The key is “lending” the intact EF of the teacher/caregiver to the individual

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Working with Individuals with Significant Cognitive Deficits Who Have Impulse Control Difficulties
 (Dawson & Guare, 2010) (Dawson & Guare, 2016) (Wilkins & Burmeister, 2015)

- Modify the environment
- Modify the task
- Positive Behavioral Supports: Functional Behavioral Assessment, Task Analysis, Reinforcement Systems
- Teach routines that are incompatible with the impulsive behavior
 - Backwards chaining
 - Forwards chaining

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Working with Individuals with Significant Cognitive Deficits Who Have Impulse Control Difficulties
(Dawson & Guare, 2010) (Dawson & Guare, 2016) (Wilkins & Burmeister, 2015)

- Functional Communication Training (Durand, 1990) (Carr, et al., 1994)
- Visual Supports (Hodgdon, 1999) (Bernard-Opitz & HauBler, 2011) (Rogers, 2013)
- Comic Strip Conversations (Gray, 1994), Social Stories (Gray, 2010), Power Cards (Gagnon & Myles, 2016)

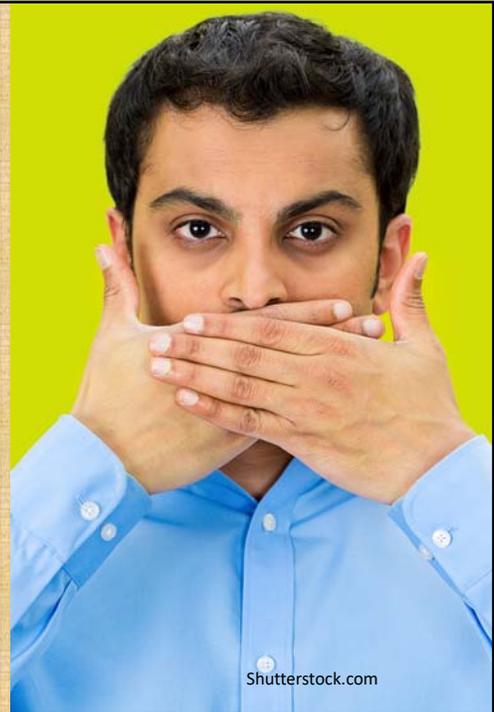


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Working with Individuals with Mild to No Cognitive Deficits Who Have Impulse Control Difficulties

(Haskins, et al., 2014) (McCloskey, 2016)

- Internal self-management and self-monitoring strategies
 - Self-Monitoring Training: teaching the use of self-monitoring routines
 - i.e., Zones of Regulation, 5-Point Scale
 - Self-Management: modeling and teaching the use of self-administered reward routines
 - Self-Talk: A Think-Aloud & Talk-Aloud Approach to Building Language
 - Use of Mediated Self-Talk on the part of the therapist/teacher to facilitate the development of language including private speech and self-talk
- Cognitive-Behavioral Therapy



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Evidence Based Practices for Working with Individuals with ASD and Commonly Co-occurring Psychiatric Disorders--Cognitive Behavioral Therapy

- (Kreslins, Robertson, & Melville, 2015): psychosocial (CBT) interventions were superior to waitlist and treatment-as-usual control conditions at post-treatment....individual treatment was more effective than group treatment.
- (Spain, Sin, Chalder, Murphy, & Happe, 2015): CBT interventions--including behavioural, cognitive, and mindfulness-based techniques--were moderately effective treatments for co-morbid anxiety and depression symptoms
- (Storch, et al., 2014): Results--Youth randomized to CBT demonstrated superior improvement across primary outcome relative to those receiving treatment as usual.
- Included on the National Autism Center's National Standards Project Phase 2 as having an Established Evidence Base for its use as an intervention with Individuals with Autism Spectrum Disorders (National Autism Center, 2015).

Considerations in the Use of Cognitive Behavioral Therapy with Individuals with Autism Spectrum Disorders

- Specific Barriers to Treatment (Selles, Ung, Nadeau, & Storch, 2014):
 - Common characteristics of ASD, such as communicative, social, and cognitive deficits, emotion regulation deficits, and inflexible adherence to rules and structure, present unique treatment barriers.
 - Youth with ASD may struggle to accurately report their mental states and daily life experiences, and to separate difficulties associated with core features of autism or comorbid psychiatric disorder.
 - Cognitive deficits such as limited insight (Storch et al., in press), lack of theory of mind, attention difficulties, and restricted interests (Wood et al., 2009) may reduce the efficacy of treatment.
 - Youth with ASD may be unwilling or unmotivated to engage in treatment because they do not believe a problem exists, are uncomfortable with any changes to their routine, or are unable to understand how therapy will help.
- **Modifications are needed to use these approaches with individuals with ASD**

Cognitive Behavioral Therapy: Skills Required to Engage in CBT

(McLeod, 2013):

- Emotion recognition
- Understanding the link between thoughts, feelings and behaviour
- Cognitive mediation
- Meta-cognitive abilities/Self-reflection
- Perspective-taking
- Verbal ability
- Short and long-term memory

Modifications to Cognitive Behavioral Therapy for Use with Individuals with Autism Spectrum Disorders

(Selles, Ung, Nadeau, & Storch, 2014) (Paxton & Estay, 2007) (Scarpa, Williams, White, & Attwood, 2013)

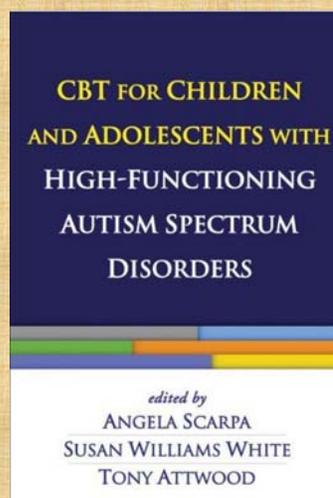
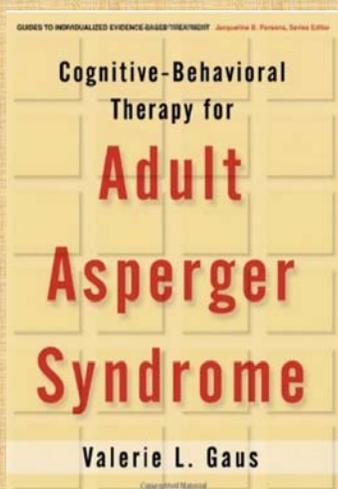
- Any modification to CBT for children with ASD will primarily be related to the previously mentioned skill deficits, rather than to the presenting comorbid condition (Selles, Ung, Nadeau, & Storch, 2014).
- Cognitive Modifications: significant reduction in reliance upon wholly cognitive tasks, may need to compensate for lack of entry-level emotional and behavioral skills required for CBT, modifying language to understanding of client, increased structure of transitions and sequencing, visual sequencing of steps, shortened individual session time, concrete terminology and activities for cognitive restructuring tasks, use of visual representations and hands-on activities (e.g., comic strip conversations), client may need assistance in generating alternative or coping thoughts, use of special interests as a metaphor, need for family/staff involvement and training to aid in skill transference

Modifications to Cognitive Behavioral Therapy for Use with Individuals with Autism Spectrum Disorders

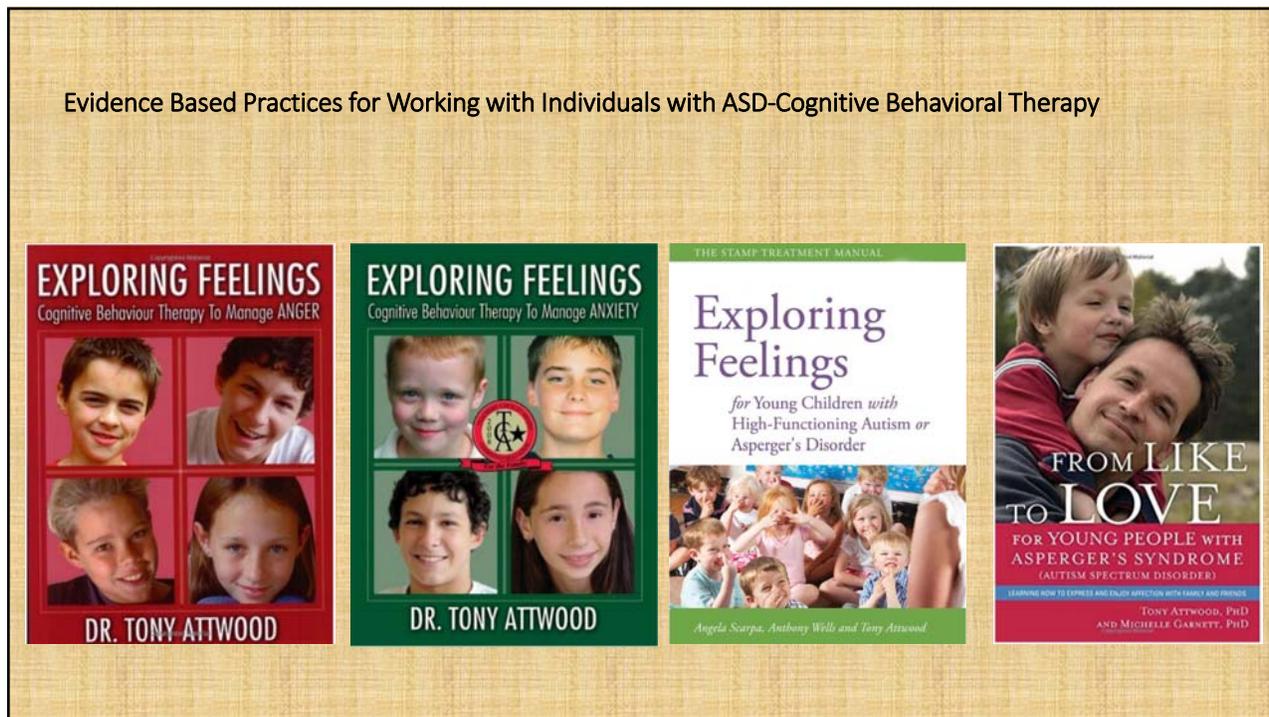
(Selles, Ung, Nadeau, & Storch, 2014) (Paxton & Estay, 2007) (Scarpa, Williams, White, & Attwood, 2013)

- Cognitive restructuring is not recommended when the client is out of touch with reality or locked into inflexible thinking (Paxton & Estay, 2007)
- Behavioral Modifications: activity and/or pleasant event scheduling, grading task/ homework assignments, exposure with response prevention, relaxation/breathing training, coping cards, rehearsal or application of learned cognitive routines, goal setting, structuring choices for success

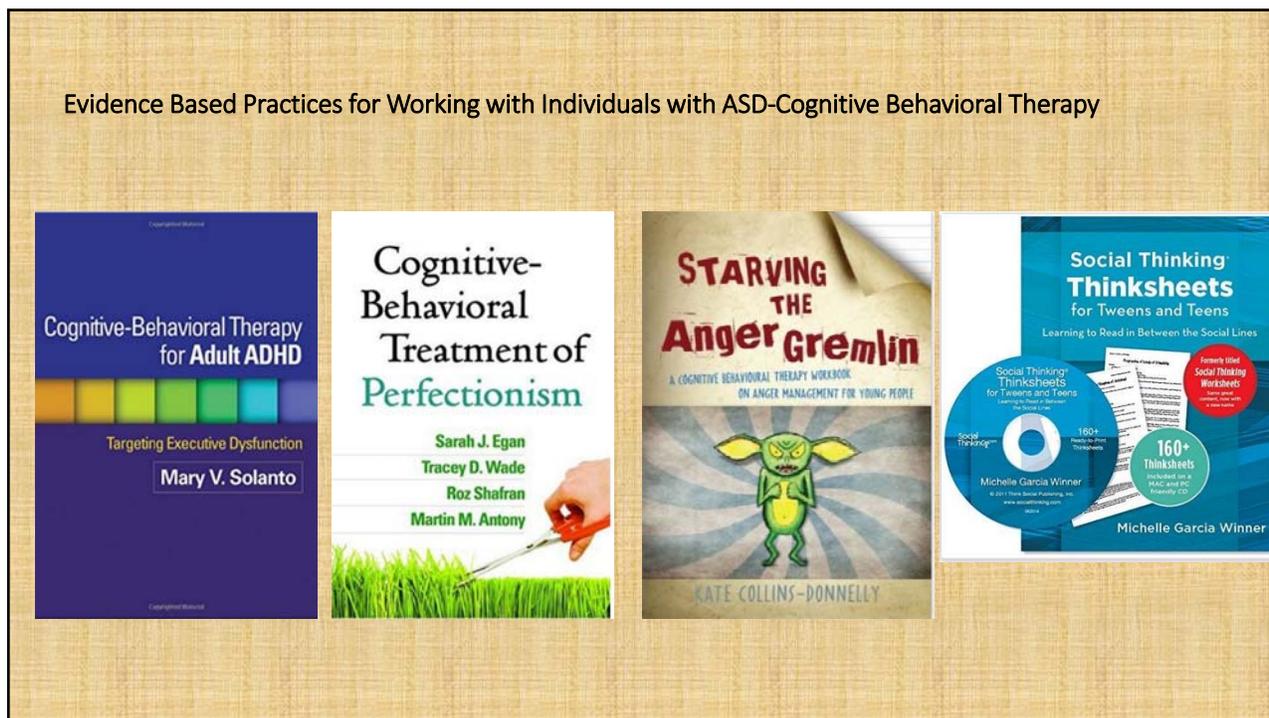
Evidence Based Practices for Working with Individuals with ASD-Cognitive Behavioral Therapy

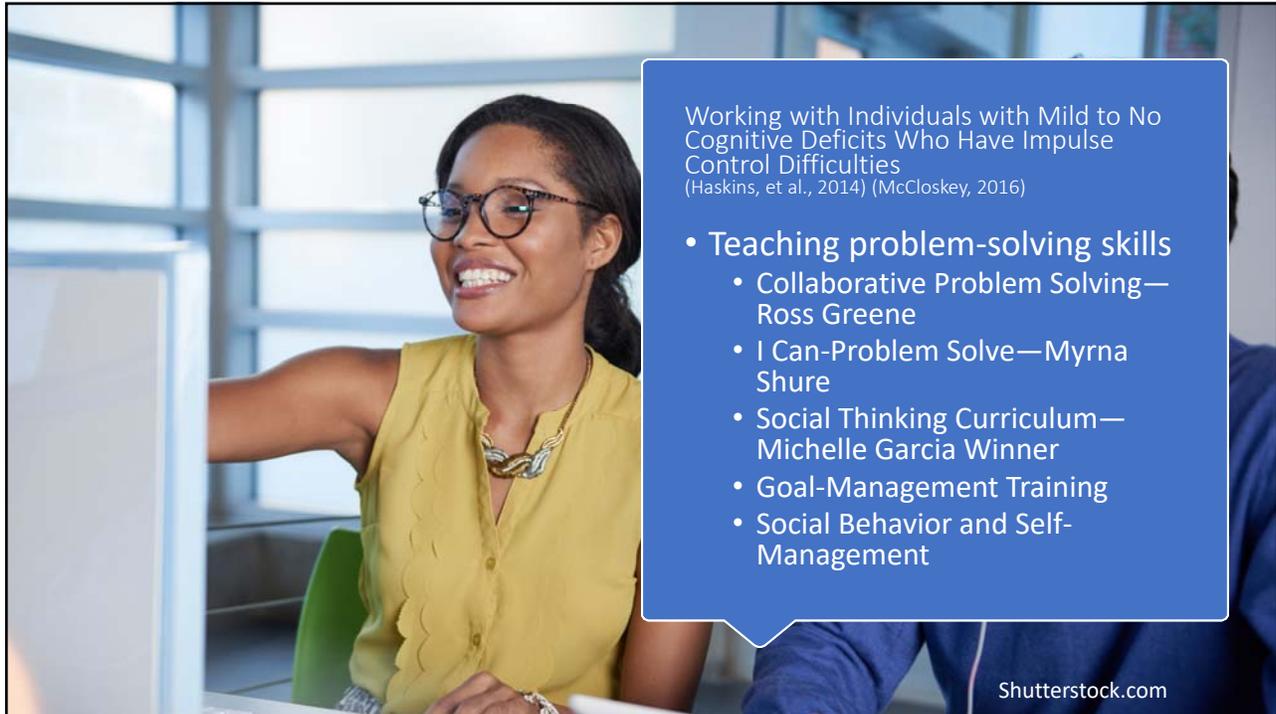


Evidence Based Practices for Working with Individuals with ASD-Cognitive Behavioral Therapy



Evidence Based Practices for Working with Individuals with ASD-Cognitive Behavioral Therapy

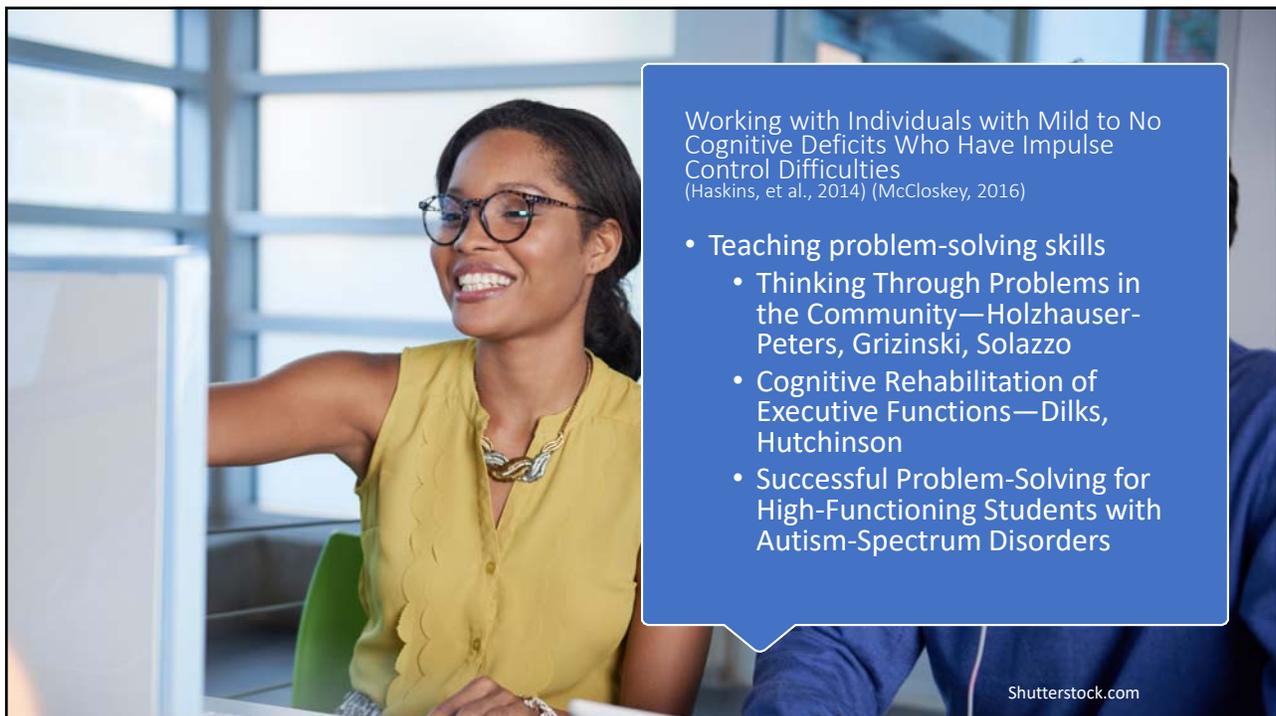




Working with Individuals with Mild to No Cognitive Deficits Who Have Impulse Control Difficulties
(Haskins, et al., 2014) (McCloskey, 2016)

- Teaching problem-solving skills
 - Collaborative Problem Solving—Ross Greene
 - I Can-Problem Solve—Myrna Shure
 - Social Thinking Curriculum—Michelle Garcia Winner
 - Goal-Management Training
 - Social Behavior and Self-Management

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Working with Individuals with Mild to No Cognitive Deficits Who Have Impulse Control Difficulties
(Haskins, et al., 2014) (McCloskey, 2016)

- Teaching problem-solving skills
 - Thinking Through Problems in the Community—Holzhauser-Peters, Grizinski, Solazzo
 - Cognitive Rehabilitation of Executive Functions—Dilks, Hutchinson
 - Successful Problem-Solving for High-Functioning Students with Autism-Spectrum Disorders

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Working with Individuals with Mild to No Cognitive Deficits Who Have Impulse Control Difficulties (Suchy, 2016)

- Teaching context awareness (may be particularly important when person has difficulty with Threat Sensitivity, Contingency Updating, and Discrepancy Detection)
 - Social Behavior Mapping—Michelle Garcia Winner
 - Comic Sense: A comic book on common sense and social skills for young people with Asperger's and ADHD—Nancy Mucklow
 - More Comic Sense: More comics and cartoons on common sense and social skills for young people—Nancy Mucklow
 - Perspective-taking training



Working with Individuals with Mild to No Cognitive Deficits Who Have Impulse Control Difficulties (Suchy, 2016)

- Teaching context awareness (may be particularly important when person has difficulty with Threat Sensitivity, Contingency Updating, and Discrepancy Detection)—Sarah Ward, 2013
- Space: Read the room
- Time: Get on the timeline
- Objects: Sense the organization
- People: Read the person

Working with Individuals with Mild to No Cognitive Deficits Who Have Impulse Control Difficulties
(McCloskey, 2016) (Kiep, Spek, & Hoeben, 2014) (Hwang & Kearney, 2015) (Singh, et al., 2006, 2011 & 2016)

- Training Mindfulness/Meditation
 - Improving all forms of self-control, especially Self-Awareness through “quieting of the mind.” (McCloskey, 2016)
 - Benefits found when training/teaching mindfulness strategies to Individuals with ASD, their Parents, and other Caregivers
 - Improvements noted in mood, coping, impulse control, anxiety, aggression, self-awareness, and cognitive flexibility

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Working with Individuals with Mild to No Cognitive Deficits Who Have Impulse Control Difficulties

- Potential psychological changes associated with mindfulness training (Perry-Parrish, Copeland-Linder, Webb, Shields, & Sibinga, 2016)
 - Improved intentional shifts in attention
 - Increased flexibility of attention
 - Reduced emotional intensity/duration and secondary emotional responses
 - Reduced belief in automatic thoughts
 - Enhanced ability for learning
 - Enhanced treatment motivation

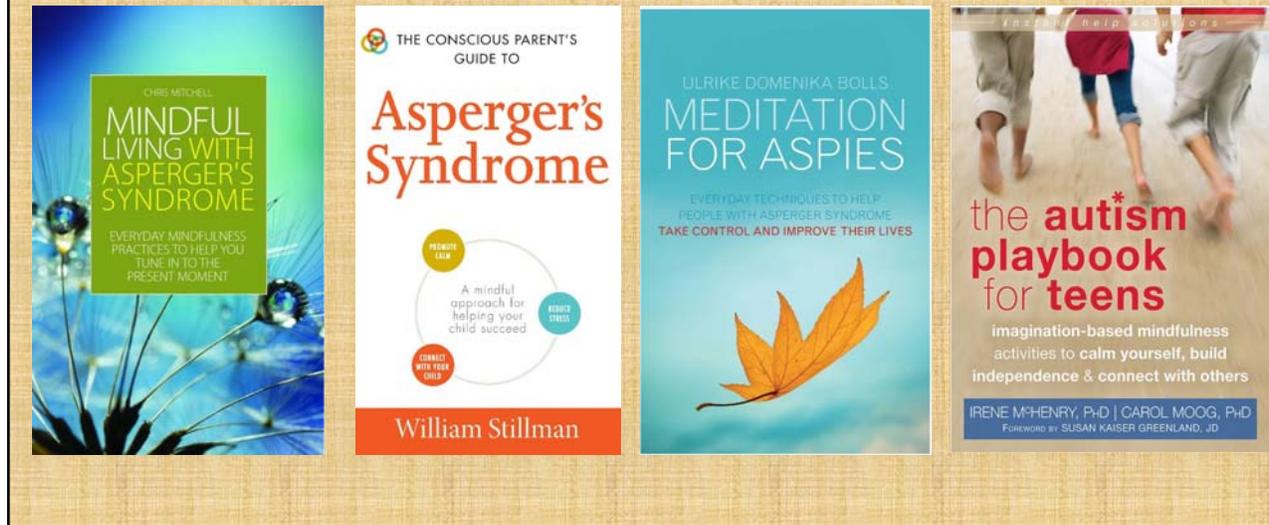
Evidence Based Practices for Working with Individuals with ASD -Mindfulness

- Emerging evidence base—expanding literature base for use of mindfulness practices in interventions for individuals with Autism Spectrum Disorders
- (Kiep, Spek, & Hoeben, 2015): early research showed that mindfulness-based therapy for individuals on the autism spectrum is effective in reducing symptoms of depression, anxiety, and rumination.
- (Hwang & Kearney, 2015): Recent intervention studies have reported the successful application of mindfulness meditation practice for individuals with developmental disability (DD), including ASD, as evidenced by reductions in their behavioural (e.g. Singh et al., 2013), psychological (e.g. Spek et al., 2013) and physical (e.g. Singh et al., 2014a) problems.

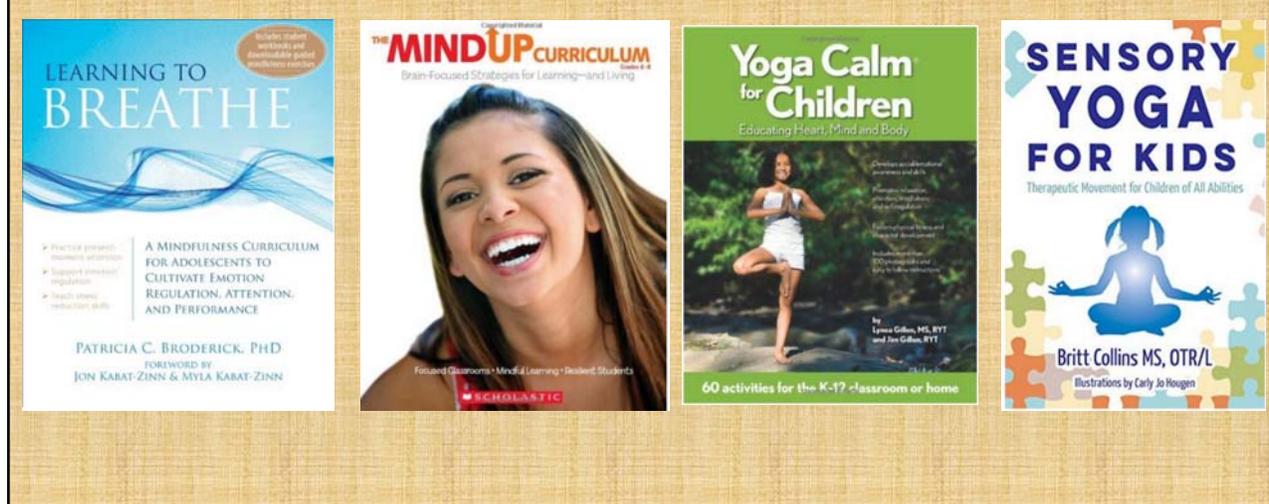
Modifications to Mindfulness Practices for Use with Individuals with Autism Spectrum Disorders

- Need to consider factors reviewed on slide related to **Considerations in the Use of Cognitive Behavioral Therapy with Individuals with Autism Spectrum Disorders** when making modifications to mindfulness practices
- Need to consider similar factors related to the cognitive modifications for Cognitive Behavioral Therapy when making modifications to mindfulness practices.
- Example: Meditation on Soles of Feet
 - Begins with practitioner establishing posture by sitting or standing with feet on floor
 - Then paying attention to breathing, thus grounding the mind
 - Next stage involves reminding herself of specifics of her arousal state
 - The practitioner then directs attention to the soles of the feet until body and mind calm down

Evidence Based Practices for Working with Individuals with ASD and Commonly Co-occurring Psychiatric Disorders--Mindfulness



Evidence Based Practices for Working with Individuals with ASD and Commonly Co-occurring Psychiatric Disorders--Mindfulness



Flexibility

- Cognitive flexibility: changing perspectives or approaches to a problem, flexibly adjusting to new demands, rules, or priorities (as in switching between tasks) (Diamond, 2013)
- Cognitive flexibility refers to the brain's ability to transition from thinking about one concept to another. (GLOOM, 2017)
- The ability to revise plans in the face of obstacles, setbacks, new information, or mistakes. It relates to adaptability to changing conditions. (Dawson & Guare, 2016)

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Flexibility

Flexible cognition: adapting inference to unfamiliar or unexpected situations, creatively combining concepts, and modifying familiar knowledge and habits to produce novel representational syntheses or action sequences. (Deak, 2003)

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Flexibility—Psychological Flexibility

- Psychological flexibility spans a wide range of human abilities to: recognize and adapt to various situational demands; shift mindsets or behavioral repertoires when these strategies compromise personal or social functioning; maintain balance among important life domains; and be aware, open, and committed to behaviors that are congruent with deeply held values. (Kashdan & Rottenberg, 2010)

Flexibility—Developmental Context

(Forgan & Richey, 2015)

2-5 years	<ul style="list-style-type: none"> • Can shift actions based on changing rules (e.g. run on the play-ground but not inside) • Begins to understand turn-taking • Emerging understanding of time • Emotions can still be very intense • Difficulty separating "real" from "imaginary" • May develop fears
3 years	<ul style="list-style-type: none"> • "Can direct and re-direct their attention to make deliberate choices," mental flexibility (Center on the Developing Child, 2011, p. 4).
5 years	<ul style="list-style-type: none"> • Can play cooperatively with several children

Flexibility—Developmental Context

(Forgan & Richey, 2015)

6-9 years

- Self-control continues to improve
- Internal thinking or self-talk develops
- Becomes better able to control negative feelings
- Develops awareness of consequences of their actions
- Begins to understand difference between "needs" and "wants"
- More sophisticated understanding of time
- Still egocentric but beginning to understand perspectives of others
- Peer competition in sports and the classroom comes to the forefront

Flexibility —Developmental Context

(Forgan & Richey, 2015)

10-12
years

- Becomes more flexible according to changing rules
- Better able to separate actions and feelings and control negative feelings (Teeter, 1998)
- Able to take more responsibility for their action
- Wants independence but still needs guidance
- Importance of peer acceptance increasing

Flexibility — Developmental Context

Teens	<p>Increased exploration of “self”</p> <p>Increased goal flexibility</p> <p>Continued increases in ability to take the perspective of others</p> <p>Ability to carry out more tasks at a single time</p> <p>Increases in “hot” executive function development</p>
20’s	<p>More stable sense of self</p> <p>More defined “set” of goals for life</p> <p>Increased resilience to life’s stressors</p>



Cognitive Flexibility Skills

- Seeing the “grays”, being comfortable with “iffy” thinking (vs. more concrete, literal, black and white thinking and need for precision)
- Thinking hypothetically or inferentially/ using hypothesis-testing
- Handling deviation from rules, routine, original plan
- Handling unpredictability, ambiguity, uncertainty, novelty

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Cognitive Flexibility Skills

- Shifting from original idea or solution/adapting to changes in plan or new rules rules/possibly perseverative or obsessive
- Taking into account situational factors that would suggest the need to adjust a plan of action
- Interpreting information accurately / avoiding cognitive distortions or biases in thinking such as over-generalizing or personalizing

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Signs and Symptoms of Difficulties with Flexibility-- Elementary Classroom Behavior

(Axelrod, et al., 2012)

- Difficulty making transitions
- Difficulty starting a new task before the first task is complete
- Difficulty switching gears (addition problems/subtraction problems on same page)
- Perseverative behaviors
- Gives the same answers to different questions
- Difficulty switching to a new topic or new subject
- Inflexibility
- Difficulty with problem solving and conflict resolution
- Failure to comply with task instructions

Signs and Symptoms of Difficulties with Flexibility- Middle School Classroom Behaviors

(Axelrod, et al., 2012)

- Perseverating on a topic, idea or activity
- Repeating the same behavior after the task has changed
- Difficulty moving on from an emotional response to a situation
- Difficulty applying different strategies to problems as they arise
- Difficulty attending to differences between two different problems
- Driven by routine and consistency
 - Needing the same seat
 - Wearing the same color
 - Eating the same foods
 - Difficulty transitioning - class to class, weekend to school, one activity to another, etc.
 - Unable to tolerate changes in schedule
 - Difficulty with transitioning within conversation

Signs and Symptoms of Difficulty with Flexibility- High School Classroom Behaviors

(Axelrod, et al., 2012) (Guare, Dawson & Guare, 2013)

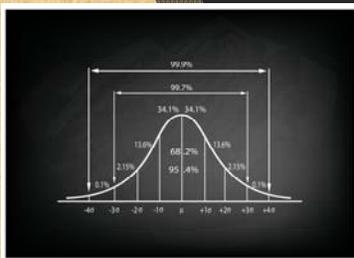
- Perseveration on previous and current tasks
- Not being prepared for next activity
- The student may just sit and stare
- Non-participation
- Noncompliance

Signs and Symptoms Difficulty with Flexibility—Adulthood

- Highly emotional—becomes stuck in emotional response
- Perseverative—will perseverate on thoughts, ideas, tasks, etc...
- Ruminative—will ruminate on unhealthy thoughts
- Inflexible need to adhere to specific routines and rituals
- Unable to adapt to changes or life events

Assessing Flexibility

(Dawson & Guare, 2010) (Goldstein & Naglieri, 2014)



- Behavior Rating Inventory of Executive Function (BRIEF)
- Comprehensive Trail-Making Test
- Delis-Kaplan Executive Function System
- NEPSY-II
- Rapid Automatic Naming and Rapid Alternating Stimulus
- Ruff Figural Fluency Test
- Stroop Color Word Test
- Wisconsin Card Sorting Test

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Flexibility Accommodations in K-12 Classrooms (Gioia & Isquith, 2013)

- Remain consistent in environment and teaching
- Gradually and incrementally introduce minor changes one at a time
- Develop the use of visual organizers, such as pictures, schedules, planners, and calendar boards
- Make child feel secure by maintaining a set of basic routines

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Working with Individuals with Significant Cognitive Deficits Who Have Flexibility Difficulties

(Dawson & Guare, 2010) (Dawson & Guare, 2016) (Wilkins & Burmeister, 2015) (Barkley, 2012)

- The strategies listed in the section on *Working with Individuals with Significant Cognitive Deficits Who Have Impulse Control Difficulties* all would benefit individuals with difficulties with flexibility.
- Remember to address any issues with arousal and anxiety
 - Remember there is an inverse relationship between an individual's level of arousal and how flexible they are going to be able to be





Working with Individuals with Significant Cognitive Deficits Who Have Flexibility Difficulties

(Dawson & Guare, 2010) (Dawson & Guare, 2016) (Wilkins & Burmeister, 2015) (Barkley, 2012) (Fralick-Ball, 2012)

- Related to Structure...
 - Signal changes well in advance to allow individual to “prepare” for change
 - Utilize visual schedules and teach routines. Teach changes to routines ahead of time.
 - Teach individual cognitive script for dealing with change
 - Using Wait Cards



Working with Individuals with Significant Cognitive Deficits Who Have Flexibility Difficulties

(Dawson & Guare, 2010) (Dawson & Guare, 2016) (Wilkins & Burmeister, 2015) (Barkley, 2012) (Fralick-Ball, 2012)

- Related to Structure...
 - Change one thing at a time when making changes
 - Reduce novelty
 - Increase level of support around the task



Working with Individuals with Significant Cognitive Deficits Who Have Flexibility Difficulties

- Dealing with individuals when they get stuck...
 - Remember that getting “stuck” is a neurological state not a willful behavior
 - Stuck behavior is different than resistant behavior
 - When someone is “stuck” their arousal level has risen to the level where they are no longer able to adequately cope

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Working with Individuals with Significant Cognitive Deficits Who Have Flexibility Difficulties

- Dealing with individuals when they get stuck...
 - Do not take “stuck” behavior personally
 - We won’t “reward” or “reinforce” someone out of “stuck” behavior
 - We won’t “consequence” or “punish” someone out of “stuck” behavior
 - One key to dealing with stuck behavior is the understanding that we are working to return control to the individual

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Working with Individuals with Significant Cognitive Deficits Who Have Flexibility Difficulties

- Dealing with individuals when they get stuck...
 - Priming
 - Give the person an “out”
 - Provide a safe space
 - “Inoculate” them against the rigidity and inflexibility of others
 - Utilize trust, attunement and relationship

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Working with Individuals with Significant Cognitive Deficits Who Have Flexibility Difficulties

- Nathan Ory, 2007
 - Key to Prevention: the Six A's: Accepting Attitude; Accommodate the person's needs and deficiencies
 - Return to routine or schedule (create a routine for these types of situations)
 - Prop-Rule-Role
 - The key is to stop any perseverative movement is to first capture the person's attention, then focusing his attention on what you expect.

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Working with Individuals with Mild to No Cognitive Deficits Who Have Flexibility Difficulties

(Meltzer, 2010) (Yeager & Yeager, 2013) (Barkley, 2012) (Dawson & Guare, 2010)

- **General Guidelines:**
 - Provide opportunities for individual to experience flexibility and to acquire knowledge flexibly
 - Demonstrate flexible approaches to solving problems/flexible strategies for approaching school work
 - Make the individual a full partner in design of routines, selection of rewards, and troubleshooting.
 - Teach self-monitoring and self-awareness skills
 - Model and teach reflection on own behavior: teach self-talk
 - Be willing to negotiate rather than dictate

Working with Individuals with Mild to No Cognitive Deficits Who Have Flexibility Difficulties

(Meltzer, 2010)

- **General Guidelines:**
 - Introduce and define the concept of shifting strategies.
 - Model shifting strategies and explain what, when, and how to do this.
 - Provide opportunities for active student learning.
 - Reinforce shifting strategies by embedding opportunities for doing this into the curriculum.
 - Reflect on students' use of specific strategies.
 - Challenge students and extend flexible strategy use to other academic areas and tasks.

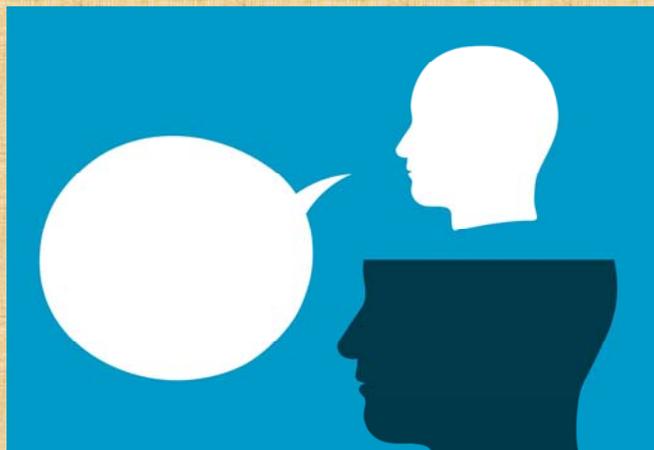
Working with Individuals with Mild to No Cognitive Deficits Who Have Flexibility Difficulties

(Diamond & Lee, 2011) (van de Ven, et al., 2015)

- Activities that may increase flexibility:
 - Computerized Training
 - Non-computerized games (cooperative games are especially beneficial)
 - Aerobics
 - Martial Arts
 - Yoga

Working with Individuals with Mild to No Cognitive Deficits Who Have Flexibility Difficulties

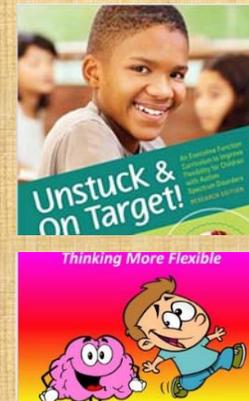
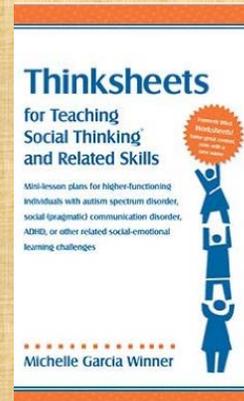
- Both Cognitive-Behavioral Therapy and Mindfulness have been found to be beneficial for addressing issues with flexibility
 - See sections under impulse control for each of these areas



Working with Individuals with Mild to No Cognitive Deficits Who Have Flexibility Difficulties

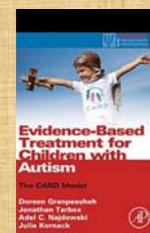
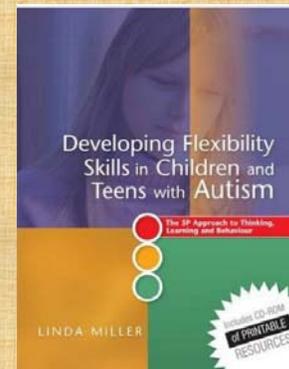
- Materials/Approaches developed for Individuals with ASD that are based on Cognitive Behavioral Therapy
 - Michelle Garcia Winner's Social Thinking Materials
 - Kenworthy, et al., 2011: *Unstuck & On Target! An Executive Function Curriculum to Improve Flexibility for Children with Autism Spectrum Disorders*
 - Kerstein, 2014: *A Week of Switching, Shifting, and Stretching: How to Make My Thinking More Flexible*

***may need to be adapted for different ability levels or ages*



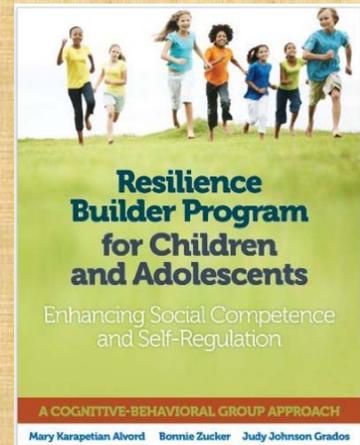
Working with Individuals with Mild to No Cognitive Deficits Who Have Flexibility Difficulties

- Approaches/Materials based on Applied Behavior Analysis
 - Miller, 2013: *Developing Flexibility Skills in Children and Teens with Autism: The 5P Approach to Thinking, Learning and Behavior*
 - Najdowski, 2017: *Flexible and Focused: Teaching Executive Function Skills to Individuals with Autism and Attention Disorders*
 - Granpeesheh, et al., 2014: *Evidence-Based Treatment for Children with Autism: The CARD Model (Practical Resources for the Mental Health Professional)*



Working with Individuals with Mild to No Cognitive Deficits Who Have Flexibility Difficulties

- Develop Resilience Skills
 - Alvord, M. K., Zucker, B., & Grados, J. J. (2011). *Resilience Builder Program for Children and Adolescents: Enhancing Social Competence and Self-Regulation*
 - Has been researched in individuals with ASD
 - Schiraldi, G. R. (2011). *The Complete Guide to Resilience: Why It Matters, How to Build and Maintain*



Working with Individuals with Mild to No Cognitive Deficits Who Have Flexibility Difficulties

- Cognitive Flexibility Training (Canas, Fajardo, & Salmeron, 2006)
 - First Type of Training: The main idea behind of these programs consists of emphasizing irregularity and variation in training over a fixed repetition of steps. This variability can be obtained by means of different training scenarios with different demands or by increasing the training of different behavioral strategies in different sequence orders.



Working with Individuals with Mild to No Cognitive Deficits Who Have Flexibility Difficulties

- Cognitive Flexibility Training (Canas, Fajardo, & Salmeron, 2006)
 - In a second set of programs, learners are instructed to vary the amount of attention (i.e. effort) dedicated to different tasks features during the training session. For example, in a task consisting of several sub-tasks involving the continued exploration of several displays, operators are told to switch their priorities from display to display through different training blocks.

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Working Memory

- The ability to hold information in mind while performing complex tasks. It incorporates the ability to draw on past learning or experience to apply to the situation at hand or to project into the future. (Dawson & Guare, 2010)
- Working memory is the limited cognitive capacity to retain information in the short term while simultaneously manipulating the same or other information. (Dehn, 2014)
- Working memory is the term used to refer to a system responsible for temporarily storing and manipulating information. It functions as a mental workspace that can be flexibly used to support everyday cognitive activities that require both processing and storage such as, mental arithmetic. (Alloway, 2006)

Working Memory (Baddeley)

(Henry, 2012)

- Phonological Loop
 - Phonological store
 - Articulatory rehearsal mechanism
- Visuospatial Sketchpad
- Episodic Buffer
- Central Executive

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Working Memory — Developmental Context

(Forgan & Richey, 2015)

3 years	Can keep two rules in mind and act on them
3.5 years	Can use past knowledge to help them remember (Wellman, Somerville, & Haake, 1979)
5 years	Begin to recall location of items, such as in a memory game or by finding items in a room
7 years	Can begin to use simple memory strategies, like organization of material, but usually need prompting (Teeter, 1998)
10-11 years	May use organizational strategies when instructed to remember information without prompting (Chance & Fischman, 1987)
	Begin using rehearsal strategies, such as grouping items together or repeating them in a certain sequence
12 years	Use more spontaneous elaboration and strategies independently

Signs and Symptoms of Difficulties with Working Memory--Elementary Classroom Behavior

(Axelrod, et al., 2012)

- Student gets confused when too much information is presented
- Has trouble remembering things (i.e., phone numbers)
- Student may lose track of what they are doing as they work
- Student may forget what they need to retrieve when sent on an errand
- May frequently switch tasks or fail to complete tasks
- Difficulty keeping up with classroom lessons
- Difficulty remaining attentive and focused for appropriate length of time
- Difficulty sequencing math word problems
- Extreme difficulty solving problems mentally (i.e., mental math)
- Poor reading comprehension
- Difficulty summarizing
- Inconsistent performance
- Difficulty following directions
- Difficulty keeping track of a lot of information

Signs and Symptoms of Difficulties with Working Memory-Middle School Classroom Behaviors

(Axelrod, et al., 2012)

- Difficulty keeping up with information to complete a task
 - may look like poor attention
 - misses important pieces of information
 - gets confused when too much information is presented at once or too quickly (i.e. information overload)
 - poor note taking from lectures
- Extreme difficulty solving problems mentally (i.e. mental math)
- Difficulty keeping up with and maintaining conversation
- Frequently asking questions
- Difficulty sequencing

Signs and Symptoms of Difficulty with Working Memory-High School Classroom Behaviors

(Axelrod, et al., 2012)

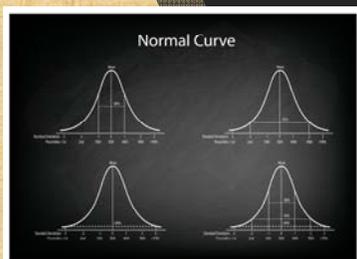
- May appear as poor attention
- Only obtains part of the information and gets confused when too much information is presented in quick manner
- Has significant difficulty solving problems mentally
- Poor reading comprehension
- Has difficulty sequencing information

Signs and Symptoms Difficulty with Working Memory—Adulthood

- Forgetful of, or misses, appointments
- Misses deadlines
- Overdue bills
- Misses components of projects/work tasks
- Requires repeated explanations to be able to complete tasks
- Does not complete basic hygiene routines
- Does not complete home living routines

Assessing Working Memory

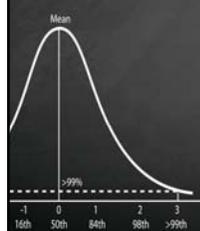
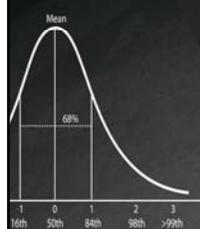
(Dawson & Guare, 2010) (Goldstein & Naglieri, 2014)



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- Behavior Rating Inventory of Executive Function
- Brown ADD Scales
- California Verbal Learning Test
- Children's Category Test
- Children's Memory Scale

Normal



Standard Deviations -3 -2 -1 0 1 2 3
Percentiles <1st 2nd

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Assessing Working Memory

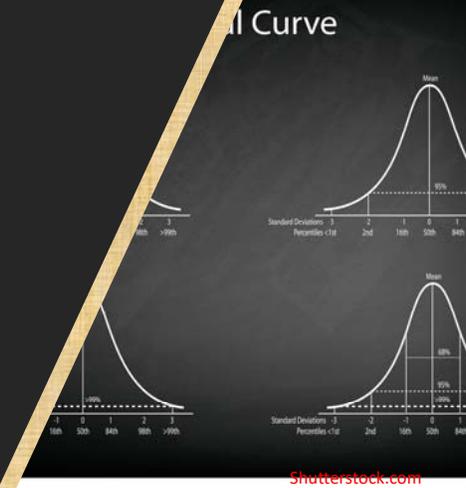
(Dawson & Guare, 2010) (Goldstein & Naglieri, 2014)

- Delis-Kaplan Executive Function System
- NEPSY-II
- Rey-Osterrieth Complex Figure Test
- Ross Information Processing Assessment
- Tasks of Executive Control
- Test of Auditory Processing Skills

Assessing Working Memory

(Dawson & Guare, 2010) (Goldstein & Naglieri, 2014)

- Test of Everyday Attention
- Test of Information Processing Skills
- Wechsler Intelligence Scale for Children—Fifth Edition
- Wide Range Assessment of Memory and Learning—Second Edition
- Woodcock Johnson Tests of Cognitive Ability



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Working Memory Accommodations in K-12 Classrooms

(Gioia & Isquith, 2013)

- Preteach framework of new information. Could meet with Resource Teacher or Aide at the beginning of the day
- Establish eye contact and alert child that something is important
- Break tasks into smaller chunks or steps
- Change tasks frequently, maybe every ten minutes
- Provide short breaks (maybe only one to two minutes)
- Provide attentional breaks with a motor activity, running an errand, getting a drink, or bringing work to the teacher

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Working with Individuals with Significant Cognitive Deficits Who Have Working Memory Difficulties

- See strategies under Impulse Control and Flexibility
- The key is externalizing motivation/reinforcement and memory functions
- Use visuals—Hodgdon Books
- Support for rules/boundaries: Social Stories, Comic Strip Conversations, 5 point scale, Zones of Regulation, etc...
- Need to reduce cognitive load for the individual

Working with Individuals with Mild to No Cognitive Deficits Who Have Working Memory Difficulties

(Dehn, 2014) (Gathercole, Lamont & Alloway, 2006) (Alloway, 2006)

- **General Guidelines--Reduce cognitive load**
 - Learning is based on success
 - Begin with a few elements that can be learned in isolation and then add more
 - Arrange and integrate information so that there is only one source
 - Present math problems vertically rather than horizontally
 - Provide materials that allow the individual to focus on processing without the need to maintain task-relevant information
 - Guide the individual through schema construction and modification
 - Working with individual to acquire automaticity
 - Use external memory aids
 - Break down problems into steps

Working with Individuals with Mild to No Cognitive Deficits Who Have Working Memory Difficulties

(Dehn, 2014) (Dehn, 2008)

- Conduct training during one-on-one brief, focused sessions, held at least a couple times weekly over a period of several weeks.
- Precede memory strategy training by informing the student of her or his memory strengths and weakness so that the student acquires metamemory and begins to recognize the personal need for adopting strategies.
- Teach only one memory strategy at a time, at least until the student is familiar with the idea of strategy use.
- Inform the student about the purpose and rationale for the strategy, including when, where, why, and how to use the strategy. Explain the benefits and how use will result in better memory performance. Without this knowledge, the student will have difficulty selecting the most appropriate strategy for the task at hand.

Working with Individuals with Mild to No Cognitive Deficits Who Have Working Memory Difficulties

(Dehn, 2014) (Dehn, 2008)

- When introducing a strategy, model all steps and components of the strategy while thinking aloud. Use different examples when modeling and demonstrate how your thinking progresses while implementing a strategy.
- Explain, demonstrate, and teach in detail each step in the strategy procedures, with special attention paid to aspects of strategy use that generally are not well understood.
- Provide plenty of relevant practice, first with external guidance, then with the student thinking aloud, and finally while encouraging the student to internalize the strategy, such as having the student whisper the steps while enacting them.
- Provide multiple practice sessions that permit the strategy to be learned, over-learned, and automatized. During practice provide corrective feedback on strategy usage.

Working with Individuals with Mild to No Cognitive Deficits Who Have Working Memory Difficulties

(Dehn, 2014) (Dehn, 2008)

- To facilitate recall of strategy procedures, it is helpful to teach students a cuing system, such as an acronym.
- Give the student positive reinforcement for using the new strategy. Also, provide data on the success of the strategy so that the student understands the personal efficacy of strategy use.
- Encourage the student to monitor and evaluate strategy use and to attribute his or her success to strategy use.
- Encourage generalization by discussing applications of the strategy and practicing the strategy with different materials and under different situations.

Working with Individuals with Mild to No Cognitive Deficits Who Have Working Memory Difficulties

(Dehn, 2014) (Dehn, 2008)

- **Working memory strategies:**
 - Rehearsal—semantic, elaborative, paraphrasing
 - Chunking
 - Metamemory
 - Mnemonics

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Working with Individuals with Mild to No Cognitive Deficits Who Have Working Memory Difficulties

(Dehn, 2014) (Dehn, 2008)

- Working memory strategies:
 - Metacognitive Training
 - Visualization and Imagery
 - Warren, 2014: Mindful Visualization for Education
 - Working Memory Exercises
 - Benigas, Brush, Elliot, 2016: Spaced Retrieval Step by Step
 - Dehn, 2011: Helping Students Remember: Exercises to Strengthen Memory

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Working with Individuals with Mild to No Cognitive Deficits Who Have Working Memory Difficulties

(Dehn, 2014)

- Working memory strategies-- Computerized:
 - N-Back
 - Counting Span
 - Arithmetic Flash Cards
 - Visual-Spatial Recall
 - Remembering Directions
 - Mental Rotation



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Factors Which May De-Motivate

(Jensen, 1998)

- Past associations
- Unsuitable learning styles
- Lack of resources
- Language barriers
- Cultural taboos
- Fear of embarrassment/fear of failure
- Lack of respect
- Lack of feedback

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Factors Which May De-Motivate

(Jensen, 1998)

- Poor nutrition
- Prejudice
- Perceptual factors
 - Poor lighting
 - Bad seating
 - Wrong temperature
- Relationship with the future
 - Presence of clear, well-defined goals
 - Beliefs about the content, and context, of learning



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{Motivational} Approaches (to intervention) are based on the following assumptions:
(Treatment, 1999)

- Motivation is a key to change.
- Motivation is multidimensional.
- Motivation is a dynamic and fluctuating state.
- Motivation is interactive.
- Motivation can be modified.
- The clinician's style influences client motivation.

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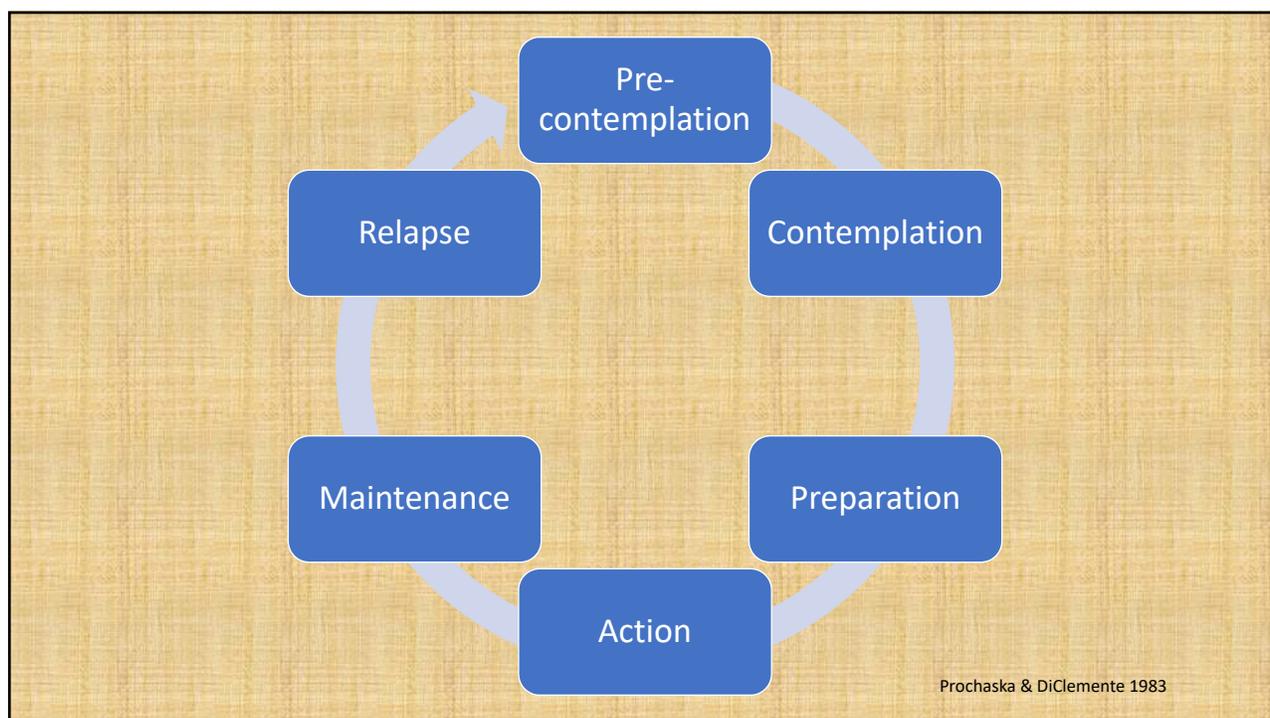
Responding to Resistance

adapted from: (Treatment, 1999)
(Mitchell, 2015) (Naar-King & Suarez, 2011) (Herman, et al., 2014)

- Build rapport, relationship and trust
- Do not take resistance personally, reframe resistance
- Understand where the individual is in the cycle of change
 - Normalize ambivalence

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Responding to Resistance

adapted from: (Treatment, 1999) (Mitchell, 2015) (Naar-King & Suarez, 2011) (Herman, et al., 2014)

- Demonstrate empathy and attunement with the individual
- Avoid becoming the individual's "friend"
- "Roll with" the resistance
- Utilize "priming" to enhance future participation in change/treatment



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Priming

- “**Priming** refers to activating particular representations or associations in memory just before carrying out an action or task.”
(<http://psychology.wikia.com/wiki/Priming>)
- “Priming refers to a increased sensitivity to certain stimuli due to prior experience.”
(http://psychology.about.com/od/pindex/g/def_priming.htm)
- “Priming is the incidental activation of knowledge structures, such as trait concepts and stereotypes, by the current situational context.”
“(Turner, Forrester, Mulhern, & Crisp, 2005)
- Preparing the brain ahead of time for stimuli (experience) that is coming



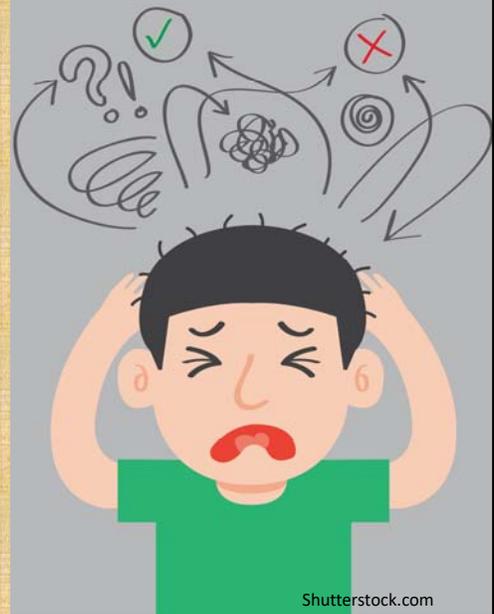
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Priming Benefits

- Optimize arousal
- Decrease anxiety
- Increase attention/concentration
- Activate memory
- Focus perceptual strengths
- Reduce perceptual confusion
- Get individual “ready” for the activity, transition, etc...

Inverse Relationship Between Arousal (Anxiety) and Executive Function Skills

- As arousal increases (beyond an optimal level) our ability to use executive skills to control behavior decreases.
- As we use our executive skills to control behavior, arousal decreases (toward an optimal level)
- Circuitry between amygdala and prefrontal cortex

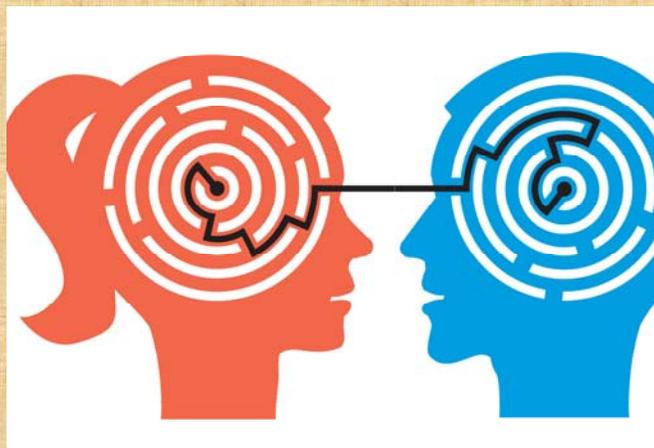


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Responding to Resistance

adapted from: (Treatment, 1999) (Mitchell, 2015) (Naar-King & Suarez, 2011) (Herman, et al., 2014)

- Elicit ideas regarding the individual's perceived self-efficacy and expectations regarding treatment
- Summarize self-motivational statements
- Further development of Helping Relationships: these may take the forms of peer mentoring groups, self-help groups, social support, or a therapeutic relationship



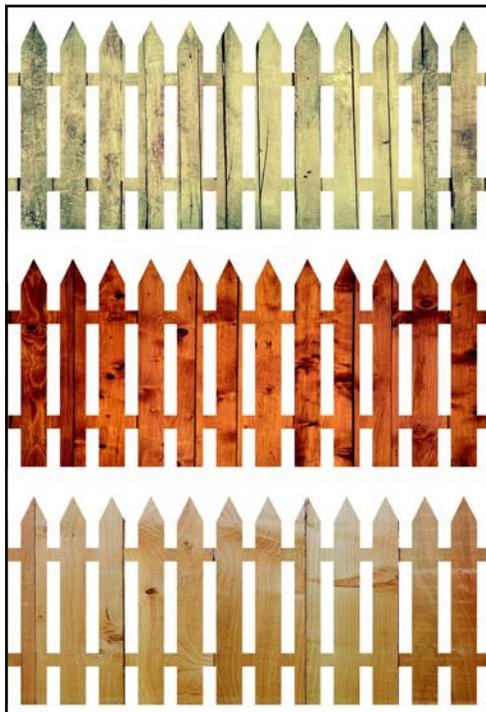
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Responding to Resistance

adapted from: (Treatment, 1999) (Mitchell, 2015) (Naar-King & Suarez, 2011) (Herman, et al., 2014)

- Find ways to “leverage” the individual’s own interests/motivations in therapy
- Clarify the individual’s own goals and strategies for change
- Identify functional impact of changes in executive functions
- Offer a menu of options for change or treatment



Responding to Resistance

adapted from: (Treatment, 1999) (Mitchell, 2015) (Naar-King & Suarez, 2011) (Herman, et al., 2014)

- With permission, offer expertise and advice
- Negotiate a change—or treatment-plan and behavior contract
- Consider and lower barriers to change/treatment
- Acknowledge the difficulties the individual may experience in early stages of change/treatment

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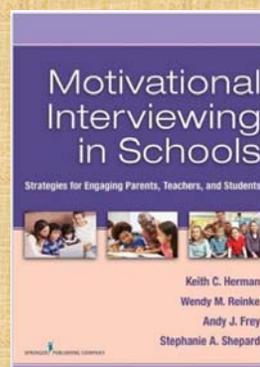
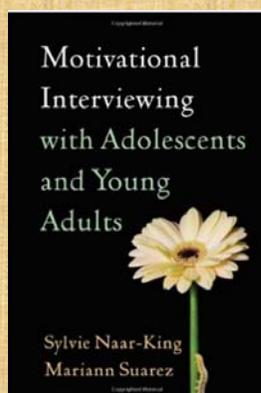
Responding to Resistance

adapted from: (Treatment, 1999) (Mitchell, 2015) (Naar-King & Suarez, 2011) (Herman, et al., 2014)

- Help the individual identify methods to continue gains established in treatment. This may include the use of executive function prostheses, as well as the continued identification of self-administered reinforcements
- Support changes the individual has made in executive functions and their functional impact on academics, life skills, work, etc...
- Help individual to practice coping skills for times when context or emotion may threaten the individual's resilience

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Additional Reading on Motivational Interviewing



Appendix 1: Hierarchy of Social/Pragmatic Skills as Related to the Development of Executive Function

created by Kimberly Peters, Ph.D.

Age	Pragmatic Skills	EF Development/Tasks requiring EF	Treatment Ideas/Strategies
0-3 months	Illocutionary—caregiver attributes intent to child actions - smiles/coos in response - attends to eyes and mouth - has preference for faces - exhibits turn-taking	Development: - behavior is designed to meet immediate needs - cognitive flexibility not emerged	- face to face interaction - vocal-turn-taking with care-providers
3-6 months	- laughs while socializing - maintains eye contact appropriately - takes turns by vocalizing - maintains topic by following gaze - copies facial expressions		- vocal turn-taking with care-providers - facial expressions: tongue protrusion, “oh”, raspberries.
6-9 months	- calls to get attention - demonstrates attachment - shows self/acts coy to Peek-a-boo (first true communicative intent) - reaches/points to request	Development: - Early inhibitory control emerges - tolerates longer delays and still maintains simple, focused attention	- peek-a-boo - place toys slightly out of reach - imitative babbling - imitating actions (waving, covering eyes with hands).

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<p>9-12 months</p>	<ul style="list-style-type: none"> - begins directing others - participates in verbal routines - repeats actions that are laughed at - tries to restart play - uses play routines to give & take, build & bash - vocalizes with gesture to protest, reject, request objects or action, call, express feelings, notice/comment, respond to others, refuse * frequency of communicative acts = 2.5/min of free play 	<p>Development:</p> <ul style="list-style-type: none"> - Early inhibitory control emerges - tolerates longer delays and still maintain simple, focused attention 	<ul style="list-style-type: none"> - singing/finger plays/nursery rhymes - routines (so big! where is baby?), peek-a-boo, patta-cake, this little piggy - stacking blocks/knocking them down - waving goodbye - pushing toys/food away; shaking head for “no” - “up” with arm raise to be picked up - put objects out of reach for child to reach - vocal play/imitative babbling
<p>12-18 months</p>	<ul style="list-style-type: none"> - imitate routines - imitates other children - uses words to protest/reject, greet/call, respond to others, label/notice, request objects/action, express feelings/wants. - controls behavior of self and others - responds to adult conversational attempts but not contingent - closer to 18 months, uses words to: request information, initiate pretend play, comment/tell info, acknowledge/answer. *Frequency of communicative acts: 5/min of free play 	<p>Development:</p> <ul style="list-style-type: none"> - can inhibit certain behaviors and shift to new response sets - some self-monitoring and early ability to identify errors (inconsistent) - impulsive behaviors reflect immature attentional system, distractibility, and undeveloped inhibitory control 	<ul style="list-style-type: none"> - model single words for age-appropriate functions - play routines (playing with a doll, pretending to talk on the phone, pushing trucks) - put toys out of reach but in sight for child to point/request with voice - “ignore” child and wait for child to vocalize to get attention - waving “hi”, modeling “please” and “thank you” (speech or sign). - using “no” to reject - joint attention activities— commenting on what the child is looking at. Modeling pointing/commenting - asking “wh” questions (“where are your shoes?” “what’s that?” “where’s daddy/sister/brother/mommy?”)

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<p>18-24 months</p>	<ul style="list-style-type: none"> - Uses longer utterance (2-3 words) to express intentions: protest/reject, greet/call, respond to others, label/notice, request object/action, express feelings, request information, initiate pretend play, comment/tell info, acknowledge/answer - practices familiar conversational frames and schema (book reading routine, go to restaurant schema). * Frequency of communicative acts: 7.5/min 	<p>Development:</p> <ul style="list-style-type: none"> - can inhibit certain behaviors and shift to new response sets - some self-monitoring and early ability to identify errors (inconsistent) - impulsive behaviors reflect immature attentional system, distractibility, and undeveloped inhibitory control - Begins to identify correct vs. incorrect block constructions (compared to designs) but unable to “fix” incorrect version. 	<ul style="list-style-type: none"> - two- and three-term semantic relations - words for emotions - shared reading activities - “what’s that?” - put toys out of reach, in front of others, for child to label. - verbal turn-taking
<p>24-30 months</p>	<ul style="list-style-type: none"> - “please” used for polite requests - New intents include: symbolic play, talk about absent objects, misrepresenting reality (lies, teases) - Narratives are “heap stories”, primarily labels and descriptions - Uses speech to announce intentions - takes two turns in conversation - verbally introduces and changes topics - uses words to express emotion - begins to give descriptions to aid listener - clarifies by repeating - requests clarification 	<ul style="list-style-type: none"> - 2 ½ year olds demonstrate knowledge of rules but unable to shift or alter behaviors, demonstrating perseverance 	<ul style="list-style-type: none"> - target emotion words - use of imaginative language (think, feel, wonder) - teasing (“that’s silly”) - requests for clarification - feign lack of understanding: strategies for repairing communication breakdown (ex: providing more information). - “experience books” for talking about past experiences. - “drama” activities (dropping things, breaking things, getting hurt, making a mess) - early pronouns
<p>30-36 months</p>	<ul style="list-style-type: none"> - converses in sentences - attempts to control situations verbally 	<p>Development:</p> <ul style="list-style-type: none"> - most choices are made by chance are 	<p>same as 24-30 months</p>

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	<ul style="list-style-type: none"> - uses polite “nice” intonation patterns - responds to requests to clarify - apologizes by saying “I’m sorry” - topic continuation near 50% - topics are continued by adding new information - use of language in play increases - narratives are “sequences,” with theme, but no plot. - ToM: understands that others can want different things (passes a “diverse desires” task at about 3 ½ years of age). 	<p>disadvantageous</p> <ul style="list-style-type: none"> - Unable to delay gratification 	
<p>36-42 months</p>	<ul style="list-style-type: none"> - takes 4 to 5 conversational turns - uses fillers to acknowledge - begins to shift register with younger children - requests permission - uses language for teasing/jokes/fantasies - consistently uses descriptions to clarify - corrects others - uses pronouns to mark old information - requests using “yes/no” questions - more flexibility in requesting, including: permission directives (“can you...?”), and indirect requests (“would you...?”). - Direct requests decrease and indirect 	<p>Development:</p> <ul style="list-style-type: none"> - increased attention, self-control, concentration, and inhibition, but not mature. - gradual decline in impulsivity, although still present - occasional perseverative behavior - incremental improvements in verbal fluency - gradual improvements in processing speed and accuracy on impulse control tasks - 3-year-olds demonstrate knowledge of rules and emerging ability to shift behaviors, but only for one rule necessary for task success. 	<ul style="list-style-type: none"> - “What’s missing” game - elaborated conversations (“tell me about what happened at school today”—may need to model this type of conversation). - modeling “baby talk” with younger kids - requests for information and clarification (deliberately obscure input to child/”practice” requests for info/clarification). - retelling simple stories - pronouns

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	<p>requests increase.</p> <ul style="list-style-type: none"> - Primitive narratives: theme and some temporal organization. 		
42-48 months	<ul style="list-style-type: none"> - has long, detailed conversations - tells two events in correct order - tells story mixing real and unreal - uses pronouns across sentences to mark object - New functions emerge: <p>reporting on past events, reasoning, predicting, expressing empathy, creating imaginary roles and props, maintaining interactions.</p> <p>ToM: understands that others can have different beliefs (passes a “diverse belief” task by 4 years of age).</p>	<p>Skills:</p> <ul style="list-style-type: none"> - Runs simple errands (“get your shoes from the bedroom”) - Tidies bedroom with some assistance - Performs simple chores and self-help tasks with reminders - inhibits behaviors (don’t touch a hot stove, don’t run in the street, don’t hit, bite, etc.) 	<ul style="list-style-type: none"> - following one- and two-step directions - retelling simple stories in correct order - sequencing three to four pictures and then describing the events - determining which “step” is missing in a three- to four-step event (“What comes next?” “What do you do before you cut the sandwich?”) - reporting to parent what happened in therapy/school/activity (child needs support for this—experience book). - predicting what comes next in a story - practicing empathy for a toy/doll that falls and gets hurt. - self-talk
4-5 years	<ul style="list-style-type: none"> - uses hints that do not mention the intention in the request - ability to address specific requests for clarification increase - narratives are “chains” with some plot, but no high point or resolution - correctly changes reference with this/that, here/there, go/come - ends conversations abruptly - changes topics appropriately 	<p>Development:</p> <ul style="list-style-type: none"> - 4-year-olds able to process 2- to 3- step units of information - 5-year-old able to process 4-step units of information - 4-year-olds begin to demonstrate ability to shift and flex between two simple task requirements, but continue to have difficulty when response sets increase in complexity 	<ul style="list-style-type: none"> - understanding sentences with 2-, 3- and 4-critical elements - simple games (go fish, bingo, lotto) - understanding simple riddles (“This is an animal that lives on a farm”). This is the beginning of inferential reasoning. - retelling stories - taking the perspective of others during story retelling

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	<ul style="list-style-type: none"> - uses apposition to cue the listener (Mary, my friend’s sister...) - uses this/that/these/those from the listener’s perspective <ul style="list-style-type: none"> - initiates easily - politely interrupts adult conversation ToM: child understands that s/he can know something that someone else doesn’t know (passes a “knowledge access” task by 4 ½ years of age). ToM: child understands that others can act erroneously based on a false belief (passes a “false belief” task by 5 years of age). 	<ul style="list-style-type: none"> - 4-year-olds begin to have more successful task completion due to increase in mental flexibility and rapid switching between two simple response sets. - 4-year-olds begin to make more advantageous choices - 4-year-olds capable of generating new concepts and ideas <p>Skills: same as above</p>	
<p>5-6 years</p>	<ul style="list-style-type: none"> - uses focused chains for narratives <ul style="list-style-type: none"> - gives threats/insults - issues promises - may give praise - stays on topic for 10 turns - uses pronoun reference as a cohesive device <ul style="list-style-type: none"> - self-monitors speech for errors - negotiates play roles, turns, and ending of play ToM: child understands that a person can feel one thing but those feelings can be hidden or not apparent on the face (passes a “hidden emotion” task between about 5 and 5 ½ years of age). 	<p>Development:</p> <ul style="list-style-type: none"> - by age six: ability to resist distractions and maintain attention begins to increase. - begin to use silent, verbal mediation as language becomes more complex - 6-year-olds able to process up to 5- step “moves” in simple problem- solving - 5-year-olds demonstrate difficulty switching between multiple rules, even when verbal cues are given. - spurt of development in mental flexibility around 6 years <ul style="list-style-type: none"> - decline in perseverative behavior - emerging capacity to learn from mistakes and create alternative 	<ul style="list-style-type: none"> - barrier games (following directions, providing specific directions) <ul style="list-style-type: none"> - 20 questions (who am I?) - “Headbandz” game - written language (draw a picture, write the story that goes with it). - similarities and differences (“how are a bike and tricycle the same? How are they different?”) - higher level inferential tasks (“he came downstairs early in the morning and saw the tree.” What is happening?). - address multiple meaning words as they come up. - inferring meaning from context (“I’m going to put this word in a sentence

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		<p>strategies for simple problems</p> <ul style="list-style-type: none"> - 4- to 5-year-olds begin to delay initial choices for behavior, selecting goals that lead to “better” rewards later on. - simple strategic planning skills emerge <ul style="list-style-type: none"> - make better choices <p>Skills:</p> <ul style="list-style-type: none"> - follows two- to three-step directions - tidies bedroom or playroom - Performs simple chores, self-help tasks; may need reminders <ul style="list-style-type: none"> - Brings papers to and from school - Completes a 20 minute homework assignment - decides how to spend money (allowance) - Inhibits behaviors (follows safety rules, doesn’t swear, raises hand before speaking in class, keeps hands to self). 	<p>and you try to figure out what it means?).</p> <ul style="list-style-type: none"> - infer feelings of characters in a story. - negotiating roles in games: “Who do you want to be?” “Who will you be?” - Blanks Level IV questions: “how do you know?” “What could you have done differently?” “What should he have done instead to avoid that problem?” - giving clues that include function (“This is used for...”)
<p>6-8 years</p>	<ul style="list-style-type: none"> - can give multiple step directions - uses well-formed narrative - uses multiple sentence descriptive language (creates riddles, describes characters) - makes and responds appropriately to evaluative comments/correction <ul style="list-style-type: none"> - check’s listener’s comprehension - produces full explanations - responds appropriately to compliments 	<p>Development:</p> <ul style="list-style-type: none"> - Selective attention begins to develop and mature - 7-year-olds struggle with switching behavior sets that are contingent on multiple demands - 8-year-olds demonstrate increase in focus, sustained and shifting attention - demonstrate more frequent strategic and planned goal choices and behaviors, but not yet mastered 	<ul style="list-style-type: none"> - expressive narrative skills/story grammar - describing character motives and feelings - formulating complex sentences given clauses without using coordinating conjunctions (and, but, so, then). - descriptive language: describing pictures in detail so that the listener can select the correct picture - role playing challenging social

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	<p>- apologizes and responds to apologies appropriately.</p>	<p>Skills: Same as above</p>	<p>situations (“let’s act out what you can do if someone is asking you to do something you don’t want to do.”) - word attack skills: “How can you turn this adjective into an adverb?” “What part of speech is that?”</p>
<p>8-9 years</p>	<ul style="list-style-type: none"> - Language is used to establish and maintain social status - increased perspective-taking allows for more successful persuasion - provides conversational repairs by defining terms or giving background information - begins to understand jokes and riddles based on sound similarities - can perform successfully on simple referential communication tasks. 	<p>Development:</p> <ul style="list-style-type: none"> - 9-year-olds begin to have more success switching rules/sets between multiple or changing demands. - Rapid surge in development of planning and organizational skills that reflect consideration of task parameters more so than personal or impulsive desires. - strategic behavior and efficient reasoning become more obvious. <p>Skills:</p> <ul style="list-style-type: none"> - Runs errands that may involve a time delay or a greater distance—going to the store, remembering to do something after school (“prospective memory”) - Tidies bedroom or playroom (may include vacuuming or dusting) - Performs chores that take 15 to 20 minutes - Brings books, papers, assignments home and takes them back to school. - Keeps track of belongings when away from home 	<ul style="list-style-type: none"> - practice taking the perspective of others - multiple meaning words, jokes, riddles. - Mad-libs - Games such as: Scattergories (working memory), Taboo (inhibitory control), Stare (visual memory). - high-level categories (ex: things that can be rolled). - inferential reasoning skills (higher level). - visualizing activities (“What will it look like when you’re done?”)

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		<ul style="list-style-type: none"> - completes homework assignments (1- hour maximum) - plans simple school projects such as book reports (selects the book, reads the book, writes a report) - Keeps track of a daily changing schedule <ul style="list-style-type: none"> - Saves money for desired objects - inhibits/self-regulates (behaves when the teacher is out of the classroom; refrains from rude comments, temper tantrums, bad manners) 	
<p>9-12 years</p>	<ul style="list-style-type: none"> - Stories include complex, embedded, and interactive episodes - understands jokes and riddles based on lexical ambiguity 	<p>Development:</p> <ul style="list-style-type: none"> - Significant improvement in ability to inhibit impulsive actions. - Selective attention nears maturity; better ability to selectively attend to relevant and necessary information in the environment. - Able to monitor and regulate actions well. - Relatively mature attentional functions - Able to limit perseverative errors at adult level - Temporary increase in impulsivity for short periods <ul style="list-style-type: none"> - Verbal fluency near maturity - significant gains in processing speed - ability to switch between multiple tasks demands continues to improve 	<ul style="list-style-type: none"> - multiple meaning words - idiomatic expressions/figurative language <ul style="list-style-type: none"> - riddles - written narratives: Story Grammar Marker (as an example). - assign personality traits to characters in books based on actions (address high-level vocabulary) - identify character beliefs based on actions (address high-level vocabulary) <ul style="list-style-type: none"> - identify motives for actions in books - games like Balderdash, Apples to Apples.

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		<ul style="list-style-type: none"> - decline in perseverative, non-task oriented behaviors - increasing capacity to learn from mistakes and devise alternative strategies for more complicated and multi-dimensional problems. - Rapid surge in development of planning and organizational skills that reflect consideration of task parameters more so than personal or impulsive desires. - strategic behavior and efficient reasoning become more obvious. <p>Skills: Same as above</p>	
<p>12-14 years</p>	<ul style="list-style-type: none"> - Expository texts used in school-sponsored writing - Most academic information is presented in expository format - Understands jokes and riddles based on deep structure ambiguity 	<p>Development:</p> <ul style="list-style-type: none"> - Relative maturity of cognitive flexibility - Perseverative behaviors are rare - Improved flexibility to switch between changing performance demands and initiate deliberate behaviors - Developmental spurt for goal-setting skills, around age 12 - increased ability to use strategies for problem-solving - complex planning skills near maturity - 12-year-old may demonstrate adult- levels of planning abilities and 	<ul style="list-style-type: none"> - practice empathetic response to peers - self-evaluation of social interactions - strategies for identifying figurative language in literature (identify unfamiliar language; keep a written record; practice practice practice). - organizational strategies (Cornell notes, planners, color-coding homework, timelines, working backwards from deadline in step) - assistive technology (iPads, iPod Touch). - break assignments into chunks with time frames for completions - “to do” lists with timelines

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		<p>performance of planned behavior</p> <p>Skills:</p> <ul style="list-style-type: none"> - Helps out with chores around the home, including daily responsibilities and occasional tasks (emptying dishwasher, raking leaves, shoveling snow). Tasks may take 60-90 minutes. - Babysits younger siblings or other kids for pay - uses system for organizing school work, including assignment books, notebooks, etc. - Follows complex school schedule involving changing teachers and changing schedules - plans and carries out long-term projects, including tasks to be accomplished and reasonable timeline to follow; may require planning multiple large projects simultaneously - plans time, including after-school activities, homework, family responsibilities; estimates how long it takes to complete individual tasks and adjusts schedule to fit. - inhibits rule-breaking in the absence of visible authority. 	<ul style="list-style-type: none"> - use large, color-coded, erasable calendars for long-term assignments and projects - use a “date stamp”: due on and received on - vocabulary apps! - keep a vocabulary notebook - identify the main idea (color code); identify supporting details (color code) or supporting evidence (color code). - identifying relevant vs. irrelevant information in writing (own/others’).
<p>15-18 years</p>	<ul style="list-style-type: none"> - Language is used to maintain social bonds (“just talking”) - Persuasive and argumentative skills reach near-adult levels. 	<p>Development:</p> <ul style="list-style-type: none"> - Perseverative errors are rare - Working memory increases significantly. 	<p>Paper writing: “outline to paper” method (outline headings: five main points of the paper; slowly add supporting details/evidence until paper)</p>

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		<ul style="list-style-type: none"> - increased verbal fluency and sequencing - more complex planning and organizational skills - strategy development and its use in complex, multidimensional goal- oriented behavior continues to improve - overall skills in decision-making, goal selection, and capacity to orchestrate efforts necessary to attain goals continue to improve <p>Skills:</p> <ul style="list-style-type: none"> - manages school work effectively on a day-to-day basis, including completing and handing in assignments on time, studying for tests, creating and following timelines for long-term projects, and making adjustments in effort and quality of work in response to feedback. - establishes and refines a long-term goal and make plans for meeting that goal. - makes good use of leisure time, including obtaining employment or pursuing recreational activities during the summer - inhibits reckless and dangerous behaviors. 	<p>is complete).</p>
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* **Focus on cognitive language, memory, prediction, and reasoning during all interactions.** Examples: “What do you think?” “Do you remember what happened?” “Can you tell mom that story?” “We have a problem. What is a good solution for this?” “What are some alternative solutions?” “What is the main point of the lecture?” (color code) “What are the details that support the main point?” (color code). “What are the most important things to remember?” (color code).

References:

Dawson, P., and Guare, R. (2009). Smart But Scattered. New York: Guildford Press

Dawson, P. and Guare, R. (2010). Executive Skills in Children and Adolescents: A Practical Guide to Assessment and Intervention, 2nd Edition. New York: Guildford Press.

Paul, R. (2007). Language Disorders from Infancy through Adolescence: Assessment and Intervention. 3rd Ed. St. Louis: Mosby. Wellman, H.M., Fang,

F., and Peterson, C.C. (2011). Sequential progression in a theory of mind scale: Longitudinal perspectives. *Child Development, 82(3), 780-792.*

Wilkes, E. (2001). Cottage Acquisition Scales for Listening, Language, and Speech.

Appendix 2: Assessments

Adaptive Behavior Assessment System (ABAS): The ABAS-3 covers three broad adaptive domains: **Conceptual, Social, and Practical**. Within these domains, it assesses 11 adaptive skill areas (each form assesses 9 or 10 skill areas based on age range). Items focus on practical, everyday activities required to function, meet environmental demands, care for oneself, and interact with others effectively and independently. On a four-point response scale, raters indicate whether the individual can perform each activity, and if so, how frequently they perform it when needed. (from: <https://www.wpspublish.com/store/p/3234/adaptive-behavior-assessment-system-third-edition-abas-3>)

A-not-B Task: This is a cognitive flexibility test typically administered to children. During this test, children are visually presented with an object that is hidden at “Location A.” The children are then allowed to look for the object at the hidden “Location A” – which is generally within arm’s reach. The hiding of the object at Location A is repeated a few times until the child becomes focused on how to find it. Next, the same object is hidden in a new area called “Location B” – a distinct location separate from Location A (also within arm’s reach). Individuals under 1 years of age will typically look again in Location A. Children over 1 years of age are able to display “cognitive flexibility” and learn to find the object at the novel Location B. This is a cognitive flexibility task reserved for infants and would be far too simplistic for older children, teens, and adults. (GLOOM, 2017)

Barkley Deficits in Executive Functioning Scale: The Barkley Deficits in Executive Functioning Scale (BDEFS for Adults) is an empirically based tool for evaluating dimensions of adult executive functioning in daily life. The BDEFS offers an ecologically valid snapshot of the capacities involved in time management, organization and problem-solving, self-restraint, self-motivation, and self-regulation of emotions. Scores are presented in raw scores and percentiles.

Beery-Buktenica Developmental Test of Visual Motor Integration: measures visual motor integration in children adults. Backed by decades of research and clinical use, the Berry VMI offers a convenient and economical way to screen for visual-motor deficits that can lead to learning, behavior, and neuropsychological problems. <http://www.therapro.com/Browse-Category/Visual-Perception-and-Visual-Skills/6th-Ed-Starter-Kit.html>

Behavior Assessment System for Children: The Behavior Assessment System For Children consists of rating scales and forms, such as the Parent Rating Scales (PRS), the Teacher Rating Scales (TRS), the Self-Report of Personality (SRP), Student Observation System (SOS), and the Structured Developmental History (SDH). The TRS, PRS, and SOS measure the child’s behavior patterns. The SRP can be used to assess the child’s emotions and feelings. The SDH is useful for obtaining the child’s background information. <http://txautism.net/evaluations/behavior-assessment-system-for-children-second-edition-basc-2>

Behavior Rating Inventory of Executive Function: Assess executive function behaviors in the school and home environments with the BRIEF, a questionnaire developed for parents and teachers of school-age children. Designed to assess the abilities of a broad range of children and adolescents, the BRIEF is useful when working with children who have learning disabilities and attention disorders, traumatic brain injuries, lead exposure, pervasive developmental disorders, depression, and other developmental, neurological, psychiatric, and medical conditions. Eight clinical scales (Inhibit, Shift, Emotional Control, Initiate, Working Memory, Plan/Organize, Organization of Materials, Monitor) and two validity scales (Inconsistency and Negativity) give the clinician a well-rounded picture of the behavior of the child or adolescent being rated. <http://www4.parinc.com/Products/Product.aspx?ProductID=BRIEF>

Behavioral Assessment of the Dysexecutive Syndrome: The assessment battery includes a 20 item Dysexecutive Questionnaire (DEX) that samples the range of problems in four broad areas of likely change: emotional or personality changes, motivational, behaviour or cognitive. Disorders of planning, organization, problem solving, setting priorities, and attention and can measure improvements over time. Can predict everyday problems associated with dysexecutive syndrome following traumatic brain injury. <http://www.emrehab.com/assessment-bads.htm>

Brown ADD Scales: The *Brown ADD Scales* help to assess a wide range of symptoms of executive function impairments associated with ADHD/ADD. These normed rating scales are available to elicit parent report and teacher report for children ages 3 to 7 yrs and 8 to 12 yrs. For 8 to 12 year olds, a normed self-report version is also available. For adolescents (12-18 yrs) and for adults, normed rating scales elicit self-report and collateral report on a single form. <http://www.drthomasebrown.com/assessment-tools/>

California Verbal Learning Test: The California Verbal Learning Test (CVLT) is a neuropsychological test which can be used to assess an individual's verbal memory abilities. The tester reads aloud a list, called "Monday's shopping list". The list contains sixteen common words, each of which belongs to one of four categories: thus, there are four fruits, four herbs and spices, etc. The subject is then asked to recall as many of these items as possible. <http://www.memorylossonline.com/glossary/californiaverballearningtest.html>

Cambridge Neuropsychological Tests Automated Battery: CANTAB technology contains a suite of the world's most validated and sensitive touchscreen neuropsychological tests of cognition, specifically designed to assess central nervous system disorders and cognitive function across a range of domains, including: memory, executive function, attention, decision making, and social cognition. <http://www.cambridgecognition.com/technology#sthash.Um7rJGvF.dpuf>

Children's Category Test: The Children's Category Test (CCT) is an abbreviated version of the original Halstead Category Test (HCT; Reitan & Wolfson, 1992). The CCT is an individually administered instrument designed to measure nonverbal learning and memory, concept formation, and problem-solving abilities. <http://www.pearsonclinical.com/psychology/products/100000169/childrens-category-test-cct.html>

Children's Depression Inventory 2: The CDI 2 is a revision of the Children's Depression Inventory (CDI™). The CDI 2 can be used in both educational and clinical settings to evaluate depressive symptoms in children and adolescents. <http://www.mhs.com/product.aspx?gr=edu&id=overview&prod=cdi2>

Children's Memory Scale: The CMS helps fill the need for a comprehensive learning and memory test for children, measuring learning in a variety of memory dimensions including attention and working memory, verbal and visual memory, short- and long-delay memory, recall and recognition, and learning characteristics. <http://www.helloq.com/overview/the-q-interactive-library/CMS.html>

Clinical Evaluation of Language Fundamentals-5: The Clinical Evaluation of Language Fundamentals (CELF-5) was designed to assess a student's language and communication skills in a variety of contexts, determine the presence of a language disorder, describe the nature of the language disorder and plan for intervention or treatment. The CELF-5 is a comprehensive and flexible assessment procedure. The test identifies a student's language strengths and weaknesses and can be used to determine eligibility for services, plan "curriculum relevant treatment," recommend classroom language adaptations or accommodations and provide performance-based assessment that corresponds to educational objectives. <http://www.leadersproject.org/2014/02/17/test-review-celf-5/>

Clock-Drawing: The clock-drawing test is used for screening for cognitive impairment and dementia and as a measure of spatial dysfunction and neglect. It was originally used to assess visuo-constructive abilities but we know that abnormal clock drawing occurs in other cognitive impairments. Doing the test requires verbal understanding, memory and spatially coded knowledge in addition to constructive skills. (Agrell & Dehlin, 1998)

Cognitive Assessment System-2nd Edition: Cognitive processing measure of ability that is fair to minority children, effective for differential diagnosis, and related to intervention. It measures: Planning, Attention, Simultaneous, and Successive Processes. <http://www.hmhco.com/hmh-assessments/other-clinical-assessments/cas2>

Color Trails Test: Developed to be free from the influence of language and cultural bias, the CTT assesses sustained attention in adults. Numbered circles are printed with vivid pink or yellow backgrounds that are perceptible to color-blind individuals. For Part 1, the respondent uses a pencil to rapidly connect circles numbered 1-25 in sequence. For Part 2, the respondent rapidly connects numbered circles in sequence, but alternates between pink and yellow. The length of time to complete each trial is recorded, along with qualitative features of performance indicative of brain dysfunction, such as near-misses, prompts, number sequence errors, and color sequence errors. Retains the sensitivity and specificity of the original Trail Making Test but substitutes color for letters, making it more suitable in cross-cultural and special needs contexts. <http://www4.parinc.com/Products/Product.aspx?ProductID=CTT>

Comprehensive Test of Phonological Processing: assesses reading-related phonological processing skills. Composite scores are obtained in the areas of: Phonological Awareness, Phonological Memory, Rapid Symbolic Naming, Rapid Non-Symbolic Naming, and Alternate Phonological Awareness. <http://www.proedinc.com/customer/ProductView.aspx?ID=5187>

Conner's 3rd edition: Conner's 3 offers a thorough assessment of ADHD. The Conner's 3 now addresses comorbid disorders such as Oppositional Defiant Disorder and Conduct Disorder. Each parent, teacher, and self-report form is available in full-length and short versions. <http://www.mhs.com/product.aspx?gr=edu&id=overview&prod=conners3>

Conner's Comprehensive Behavior Rating Scale: Conner's Comprehensive Behavior Rating Scales (Conner's CBRS™) is designed to provide a complete overview of child and adolescent concerns and disorders. Those working in the field of child and youth psychology can use the

Conner's CBRS to assess a wide spectrum of behaviors, emotions, academic, and social problems in today's youth. <http://www.mhs.com/product.aspx?gr=edu&id=overview&prod=cbrs>

Conner's CPT-3rd Edition: The **Conner's Continuous Performance Test 3rd Edition™ (Conner's CPT 3™)** is a task-oriented computerized assessment of attention-related problems in individuals aged 8 years and older. By indexing the respondent's performance in areas of inattentiveness, impulsivity, sustained attention, and vigilance, the Conner's CPT 3 can be useful to the process of diagnosing Attention-Deficit/Hyperactive Disorder (ADHD) and other neurological conditions related to attention. <http://www.mhs.com/product.aspx?gr=edu&prod=cpt3&id=overview>

Conner's K-CPT: The Conner's Kiddie Continuous Performance Test 2nd Edition™ (Conner's K-CPT 2™) assesses attention deficits in children ages 4 to 7 years old. Based on the well-established Conner's CPT paradigm, the Conner's K-CPT 2™ takes half the time to complete, making it more appropriate for younger children. The 7.5 minute performance-based assessment uses pictures of objects (e.g. boat, soccer ball, train) that are familiar to young children. The child is asked to respond to targets (all objects except soccer ball) and refrain from responding to non-targets (soccer ball) that appear on the computer screen. <http://www.mhs.com/product.aspx?gr=edu&prod=kcpt2&id=overview>

Continuous Performance Tests: A **continuous performance task, continuous performance test, or CPT**, is any of several kinds of neuropsychological test that measures a person's sustained and selective attention. Clients are presented with a repetitive, boring task and must maintain their focus over a period of time in order to respond to targets or inhibit response to foils. Tests may use numbers, symbols, or even sounds, but the basic task has the same concept. https://en.wikipedia.org/wiki/Continuous_performance_task

Delis-Kaplan Executive Function System: The **Delis-Kaplan Executive Function System (D-KEFS)** is the first nationally standardized set of tests to evaluate higher level cognitive functions in both children and adults. With nine stand-alone tests, comprehensively assess the key components of executive functions believed to be mediated primarily by the frontal lobe. Tests are in the areas of: Trail Making, Verbal Fluency, Design Fluency, Color-Word Interference, Sorting, Twenty Questions, Word Context, Tower, and Proverb.

- The *Trail Making Test* measures flexibility of thinking on a visual-motor sequencing task
- The *Verbal Fluency Test* measures letter fluency, category fluency, and category switching
- The *Design Fluency Test* measures one's initiation of problem-solving behavior, fluency in generating visual patterns, creativity in drawing new designs, simultaneous processing in drawing the designs while observing the rules and restrictions of the task, and inhibiting previously drawn responses
- The *Color-Word Interference Test* measures ability to inhibit a dominant and automatic verbal response
- The *Sorting Test* measures concept-formation skills, modality-specific problem-solving skills (verbal/nonverbal), and the ability to explain sorting concepts abstractly
- The *Twenty Questions Test* measures the ability to categorize, formulate abstract, yes/no questions, and incorporate the examiner's feedback to formulate more efficient yes/no questions
- The *Word Context Test* measures verbal modality, deductive reasoning, integration of multiple bits of information, hypothesis testing, and flexibility of thinking

- The *Tower Test* measures spatial planning, rule learning, inhibition of impulsive and perseverative responding, and the ability to establish and maintain instructional set
- The *Proverb Test* measures one's ability to form novel, verbal abstractions

https://en.wikipedia.org/wiki/Delis%E2%80%93Kaplan_Executive_Function_System and
<http://www.pearsonclinical.com/psychology/products/100000618/deliskaplan-executive-function-system-d-kefs.html>

Design Fluency: Design Fluency (DF) is typically assumed to assess planning, cognitive flexibility, and fluency in generation of visual patterns, above and beyond contributions from motor speed. (Suchy, Kraybill, & Gidley Larson, 2010)

Dichotic Listening: The Dichotic listening test is a psychological test commonly used to investigate selective attention within the auditory system and is a subtopic of cognitive psychology and neuroscience. Specifically, it is "used as a behavioral test for hemispheric lateralization of speech sound perception." During a standard dichotic listening test, a participant is presented with two different auditory stimuli simultaneously (usually speech). The different stimuli are directed into different ears over headphones. https://en.wikipedia.org/wiki/Dichotic_listening_test

Digit Symbol Substitution Test: Digit Symbol Substitution asks you to match symbols with their corresponding digit. It consists of 9 digit symbols matched with their corresponding numerical digit. At first this seems simple, but the time limit on the test makes it quite challenging. You have a very small amount of time to enter the correct symbol for each digit. The most obvious application of digit symbol substitution is to memory. The test requires you to remember where each symbol matches a digit. There is also a speed of processing component, since you have a very small amount of time to enter the correct symbol. In the clinical setting, this test is used to test brain injury, especially for athletes suffering concussions. <https://www.brainbaseline.com/assessments/symbol-substitution>

Dimensional Change Card Sorting Tasks: The dimensional change card sort (DCCS) is an easily administered and widely used measure of executive function that is suitable for use with participants across a wide range of ages. In the standard version, children are required to sort a series of bivalent test cards, first according to one dimension (e.g., color), and then according to the other (e.g., shape). Most 3-year-olds perseverate during the post-switch phase, exhibiting a pattern of inflexibility similar to that seen in patients with prefrontal cortical damage. By 5 years of age, most children switch when instructed to do so. Performance on the DCCS provides an index of the development of executive function, and it is impaired in children with disorders such as attention-deficit/hyperactivity disorder (ADHD) and autism. (Zelazo P. D., 2006)

Go/No-go Task: A task in which stimuli are presented in a continuous stream and participants perform a binary decision on each stimulus. One of the outcomes requires participants to make a motor response (go), whereas the other requires participants to withhold a response (no-go). Accuracy and reaction time are measured for each event. Go events typically occur with higher frequency than no-go events. http://www.cognitiveatlas.org/task/go/no-go_task

Matching Familiar Figures Test: An instrument designed to measure reflection-impulsivity by requiring the respondent to select repeatedly from several alternative figures the one that matches a standard. The number of errors and the time required to complete the test are recorded, and people with below-median errors and above-median response times are classified as *reflective*; people with above-median errors and below-

median response times *impulsive*; people with below-median errors and below-median response times *quick*; and people with above-median errors and above-median response times *slow*. <http://oxfordindex.oup.com/view/10.1093/oi/authority.20110810105346925>

Metacognitive Awareness Inventory: The Metacognitive Awareness Inventory (MAI) consists of 52-items which measure an individual's knowledge of cognition and regulation of cognition (Schraw & Dennison, 1994). Within these two constructs, the MAI also examines individuals' monitoring, evaluation of learning, debugging strategies, conditional knowledge, planning, declarative knowledge, information management strategies, and procedural knowledge (Schraw & Dennison, 1994).

n-back task: The *n-back* task is a continuous performance task that is commonly used as an assessment in cognitive neuroscience to measure a part of working memory and working memory capacity. The subject is presented with a sequence of stimuli, and the task consists of indicating when the current stimulus matches the one from *n* steps earlier in the sequence. The load factor *n* can be adjusted to make the task more or less difficult. <https://en.wikipedia.org/wiki/N-back>

NEPSY-II: NEPSY-II is a comprehensive instrument designed to assess neuropsychological development and provide insights regarding academic, social, and behavioral difficulties in preschool and school-age children. It enables clinicians to assess across six functional domains, including Attention and Executive Functioning, Language, Memory and Learning, Sensorimotor, Social Perception, and Visuospatial Processing. <http://www.helloq.com/tests/test-library/nepsy-ii.html>

Porteus Maze Test: designed to measure psychological planning capacity and foresight in children, adolescents, and adults. Maze test consists of a set of paper forms in which the subject is required to trace a path through a drawn maze of varying complexity with a limit of 15–60 minutes to perform this test. The subject must avoid blind alleys and dead ends; no back-tracking is allowed. https://en.wikipedia.org/wiki/Porteus_Maze_Test

Posner Task: also known as the Posner paradigm, is a neuropsychological test often used to assess attention. The task assesses an individual's ability to perform an attentional shift. It has been used and modified to assess disorders, focal brain injury, and the effects of both on spatial attention. https://en.wikipedia.org/wiki/Posner_cueing_task

Rapid Automatic Naming and Rapid Alternating Stimulus: The tests consist of rapid automatized naming tests (i.e., letters, numbers, objects, colors) and two rapid alternating stimulus tests (i.e., two-set letters and numbers; three-set letters, numbers, and colors). The examinee is asked to accurately name each stimulus item as quickly as possible. The tests consist of rapid automatized naming tests (i.e., letters, numbers, objects, colors) and two rapid alternating stimulus tests (i.e., two-set letters and numbers; three-set letters, numbers, and colors). The examinee is asked to accurately name each stimulus item as quickly as possible. The RAN/RAS tests assess children's and adolescents' ability to perceive a visual symbol and name it accurately and rapidly, effectively aiding in the identification of children who have reading disabilities. <http://www4.parinc.com/Products/Product.aspx?ProductID=RAN/RAS>

Raven's Progressive Matrices: The Progressive Matrices usefully provide an assessment of non-verbal ability, an important feature for our ethnically diverse population. A measure of educative ability – the ability to make sense and meaning out of complex or confusing data; the ability to perceive new patterns and relationships, and to forge (largely non-verbal) constructs which make it easy to handle complexity.

<http://www.pearsonclinical.co.uk/Psychology/AdultCognitionNeuropsychologyandLanguage/AdultGeneralAbilities/Ravens-Progressive-Matrices/Ravens-Progressive-Matrices.aspx>

Rey–Osterrieth complex figure test: The RCFT standardizes the materials and procedures for administering the Rey complex figure, measures recognition memory for the elements of the Rey complex figure, and assesses the respondent's ability to use cues to retrieve information. Appropriate for use with children and adults, the instrument enables you to gather information on major aspects of neuropsychological functioning. <http://www4.parinc.com/Products/Product.aspx?ProductID=RCFT>

Ross Information Processing Assessment: The RIPA-2 can be used to quantify cognitive-linguistic deficits, determine severity levels for skills, and develop rehabilitation goals. The RIPA-2 profiles 10 key areas in communicative and cognitive functioning: Immediate Memory, Recent Memory, Temporal Orientation (Recent Memory), Temporal Orientation (Remote Memory), Spatial Orientation, Orientation to Environment, Recall of General Information, Problem Solving and Abstract Reasoning, Organization, and Auditory Processing and Retention.

[http://www.academictherapy.com/detailATP.tpl?action=search&cart=14497730121667175&eqskudatarq=DDD-2113&eqTitledatarq=Ross%20Information%20Processing%20Assessment-2%20\(RIPA-2\)&eqvendordatarq=ATP&bobby=%5Bbobby%5D&bob=%5Bbob%5D](http://www.academictherapy.com/detailATP.tpl?action=search&cart=14497730121667175&eqskudatarq=DDD-2113&eqTitledatarq=Ross%20Information%20Processing%20Assessment-2%20(RIPA-2)&eqvendordatarq=ATP&bobby=%5Bbobby%5D&bob=%5Bbob%5D)

Ruff Figural Fluency Test: The RFFT was developed to provide clinical information regarding nonverbal capacity for fluid and divergent thinking, ability to flexibly shift cognitive set, planning strategies, and executive ability to coordinate this process. The RFFT was designed as a nonverbal analog to popular verbal fluency tests that require respondents ages 16-70 years to generate as many words as possible starting with a specific letter. <http://www.ronruff.com/tests/ruff-figural-fluency-test-rfft/>

School Function Assessment: The *School Function Assessment* measures a student's performance of functional tasks that support participation in the academic and social aspects of an elementary school program (grades K-6). It was designed to facilitate collaborative program planning for students with a variety of physical and cognitive disabilities.

<http://www.proedinc.com/customer/productView.aspx?ID=3160>

Span tasks (digits, words, spatial): In psychology and neuroscience, memory span is the longest list of items that a person can repeat back in correct order immediately after presentation on 50% of all trials. Items may include words, numbers, or letters. The task is known as *digit span* when numbers are used. Memory span is a common measure of short-term memory. It is also a component of cognitive ability tests such as the WAIS. Backward memory span is a more challenging variation which involves recalling items in reverse order. https://en.wikipedia.org/wiki/Memory_span

Stop-signal task: In a stop-signal task, you are asked to respond quickly, except when a stop signal arrives. Once you have initiated a movement, even when just "in the brain" as a plan, it is hard to stop. Stop-signal tasks are a variation on go/no-go. Introduced by Lappin and Eriksen in 1966,

and further developed by Gordon Logan and colleagues, the tasks measure how good a person is in withholding a response.
<http://www.psytoolkit.org/experiment-library/stopsignal.html>

Stroop Color-Word Test: The Stroop Color and Word Test consists of a Word Page with color words printed in black ink, a Color Page with 'Xs' printed in color, and a color-Word Page with words from the first page printed in colors from the second page (the color and the word do not match). The respondent goes down each sheet reading words or naming the ink colors as quickly as possible within a time limit. The test yields three scores based on the number of items completed on each of the three stimulus sheets. An Interference score, which is useful in determining the individual's cognitive flexibility, creativity, and reaction to cognitive pressures also can be calculated.

Tasks of Executive Control: The TEC is a standardized computer-administered measure of two fundamental aspects of executive control processes: working memory and inhibitory control. It provides four sequential tasks for 5- to 7- year old children and six tasks for children and adolescents ages 8-18 years. The tasks involved consist of on-screen instructions, a set of practice trials with feedback, and 100 timed-interval stimuli that require responses. It was determined that this assessment would be administered to determine whether difficulties with working memory or inhibition may be influencing or contributing to the client's struggles.

Test of Auditory Processing Skills 3: The TAPS-3 measures what a person does with what is heard. It provides a way to identify particular auditory processes that the individual may be having difficulties with, allowing appropriate remediation strategies to be planned. The nine *TAPS-3* subtests provide information for four main areas (reflected as Index scores), confirmed by factor analysis. In addition, there is one optional subtest presented on CD. The indices and subtests are:

Basic Phonological Skills:

Subtest 1: Word Discrimination

Subtest 2: Phonological Segmentation

Subtest 3: Phonological Blending

Auditory Memory

Subtest 4: Number Memory Forward

Subtest 5: Number Memory Reversed

Subtest 6: Word Memory

Subtest 7: Sentence Memory

Auditory Cohesion:

Subtest 8: Auditory Comprehension

Subtest 9: Auditory Reasoning

<http://www.academictherapy.com/detailATP.tpl?eqskudatarq=8338-2>

Test of Everyday Attention: The **Test of Everyday Attention (TEA)** is designed to measure attention in adults age 18 through 80 years. The test comprises 8 subsets that represent everyday tasks and has three parallel forms. It assess three aspects of attentional functioning: selective attention, sustained attention, and mental shifting. The subtests include the following:^[2]

- Map Search: looking at a large map of Philadelphia, patients search for symbols (selective attention)
- Elevator Counting
- Visual Elevator
- Telephone Search
- Lottery: patient are asked to listen for their 'winning number' presented on audio tape, then write down the two letters preceding a specified number

https://en.wikipedia.org/wiki/Test_of_everyday_attention

Test of Everyday Attention for Children: There is also a version available for children and adolescents aged 6 to 15 years and 11 months, called the Test of Everyday Attention for Children (TEA-Ch). The TEA-Ch has 9 subsets and two parallel forms. Administration time is 55 to 60 minutes.

Selective attention is measured by two tasks requiring the ability to detect targets from distractors:

Sky Search

Map Mission

Sustained attention is measured by four tasks:

Score

Score DT

Code Transmission

Walk/Don't Walk

https://en.wikipedia.org/wiki/Test_of_everyday_attention

Test of Information Processing Skills: The TIPS provides clinicians with quick and reliable measures of how well a person processes information (letter strings) presented visually and auditorily. TIPS assesses: executive function, working memory, auditory and visual processing, semantic fluency, and the effects of interference on recall. Designed for individuals from aged 5-90+.

<http://www.academictherapy.com/detailATP.tpl?eqskudatarq=8468-0>

Test of Language Competence: Now revised and called the CELF-5: Metalinguistics-- A revision of the Test of Language Competence-Expanded, the CELF-5 Metalinguistics assessment includes four tests of higher-level language skills that are embedded in upper-grade curricula and are critical to classroom success. Use it to measure a student's ability to think about and use language to make inferences, manipulate conversational speech given a context, use words in multiple ways, and use language in a non-literal manner. Administer the four tests individually or as a battery to obtain information about an individual's language skills in: Making Inferences, Conversation Skills, Multiple Meanings, and Figurative Language. <http://www.pearsonclinical.com/language/products/100000783/clinical-evaluation-of-language-fundamentals-fifth-edition-metalinguistics-celf-5-metalinguistics.html#tab-details>

Test of Variables of Attention: The T.O.V.A. uses geometric stimuli (to minimize the effects of cultural differences and learning problems), and contains two test conditions: target infrequent and target frequent. In the first half of the test (the target infrequent half), the target: nontarget ratio is 1:3.5, i.e.: a target is presented (randomly) only once every 3.5 nontarget presentations. In this half which is similar to most of the other Continuous Performance Tests (CPTs), the task is boring and fatiguing, and the subject must pay close attention to respond to the infrequent target

correctly. When a subject does not respond to the target, it is called an error of omission and is a measure of inattention. In the second half of the test (target frequent half), the target: nontarget ratio is 3.5:1, i.e: 3.5 targets are presented for every 1 nontarget. In this half of the test, the subject expects to respond most of the time but occasionally must inhibit the tendency to respond. T.O.V.A. measures include variability of response time (consistency), response time, commission (impulsivity), errors of omission (inattention), post-commission response times, multiple and anticipatory responses, and an ADHD score, which is a comparison to an age/gender specific ADHD group. <http://www.tovatest.com/about-the-t-o-v-a/>

Thematic Apperception Test: a projective psychological test. Proponents of the technique assert that subjects' responses, in the narratives they make up about ambiguous pictures of people, reveal their underlying motives, concerns, and the way they see the social world. https://en.wikipedia.org/wiki/Thematic_apperception_test

Tinker toy Task: The Tinker toy Test is a self-structured task used to evaluate executive functioning, which include initiating, planning, and structuring of behaviors. This test is used often to assess executive dysfunction in patients with neurodegenerative diseases. http://link.springer.com/referenceworkentry/10.1007%2F978-0-387-79948-3_1911

Tower of Hanoi: The Tower of Hanoi (also called the Tower of Brahma or Lucas' Tower,^[1] and sometimes pluralized) is a mathematical game or puzzle. It consists of three rods, and a number of disks of different sizes which can slide onto any rod. The puzzle starts with the disks in a neat stack in ascending order of size on one rod, the smallest at the top, thus making a conical shape. The Tower of Hanoi is frequently used in psychological research on problem solving. There also exists a variant of this task called Tower of London for neuropsychological diagnosis and treatment of executive functions.

The objective of the puzzle is to move the entire stack to another rod, obeying the following simple rules:

1. Only one disk can be moved at a time.
2. Each move consists of taking the upper disk from one of the stacks and placing it on top of another stack i.e. a disk can only be moved if it is the uppermost disk on a stack.
3. No disk may be placed on top of a smaller disk.

https://en.wikipedia.org/wiki/Tower_of_Hanoi#Applications

Tower of London: Children with acquired and developmental problems often exhibit impairment in executive planning. The TOL^{DX} 2nd Edition measures higher order problem-solving ability. The information it provides is not only useful when assessing frontal lobe damage, but also when evaluating attention disorders and executive functioning difficulties. <http://www.mhs.com/product.aspx?gr=edu&id=overview&prod=toldx>

Trail Making Test: (from the Comprehensive Trail-Making Test) The CTMT is a standardized set of five visual search and sequencing tasks. Attention, concentration, resistance to distraction, and cognitive flexibility (or set-shifting) heavily influence performance on these tasks.

The CTMT can be used to determine challenges with processing speed, visual search and sequencing, visual attention, and impairments in set-shifting (flexibility).

Transdisciplinary Play-Based Assessment: *Transdisciplinary Play-Based Assessment, Second Edition (TPBA2)* is a comprehensive, easy-to-follow process for assessing four critical developmental domains—sensorimotor, emotional and social, communication, and cognitive—through observation of the child's play with family members, peers, and professionals. <http://products.brookespublishing.com/Transdisciplinary-Play-Based-Assessment-Second-Edition-TPBA2-P215.aspx>

Verbal Fluency Tasks (first letter, phonemic, semantic): The verbal fluency test is a short test of verbal functioning (e.g., Lezak et al., 2012). It typically consists of two tasks: category fluency (sometimes called semantic fluency; Benton, 1968) and letter fluency (sometimes called phonemic fluency; Newcombe, 1969). (Shao, Janse, Visser, & Meyer, 2014)

Visual Search and Attention Test: The VSAT consists of four visual cancellation tasks that require the respondent to cross out letters and symbols that are identical to a target. It yields an overall attention score and provides separate scores for left- and right-side performance to assess visual field defects, unilateral spatial neglect, or syndromes that affect the perception of portions of the visual space. <http://www4.parinc.com/Products/Product.aspx?ProductID=VSAT>

Wechsler Adult Intelligence Scale—Fourth Edition: The Wechsler Adult Intelligence Scale (WAIS) is an IQ test designed to measure intelligence and cognitive ability in adults and older adolescents. There are four index scores representing major components of intelligence:

- Verbal Comprehension Index (VCI): Similarities, Vocabulary, Information, Comprehension
- Perceptual Reasoning Index (PRI): Block Design, Matrix Reasoning, Visual Puzzles, Picture Completion, Figure Weights
- Working Memory Index (WMI): Digit Span, Arithmetic, Letter-Number Sequencing
- Processing Speed Index (PSI): Symbol Search, Coding, Cancellation

https://en.wikipedia.org/wiki/Wechsler_Adult_Intelligence_Scale#WAIS-IV

Wechsler Individual Achievement Scale—Third Edition: The WIAT-III is suitable for use in a variety of clinical, educational, and research settings, including schools, clinics, private practices, and residential treatment facilities. Use WIAT-III results to:

- Identify the academic strengths and weaknesses of a student
- Inform decisions regarding eligibility for educational services, educational placement, or diagnosis of a specific learning disability
- Design instructional objectives and plan interventions

Sixteen subtests include: Listening Comprehension, Early Reading Skills, Reading Comprehension, Math Problem Solving, Alphabet Writing Fluency, Sentence Composition, Word Reading, Essay Composition, Pseudoword Decoding, Numerical Operations, Oral Expression, Oral Reading Fluency, Spelling, Math Fluency-Addition, Math Fluency-Subtraction, Math Fluency-Multiplication

<http://www.pearsonclinical.com/psychology/products/100000463/wechsler-individual-achievement-testthird-edition-wiatiii-wiat-iii.html#tab-details>

Wechsler Intelligence Scale for Children—Fifth Edition: The Wechsler Intelligence Scale for Children (WISC), developed by David Wechsler, is an individually administered intelligence test for children between the ages of 6 and 16. The Fifth Edition (WISC-V; Wechsler, 2014) is the most current version. There are five scale scores representing major components of intelligence:

- Verbal Comprehension: Similarities, Vocabulary, Information, Comprehension
- Visual Spatial: Block Design, Visual Puzzles
- Fluid Reasoning: Matrix Reasoning, Figure Weights, Picture Concepts, Arithmetic
- Working Memory: Digit Span, Picture Span, Letter-Number Sequencing
- Processing Speed: Coding, Symbol Search, Cancellation

https://en.wikipedia.org/wiki/Wechsler_Intelligence_Scale_for_Children and

<http://www.pearsonclinical.com/psychology/products/100000771/wechsler-intelligence-scale-for-childrensupfifth-edition--wisc-v.html>

Wide Range Assessment of Memory and Learning—Second Edition: This test makes it easier to assess memory functions in children, adolescents, and—with this edition—adults as well. The WRAML2 gives clinicians a single, integrated collection of relevant memory tests that can be used across the life span. Appropriate for individuals from 5 to 90 years of age, the WRAML2 core battery produces a General Memory Index, plus three more specific index scores and six subtest scores:

- **Verbal Memory Index**
 - Verbal Learning Subtest
 - Story Memory Subtest
- **Visual Memory Index**
 - Design Memory Subtest
 - Picture Memory Subtest
- **Attention and Concentration Index**
 - Number/Letter Subtest
 - Finger/Windows Subtest

<http://www.wpspublish.com/store/p/3097/wide-range-assessment-of-memory-and-learning-second-edition-wraml2>

Wide Range Assessment of Visual Motor Abilities: The WRAVMA lets you assess and compare visual–spatial, fine motor, and integrated visual–motor skills using norms gathered from the same sample. Designed for 3- to 17-year-olds, WRAVMA includes three subtests, which can be used individually or in combination:

- **The Drawing Test** measures visual–motor integration by asking the child to copy designs that are arranged in order of increasing difficulty.
- **The Matching Test** assesses visual–spatial skills by asking the child to look at a visual “standard” and select the option that “goes best” with it. Again, items are arranged in order of increasing difficulty.
- **The Pegboard Test** evaluates fine motor skills by asking the child to insert as many pegs as possible, within 90 seconds, into a waffled pegboard. Norms are provided for both dominant and nondominant hands.
- Each test requires just 4 to 10 minutes, and each provides a scaled score, standard score, age equivalent, and percentile score. Norms are based on a nationally representative sample of more than 2,600 children.

<http://www.wpspublish.com/store/p/3099/wide-range-assessment-of-visual-motor-ability-wravma>

Wisconsin Card Sorting Task: Used primarily to assess perseveration and abstract thinking, the WCST is also considered a measure of executive function because of its reported sensitivity to frontal lobe dysfunction. As such, the WCST allows you to assess your client’s strategic planning; organized searching; and ability to utilize environmental feedback to shift cognitive sets, direct behavior toward achieving a goal, and modulate impulsive responding. Four stimulus cards incorporate three stimulus parameters (color, form, and number). Respondents are required to sort numbered response cards according to different principles and to alter their approach during test administration. To complete the task, clients should have normal or corrected vision and hearing sufficient to adequately comprehend the instructions and to visually discriminate the stimulus parameters.

<http://www4.parinc.com/Products/Product.aspx?ProductID=WCST>

Woodcock Johnson Tests of Achievement: The WJ IV Tests of Achievement are ideal for accurately screening, diagnosing, and monitoring progress in reading, writing, and mathematics achievement areas. The Achievement battery is available in three forms (A, B, C) with parallel content, providing the means to monitor progress two to three times per year once a proficiency level is established and interventions are implemented with a student. The parallel forms also provide flexibility to examiners who wish to alternate the three forms to reduce examinees’ familiarity with test content.

<http://www.hmhco.com/~media/sites/home/hmh-assessments/clinical/woodcock-johnson/pdf/wjiv/wjiv-contemporary-assessment-brochure.pdf?la=en>

Woodcock Johnson Tests of Cognitive Ability: Supporting a new era of CHC theory, the WJ IV Tests of Cognitive Abilities contain the greatest breadth of cognitive abilities of any standardized body of tests. New tests and clusters have been designed to place emphasis on the most useful measures for identifying individuals’ patterns of strengths and weaknesses through seven different broad CHC abilities. The WJ IV Tests of

Cognitive Abilities also offer a new Gf-Gc Composite for comparison with other cognitive abilities, oral language, and achievement. Understanding relative strengths and weaknesses in comparison to the Gf-Gc Composite can lead to individualized instruction designed to target identified learning needs.

- Tests
 - Standard Battery-- Test 1: Oral Vocabulary, Test 2: Number Series, Test 3: Verbal Attention—NEW, Test 4: Letter-Pattern Matching—NEW, Test 5: Phonological Processing—NEW, Test 6: Story Recall, Test 7: Visualization—NEW, Test 8: General Information, Test 9: Concept Formation
 - Extended Battery--Test 10: Numbers Reversed, Test 11: Number-Pattern Matching, Test 12: Nonword Repetition—NEW, Test 13: Visual-Auditory Learning Test, 14: Picture Recognition, Test 15: Analysis-Synthesis, Test 16: Object-Number Sequencing, Test 17: Pair Cancellation Test 18: Memory for Words
- Clusters
 - Short-Term Working Memory-Extended—NEW; Brief Intellectual Ability; Gf-Gc Composite—NEW; Cognitive Processing Speed (Gs); Number Facility (N)—NEW; Perceptual Speed (P); General Intellectual Ability; Auditory Processing (Ga); Comprehension-Knowledge (Gc); Auditory Memory Span (MS)*; Comprehension-Knowledge-Extended; Long-Term Retrieval (Glr); Fluid Reasoning (Gf); Visual Processing (Gv); Fluid Reasoning-Extended; Cognitive Efficiency; Short-Term Working Memory (Gwm); Cognitive Efficiency-Extended Clusters

* Obtained when used with the WJ IV Tests of Oral Language.

<http://www.hmhco.com/~media/sites/home/hmh-assessments/clinical/woodcock-johnson/pdf/wjiv/wjiv-contemporary-assessment-brochure.pdf?la=en>

Appendix 3: Forms and Checklists

Dawson and Guare: Executive Skills in Children and Adolescents Second Edition
A Practical Guide to Assessment and Intervention (2010)

Executive Skills Semistructured Interview—Parent Version
Executive Skills Semistructured Interview—Teacher Version
Executive Skills Semistructured Interview—Student Version
Executive Skills Questionnaire for Parents/Teachers
Executive Skills Questionnaire for Students
Executive Skills Questionnaire-Teen Version
Executive Skills: Planning Interventions
Forms for Developing Behavior Plans/Incentive Systems
Executive Skills Self-Management Checklist

McCloskey: Assessment and Intervention for Executive Function Difficulties (School-Based Practice in Action)

Executive Function Student Observation Form (EFSO)
Executive Function Structured Interview (EFSI)
Executive Function Structured Interview for Children (EFSI-C)
Self-Regulation Abbreviated Version (MEFS-SRAV)—Self-Rating Inventory
McCloskey Executive Functions Scale (MEFS) – School Age Teacher Form

Abridged Executive Control Skills Checklist: <http://dradamcox.com/resources/no-mind-left-behind/does-your-child-have-an-executive-function-problem/>

Elementary School Executive Function (EF) Checklist: <http://schoolslp.blogspot.com/2014/12/friday-freebee.html#more>

Adult College Symptoms Checklist:
<http://www.ebhr.org/app/download/7237138277/COLLEGE+SYMPTOMS+CHECKLIST.pdf>

Appendix 4: Resources for Addressing Executive Function Deficits

Impulse Control

Therapeutic Manuals

- Caselman, T., & Cantwell, J. (2011). *Impulse Control: Activities & Worksheets for Middle School Students*. Chapin: Youthlight, Inc.
- Caselman, T., & Cohen, B. K. (2008). *All About Boundaries: Teaching Children about "Drawing the Line"*. Chapin: youthlight inc.
- Feuerstein, R., Falik, L. H., Feuerstein, R. S., & Bohacs, K. (2013). *A Think-Aloud and Talk-Aloud Approach to Building Language*. New York: Teachers College Press.
- Helm-Estabrooks, N., & Karow, C. M. (2010). *Problem-Solving Therapy Program: A Model-Based Approach*. Northborough: Communication Disorders Resources.
- Henley, M. (2003). *Teaching Self-Control: A Curriculum for Responsible Behavior*. Bloomington: Solution Tree.
- Holzhauser-Peters, L., Grizinski, Y., & Solazzo, R. (2009). *Thinking Through Problems in the Community: Social Problem Solving Scenarios to Enhance Communication, Thinking, and Decision Making Skills*. Asperger Family Learning Source, LLC.
- Kaiser, K., Romero-Davis, K., Schott, D., & Yacono, C. (2008). *CARDS: Cognition, Attention and Recall Drill Set-Attention*. East Moline: LinguSystems, Inc.
- Kuypers, L. (2011). *Zones of Regulation*. Santa Clara: Think Social Publishers.
- Miller, D. (2004). *The Stop....Think...Do...Program: A Workbook for Children with ADD or ADHD*. Xulon Press.
- Sibley, M. H. (2017). *Parent-Teen Therapy for Executive Function Deficits and ADHD: Building Skills and Motivation*. New York: The Guilford Press.
- Smith, B., & Griffen, L. M. (2016). *What Were You Thinking: A Story about Learning to Control Your Impulses*. Boys Town: Boys Town Press.

Games

- Therapy Games: Creative Ways to Turn Popular Games Into Activities That Build Self-Esteem, Teamwork, Communication Skills, Anger Management, Self-Discovery, and Coping Skills; Jones, Alanna—also has activities that can be adapted for flexibility and working memory
- The Impulse Control Board Game: <https://www.amazon.com/Impulse-Control-Board-Franklin-Learning/dp/B002P8LK90>
- Stop, Relax & Think: A Game to Help Impulsive Children Think Before They Act: https://www.amazon.com/Stop-Relax-Think-Impulsive-Children/dp/B002V7456A/ref=pd_sim_21_4?encoding=UTF8&pd_rd_i=B002V7456A&pd_rd_r=1QRR62QD5J6MAEJHJJ2F&pd_rd_w=YVXus&pd_rd_wg=BU9MW&psc=1&refRID=1QRR62QD5J6MAEJHJJ2F

- The Talking, Feeling and Doing Game: https://www.amazon.com/Talking-Feeling-Doing-Game/dp/B000MBE3S2/ref=pd_sim_21_10?encoding=UTF8&pd_rd_i=B000MBE3S2&pd_rd_r=CDPWEMV9VZYRKZGEV411&pd_rd_w=EzFtT&pd_rd_wg=OdvCK&psc=1&refRID=CDPWEMV9VZYRKZGEV411

Flexibility

Manuals

- Alvord, M. K., Zucker, B., & Grados, J. J. (2011). *Resilience Builder Program for Children and Adolescents: Enhancing Social Competence and Self-Regulation*. Champaign: Research Press.
- Cannon, L., Kenworthy, L., Alexander, K. C., Werner, M. A., & Anthony, L. (2011). *Unstuck & On Target! An Executive Function Curriculum to Improve Flexibility for Children with Autism Spectrum Disorders*. Baltimore: Paul H Brookes Publishing Co.
- Granpeesheh, D., Tarbox, J., Najdowski, A. C., & Kornack, J. (2014). *Evidence-Based Treatment for Children with Autism: The CARD Model (Practical Resources for the Mental Health Professional)*. Waltham: Academic Press.
- Helm-Estabrooks, N., & Karow, C. M. (2010). *Problem-Solving Therapy Program: A Model-Based Approach*. Northborough: Communication Disorders Resources.
- Holzhauser-Peters, L., Grizinski, Y., & Solazzo, R. (2009). *Thinking Through Problems in the Community: Social Problem Solving Scenarios to Enhance Communication, Thinking, and Decision Making Skills*. Asperger Family Learning Source, LLC.
- Kaiser, K., Romero-Davis, K., Schott, D., & Yacono, C. (2008). *CARDS: Cognition, Attention and Recall Drill Set-Attention*. East Moline: LinguiSystems, Inc.
- Kerstein, L. H. (2014). *A Week of Switching, Shifting, and Stretching: How to Make My Thinking More Flexible*. Shawnee Mission: AAPC Publishing.
- Kuypers, L. (2011). *Zones of Regulation*. Santa Clara: Think Social Publishers.
- Miller, L. (2013). *Developing Flexibility Skills in Children and Teens with Autism: The 5P Approach to Thinking, Learning and Behavior*. Philadelphia: Jessica Kingsley Publishers.
- Najdowski, A. C. (2017). *Flexible and Focused: Teaching Executive Function Skills to Individuals with Autism and Attention Disorders*. San Diego: Academic Press.
- Schiraldi, G. R. (2011). *The Complete Guide to Resilience: Why It Matters, How to Build and Maintain It*. Ashburn: Resilience Training International.
- Sibley, M. H. (2017). *Parent-Teen Therapy for Executive Function Deficits and ADHD: Building Skills and Motivation*. New York: The Guilford Press.
- Smith, B. (2016). *May Day is Ruined: A story for Teaching Flexible Thinking*. Boys Town: Boys Town Press.

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- Yacono, C., Schott, D., Romero-Davis, K., Kaiser, K., & Galajda, P. (2008). *CARDS: Cognition, Attention and Recall Drill Set-Memory*. East Moline: LinguSystems, Inc.

Working Memory

- Benigas, J. E., Brush, J. A., & Elliot, G. M. (2016). *Spaced Retrieval Step by Step: An Evidence-Based Memory Intervention*. Baltimore: Health Professions Press, Inc.
- Dehn, M. J. (2011). *Helping Students Remember: Exercises and Strategies to Strengthen Memory*. Hoboken: John Wiley & Sons, Inc.
- Helm-Estabrooks, N., & Karow, C. M. (2010). *Problem-Solving Therapy Program: A Model-Based Approach*. Northborough: Communication Disorders Resources.
- Kaiser, K., Romero-Davis, K., Schott, D., & Yacono, C. (2008). *CARDS: Cognition, Attention and Recall Drill Set-Attention*. East Moline: LinguSystems, Inc.
- Mense, B., Debney, S., & Druce, T. (2006). *ready, set, remember: short-term auditory memory activities*. Camberwell: ACER Press.
- Richards, R. G. (2003). *The Source for Learning and Memory Strategies*. East Moline: LinguSystems.
- Sibley, M. H. (2017). *Parent-Teen Therapy for Executive Function Deficits and ADHD: Building Skills and Motivation*. New York: The Guilford Press.
- Warren, E. (2014). *Working Memory, Hemisphere Integration and Attention Building Activities for Optimal Learning*. Putnam Valley: Erica Warren Publications.
- Warren, E. (2014). *Mindful Visualization for Education: Teaching Students How to Visualize and Use the Senses for Improved Reading, Writing, and Learning*. Putnam Valley: Erica Warren Publications.
- Yacono, C., Schott, D., Romero-Davis, K., Kaiser, K., & Galajda, P. (2008). *CARDS: Cognition, Attention and Recall Drill Set-Memory*. East Moline: LinguSystems, Inc.

General Executive Function

Barkley, R. A. (2012). *Executive Functions: What They Are, How They Work, and Why They Evolved*. New York: The Guilford Press.

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- Cartwright, K. B. (2015). *Executive Skills and Reading Comprehension: A Guide for Educators*. New York: The Guilford Press.
- Crosby, G., & Lippert, T. (2015). *Transforming ADHD: Simple, Effective Attention and Action Regulation Skills to Help You Focus and Succeed*. Oakland: New Harbinger Publications, Inc.
- Dawson, P., & Guare, R. (2009). *Smart but Scattered*. New York: The Guilford Press.
- Dawson, P., & Guare, R. (2010). *Executive Skills in Children and Adolescents: A Practical Guide to Assessment and Intervention, Second Edition*. New York: The Guilford Press.
- Dawson, P., & Guare, R. (2012). *Coaching Students with Executive Skills Deficits*. New York: The Guilford Press.
- Dawson, P., & Guare, R. (2016). *The Smart but Scattered Guide to Success: How to Use Your Brain's Executive Skills to Keep Up, Stay Calm, and Get Organized at Work and at Home*. New York: The Guilford Press.
- DiPipi-Hoy, C., & Steere, D. (2016). *Teaching Time Management to Learners with Autism Spectrum Disorder*. Lenexa: AAPC Publishing.
- Drazinski, L. A. (2011). *Executive Functions Training Adolescent*. LinguiSystems.
- Feuerstein, R., Falik, L. H., Feuerstein, R. S., & Bohacs, K. (2013). *A Think-Aloud and Talk-Aloud Approach to Building Language*. New York: Teachers College Press.
- Forgan, J. W., & Richey, M. A. (2015). *The Impulsive, Disorganized Child: Solutions for Parenting Kids with Executive Functioning Difficulties*. Waco: Prufrock Press, Inc.
- Gallagher, R., Abikoff, H. B., & Spira, E. G. (2014). *Organizational Skills Training for Children with ADHD*. New York: The Guilford Press.
- Gottschall, C. P. (2011). *Executive Functions Training Elementary*. LinguiSystems.
- Guare, R., Dawson, P., & Guare, C. (2013). *Smart but Scattered Teens*. New York: The Guilford Press.
- Johnston-Tyler, J. (2014). *The CEO of Self: An Executive Functioning Workbook*. Clara: EvoLibri Consulting.
- Kaufman, C. (2010). *Executive Function in the Classroom: Practical Strategies for Improving Performance and Enhancing Skills for All Students*. Baltimore: Paul H Brookes Publishing Co.
- Kenworthy, L., Anthony, L. G., Alexander, K. C., Werner, M. A., Cannon, L., & Greenman, L. (2014). *Solving Executive Function Challenges: Simple Ways to Get Kids with Autism Unstuck and On Target*. Baltimore: Paul H Brookes Publishing Co.

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- Kulman, R. (2012). *Train Your Brain for Success: A Teenager's Guide to Executive Functions*. Plantation: Specialty Press, Inc.
- McCloskey, G., Perkins, L. A., & Divner, B. V. (2009). *Assessment and Intervention for Executive Function Difficulties*. New York: Routledge.
- Meltzer, L. (2010). *Promoting Executive Function in the Classroom*. New York: The Guilford Press.
- Moraine, P. (2012). *Helping Students Take Control of Everyday Executive Functions: The Attention Fix*. Philadelphia: Jessica Kingsley Publishers.
- Ramsay, J. R., & Rostain, A. L. (2008). *Cognitive-Behavioral Therapy for Adult ADHD: An Integrative Psychosocial and Medical Approach*. New York: Routledge.
- Safren, S. A., Perlman, C. A., Sprich, S., & Otto, M. (2005). *Mastering Your Adult ADHD: A Cognitive-Behavioral Treatment Program Therapist Guide*. New York: Oxford University Press.
- Scherer, M. J. (2012). *Assistive Technologies and Other Supports for People with Brain Impairment*. New York: Springer Publishing Company.
- Schetter, P. (2004). *Learning the R.O.P.E.S. for Improved Executive Function*. Redding: ABTA Publications and Products.
- Sibley, M. H. (2017). *Parent-Teen Therapy for Executive Function Deficits and ADHD: Building Skills and Motivation*. New York: The Guilford Press.
- Solanto, M. V. (2011). *Cognitive-Behavioral Therapy for Adult ADHD*. New York: The Guilford Press.
- Sparrowhawk, K. (2016). *Executive Function: Cognitive Fitness for Business*. London: LID Publishing.
- Suchy, Y. (2016). *EXECUTIVE FUNCTIONING A Comprehensive Guide for Clinical Practice*. New York: Oxford University Press.
- Tuckman, A. (2009). *More Attention, Less Deficit: Success Strategies for Adults with ADHD*. Plantation: Specialty Press, Inc.
- Tuckman, A. (2012). *Understand Your Brain, Get More Done: The ADHD Executive Functions Workbook*. Plantation: Specialty Press, Inc.
- Warren, E. (2014). *Working Memory, Hemisphere Integration and Attention Building Activities for Optimal Learning*. Putnam Valley: Erica Warren Publications.
- Warren, E. (2014). *Mindful Visualization for Education: Teaching Students How to Visualize and Use the Senses for Improved Reading, Writing, and Learning*. Putnam Valley: Erica Warren Publications.
- Wilkins, S., & Burmeister, C. (2015). *FLIPP The Switch: Strengthen Executive Function Skills*. Shawnee Mission: AAPC Publishing.
- Yeager, M., & Yeager, D. (2013). *Executive Function & Child Development*. New York: W. W. Norton & Company.

Related to ASD

- A 5 Is Against the Law! Social Boundaries: Straight Up! An honest guide for teens and young adults; Buron, Kari Dunn
- Colour Coding for Learners with Autism: A Resource Book for Creating Meaning through Colour at Home and School; Devine, Adele
- Comic Strip Conversations: Illustrated interactions that teach conversation skills to students with autism and related disorders; Gray, Carol
- FBA to Z: Functional Behavior and Intervention Plans for Individuals with ASD; Aspy, Ruth, Grossman, Barry G, Myles, Brenda Smith, Henry, Shawn A
- The Hidden Curriculum of Getting and Keeping a Job: Navigating the Social Landscape of Employment: A Guide for Individuals with Autism Spectrum and Other Social-Cognitive Challenges:
- The Hidden Curriculum for Understanding Unstated Rules in Social Situations for Adolescents and Young Adults; Myles, Brenda Smith, Trautman, Melissa L, Schelvan, Ronda L
- The Incredible 5-Point Scale: The Significantly Improved and Expanded Second Edition; Buron, Kari Dunn, Curtis, Mitzi
- Lights! Camera! Autism! 2: Using Video Technology to Support New Behavior; McGinnity, Kate, Hammer, Sharon, Ladson, Lisa
- The New Social Story Book: Gray, Carol
- The Power Card Strategy 2.0: An Evidence Based Practice Using Special Interests to Motivate Children and Youth with Autism Spectrum Disorder; Gagnon, Elisa, Myles, Brenda Smith
- Seeing is Believing: Video Self-Modeling for People with Autism and Other Developmental Disabilities; Buggey, Tom
- Social Behavior and Self-Management: 5-Point Scales for Adolescents and Adults; Buron, Kari Dunn, Curtis, Mitzi
- Social Thinking: Michelle Garcia Winner
 - Inside Out
 - Should I? or Shouldn't I?
 - Social Behavior Mapping
 - Social Fortune, Social Fate
 - Social Thinking and Me
 - Social Thinking Worksheets for Teens and Tweens
 - Social Town Citizens Discover 82 New Unthinkables for Superflex to Outsmart
 - Superflex Curriculum

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- Superflex: My Hero Inside Music CD
 - Superflex Superdecks
 - Superflex: A Superhero Social Thinking Curriculum
 - Superflex Takes on Brain Eater and the Team of Unthinkables
 - Superflex Takes on Glassman and the Team of Unthinkables
 - Superflex Takes on One-Sided Sid, Un-Wonderer and the Team of Unthinkables
 - Thinking About You, Thinking About Me
 - Think Social
 - We Thinkers
-
- Stuck! Strategies: What to Do When Students Get STUCK” How to Turn “No!” Into “Let’s Go!”; Carroll, Janice, Izrealevitz, Terry Ellis
 - Visual Support for Visual Thinkers: Practical Ideas for Students with Autism Spectrum Disorders and Other Special Educational Needs; Rogers, Lisa
 - Writing Social Stories with Carol Gray; Gray, Carol

Appendix 5: STRUCTURED REVIEW OF COMPUTER-BASED PROGRAMS FOR EXECUTIVE FUNCTION TRAINING

Obtained from: http://www.stroking.ca/pdf/REVIEW_OF_COMPUTER-BASED_PROGRAMS.pdf on 1/30/17,

adaptations January 31, 2017 by Joseph Falkner, MST/CCC-SLP

Software	Executive Function Components								<ul style="list-style-type: none"> ➤ Description of the software ➤ Characteristics of the cognitive training 	<ul style="list-style-type: none"> ➤ Development and scientific validity ➤ Effectiveness 	Clinical utility <ul style="list-style-type: none"> ○ Target clientele ○ Pre-requisite abilities ○ Language ○ System requirements ○ Ordering information ○ Cost
	Planning	Problem-Solving	Inhibition	Working Memory	Divided Attention	Flexibility					
Acquired Brain Injury Memory Exercises			X					<ul style="list-style-type: none"> ➤ ABIME has six key components with exercises across a range of visual, verbal and spatial memory functions: 1) memory for numbers; 2) working visual memory; 3) short term visual memory; 4) visuospatial memory; 5) immediate verbal recall; and 6) delayed visual/verbal memory. ➤ Responses are computer tracked and scored. 	<ul style="list-style-type: none"> ➤ Developed by a clinical neuropsychologist specializing in brain injury rehabilitation and cognitive communication. ➤ No published studies on the effectiveness of the ABIME program were found. 	<p>Target clientele: Developed for adolescents and adults with neurological impairments including traumatic brain injury and stroke.</p> <p>Pre-requisite abilities:</p> <ul style="list-style-type: none"> - Using a mouse to point and click - Other pre-requisites: understanding written instructions and basic attention skills. <p>Language: English</p> <p>System requirements: XP SP2, Vista or Windows 7 - 32 or 64 bit platforms ***does run on Windows 10</p> <p>Contact information: https://www.lapublishing.com/brain-injury-memory-exercises/ or 919-556-0300</p> <p>Cost: \$120.00</p>	

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Software	Executive Function Components								<ul style="list-style-type: none"> ➤ Description of the software ➤ Characteristics of the cognitive training 	<ul style="list-style-type: none"> ➤ Development and scientific validity ➤ Effectiveness 	Clinical utility <ul style="list-style-type: none"> ○ Target clientele ○ Pre-requisite abilities ○ Language ○ System requirements ○ Ordering information ○ Cost
	Planning	Problem-Solving	Inhibition	Working Memory	Divided Attention	Flexibility					
Attention Processing Training III			X	X	X	X		<ul style="list-style-type: none"> ➤ Over 100 tasks with parameters that can be modified to increase or decrease the number of stimuli and the speed of presentation. The program is designed to be used with a wide range of people including those who have severe attention deficits to those with concussion symptoms ✓ The attention framework used to organize the tasks has been updated to reflect the expanded attention research and includes tasks targeting: Basic Sustained Attention as well as Executive Control Processes related to Working Memory, Selective Attention, Suppression and Alternating Attention 	<ul style="list-style-type: none"> ➤ Developed by a Clinical Psychologist and a Speech-Language Pathologist ➤ The research base developed for the APT is in the area of direct attention training. ➤ Included in the <i>Cognitive Rehabilitation Manual: Translating Evidence-Based Recommendations into Practice</i> as an evidence-based approach for working on attention 	<p>Target clientele: Adolescent and adults with acquired brain injury from mild (concussive) to more severe injuries.</p> <p>Pre-requisite abilities:</p> <ul style="list-style-type: none"> - Ability to press space bar <p>Language: English</p> <p>System requirements:</p> <ul style="list-style-type: none"> - The APT 3 uses a USB drive which contains the complete program - APT-3 will work with computers and laptops running Mac OS 10.5 or newer and Windows XP or newer. The computer or laptop will need an available USB port for connecting the APT-3 USB drive. All of the software necessary to run the tool is contained on the drive. The clinician runs the program from the drive; thus, no software needs to be installed on the computer and any computer can be used to run the therapy program. <p>Contact information: https://www.lapublishing.com/attention-process-training-apt3/ or 919-556-0300</p> <p>Cost: \$850 for the complete program</p>	

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	Planning	Problem-Solving	Inhibition	Working Memory	Divided Attention	Flexibility				
Brainbuilder			X	X		X	<ul style="list-style-type: none"> ➤ Broken up into the following areas: Brain Coach, Brain Exercises, Brain Music and Brain Games ✓ Tasks become more difficult as the person progresses through an exercise ✓ 20 diverse visual, auditory and focus exercises with varying degree of difficulty ✓ Can track up to five people on one computer 	<ul style="list-style-type: none"> ➤ No specific information provided on website concerning development of software ➤ No published studies on the effectiveness of the BrainBuilder program were found. 	<p>Target clientele: Healthy children and adults 7 years of age or older or those with various neurological disorders, learning disabilities or attention disorders</p> <p>Pre-requisite abilities:</p> <ul style="list-style-type: none"> - No specific pre-requisite abilities noted. - Using a mouse/keyboard - Other pre-requisites: understanding verbal and/or written instructions, and basic attention skills <p>Language: English</p> <p>System requirements:</p> <ul style="list-style-type: none"> • 1.6 GHz Pentium III (2.8 GHz or Greater Recommended) • XP SP2, Vista or Windows 7 - 32 or 64 bit platforms • 512 MB RAM or Greater • Minimum 300 MB Free Disk Space • CD/DVD Drive • Screen Resolution 1024 x 768 or Greater • Sound Card • Speakers or Headphones <p>Contact information: http://l.advancedbrain.com/brainbuilder/brainbuilder.html</p> <p>Cost:</p>	

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Software	Executive Function Components						<ul style="list-style-type: none"> ➤ Description of the software ➤ Characteristics of the cognitive training 	<ul style="list-style-type: none"> ➤ Development and scientific validity ➤ Effectiveness 	<p style="text-align: center;">Clinical utility</p> <ul style="list-style-type: none"> ○ Target clientele ○ Pre-requisite abilities ○ Language ○ System requirements ○ Ordering information ○ Cost
	Planning	Problem-Solving	Inhibition	Working Memory	Divided Attention	Flexibility			
<p><i>Brain Train: Captain's Log MindPower Trainer</i></p>	X	X	X	X	X	X	<ul style="list-style-type: none"> ➤ Comprehensive mental gym offering over 2000 different challenging brain training exercises targeting 20 different cognitive skills. ➤ Uses visual and/or auditory stimuli ✓ Tasks become more difficult as the person progresses through an exercise ✓ Exercises can be adapted for any level of ability ✓ Client's performance is recorded and presented in summary tables ✓ Provides auditory and visual feedback on performance ✓ Can incorporate optional biofeedback training 	<ul style="list-style-type: none"> ➤ Developed in collaboration with medical specialists and neuropsychologists ✓ Studies in children with Attention Deficit Hyperactivity Disorder (ADHD) and in adults with traumatic brain injury and psychiatric disorders support the effectiveness of the Captain's Log software for improving cognitive skills. 	<p>Target clientele: Children and adults (aged 5 years and over) with brain injuries, ADHD, learning disabilities, psychiatric disorders or other cognitive problems.</p> <p>Pre-requisite abilities:</p> <ul style="list-style-type: none"> - Using a mouse/keyboard or touch screen - Other pre-requisites: understanding verbal and/or written instructions, and basic attention skills. <p>Language: English</p> <p>System requirements:</p> <p>Pentium IV 2.0 GHz or faster processor</p> <p>1 GB free hard drive space</p> <p>2 GB of RAM or more</p> <p>Windows Win 7 / Win 8.1 / Win 10</p> <p>DirectX 10 Compatible Video Card</p> <p>256 MB video memory</p> <p>Color monitor</p>

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				<p>Sound card</p> <p>External speakers or headphones</p> <p>USB Mouse required</p> <p>Internet access is required for activation and updates.</p> <p>Contact information: www.braintrain.com or 1-800-822-0538</p> <p>Cost (prices subject to change)</p> <p>Free trial: http://www.braintrain.com/software-trial-registration-form/</p> <p>Player Licensing:</p> <p>1 Player, 1 Year: \$395; 5 Players, 1 year: \$995; 10 players, 1 year: \$1295</p> <p>Station Licensing:</p> <p>1 Year Station Licenses: 1 station, unlimited Players: \$1495</p> <p>5 Year Station Licenses: 1 station, unlimited Players: \$5495</p>
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Software	Executive Function Components								<ul style="list-style-type: none"> ➤ Description of the software ➤ Characteristics of the cognitive training 	<ul style="list-style-type: none"> ➤ Development and scientific validity ➤ Effectiveness 	Clinical utility <ul style="list-style-type: none"> ○ Target clientele ○ Pre-requisite abilities ○ Language ○ System requirements ○ Ordering information ○ Cost
	Planning	Problem-Solving	Inhibition	Working Memory	Divided Attention	Flexibility					
CAMSART: Concentration-Attention-and-Mental-Speed-Rehabilitation-Task	X			X	X			<ul style="list-style-type: none"> ➤ CAMSART combines structured tasks with performance measurement. It requires the user to memorize a set of instructions in short term memory and then undertake a task that demands selective, divided and sustained attention as well as decision making and information processing. ➤ The underlying principle and tasks involved in CAMSART are largely based on the Stroop effect. The basic effect is one of increasing reaction time and error in performance in the dichotomy caused when the color of the written word is different than the color described. This effect has been attributed to (among a variety of other explanations) the difficulty that the human brain has in the parallel 	<ul style="list-style-type: none"> ➤ Developed by a clinical neuropsychologist specializing in brain injury rehabilitation and cognitive communication. ➤ No published studies on the effectiveness of the CAMSART program were found. 	<p>Target clientele: Developed for adolescents and adults with traumatic brain injury.</p> <p>Pre-requisite abilities:</p> <ul style="list-style-type: none"> - Using a mouse to point and click - Other pre-requisites: understanding written instructions and basic attention skills. <p>Language: English</p> <p>System requirements: XP SP2, Vista or Windows 7 - 32 or 64 bit platforms ***does run on Windows 10</p> <p>Contact information: https://www.lapublishing.com/CAMSART-cognitive-rehab/ or 919-556-0300</p> <p>Cost: \$120.00</p>	

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		processing between pertinent and irrelevant information.		
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Software	Executive Function Components								<ul style="list-style-type: none"> ➤ Description of the software ➤ Characteristics of the cognitive training 	<ul style="list-style-type: none"> ➤ Development and scientific validity ➤ Effectiveness 	Clinical utility <ul style="list-style-type: none"> ○ Target clientele ○ Pre-requisite abilities ○ Language ○ System requirements ○ Ordering information ○ Cost
	Planning	Problem-Solving	Inhibition	Working Memory	Divided Attention	Flexibility					
DASAT: Divided and Sustained Attention Task			X	X	X			<ul style="list-style-type: none"> ➤ DASAT has been designed as an early intervention tool to develop the cognitive recovery of divided and sustained attention, information processing and working memory following an acquired brain injury or to help delay cognitive decline in neurological degenerative conditions such as Alzheimer’s. ➤ DASAT is a clinical tool for use in hospitals, rehabilitation programs or can easily be set up to be used at home. ➤ DASAT is designed to minimize information overload which is a common problem for people with neurological impairments and to steadily build up cognitive ability. 	<ul style="list-style-type: none"> ➤ Developed by a clinical neuropsychologist specializing in brain injury rehabilitation and cognitive communication. ➤ No published studies on the effectiveness of the DASAT program were found. 	<p>Target clientele: Developed for persons with challenges in divided and sustained attention, information processing, and working memory following acquired brain injury or a neurological degenerative condition.</p> <p>Pre-requisite abilities:</p> <ul style="list-style-type: none"> - Using a mouse to point and click - Other pre-requisites: understanding written instructions and basic attention skills. <p>Language: English</p> <p>System requirements: XP SP2, Vista or Windows 7 - 32 or 64 bit platforms ***does run on Windows 10</p> <p>Contact information: https://www.lapublishing.com/DASAT-attention-cognitive-rehab/ or 919-556-0300</p> <p>Cost: \$120.00</p>	

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		<p>Graded exposure to the task, an intelligent system which automatically adjusts to the user's ability level, on screen user feedback within a user friendly system, and a comprehensive performance history which can be printed or electronically transferred to the medical record make this a useful tool for any practitioner or researcher in neurological impairment.</p>		
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	Planning	Problem-Solving	Inhibition	Working Memory	Divided Attention	Flexibility				
CogniFit	X	X	X	X	X	X	<ul style="list-style-type: none"> ➤ Includes brain training games focusing on auditory short-term memory, contextual memory, divided attention, focus, hand-eye coordination, inhibition, naming, planning, processing speed, recognition, response time, shifting, short-term memory, spatial perception, updating, non-verbal memory, working memory, etc... ✓ Levels of difficulty and training tasks automatically selected by the software (based on the results of a pre-training assessment that determines the user's cognitive profile) ✓ The program automatically adjusts the training 	<ul style="list-style-type: none"> ➤ Developed and validated through neurology, cognitive science and brain research. ✓ Published studies show improvements in cognitive function in healthy older adults. Other studies in individuals with multiple sclerosis, dyslexia, mental health, and intellectual and developmental disabilities 	Target clientele: Developed for healthy older adults and also adults and children with various neurological disorders, learning disabilities or attention disorders Pre-requisite abilities: <ul style="list-style-type: none"> - Using a mouse to point and click - Other pre-requisites: understanding written instructions and basic attention skills. Language: English, French, Spanish (and 7 other languages) System requirements: <ul style="list-style-type: none"> - Internet access Contact information: www.cognifit.com Cost: Free registration. All training free except for some additional applications. 19.99/mo.	

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		<p>progress by monitoring the client's performance</p> <ul style="list-style-type: none">✓ Client's performance is recorded during each training session and presented in a graph; also each cognitive skill is recorded individually✓ Uses auditory and visual feedback✓ iOS and Android Apps are also available.		
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	Planning	Problem-Solving	Inhibition	Working Memory	Divided Attention	Flexibility				
Constant Therapy	X	X	X	X	X	X	<ul style="list-style-type: none"> ➤ 65 evidence-based tasks, with 60,000+ stimuli that are continuously updated and expanded. ➤ Clients access activities through an app on either an iOS or Android device ➤ Constant Therapy has activities impacting on: auditory skills, naming, phonological skills, reading, writing, production, attention, visual skills, memory, problem solving and everyday skills 	<ul style="list-style-type: none"> ➤ Designed by neuroscientists and game developers. Based on principles of neuroplasticity. ➤ The research base developed for the Constant Therapy is in the area of computer-mediated cognitive-communication interventions. ➤ No specific outcome research was found on the Constant Therapy Website. 	<p>Target clientele: Designed for individuals with stroke, traumatic brain injury, and other cognitive, language, or learning disabilities.</p> <p>Pre-requisite abilities:</p> <ul style="list-style-type: none"> - Using a touchscreen tablet device - Other pre-requisites: understanding written instructions and basic attention skills. <p>Language: English</p> <p>System requirements: App-based Utilizes either an iPad or Android Tablet</p> <p>Contact information: https://constanttherapy.com/ or</p> <p>Cost: Free for clinicians For patient: Monthly: 19.99 Yearly 199.99 3 year: 299.99</p>	

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	Planning	Problem-Solving	Inhibition	Working Memory	Divided Attention	Flexibility				
Lumosity	X	X	X	X	X	X	<ul style="list-style-type: none"> ➤ Includes over 50 games and exercises to enhance brain functions ➤ 5 types of game categories available: Speed, memory, attention, flexibility and problem-solving ➤ Uses visual and/or auditory stimuli ✓ Training level of difficulty is automatically adjusted by monitoring the users performance ✓ Training may be customized according to the user's goals exercise varies depending on the exercise; each training session lasts approximately 15 minutes. ✓ Has both iOS and Android apps for use on tablets 	<ul style="list-style-type: none"> ➤ Designed by neuroscientists and game developers. Based on principles of neuroplasticity. ➤ Some studies on Lumosity showed improvements in cognitive and executive function performance after training in survivors of childhood cancer, healthy young adults and persons with mild cognitive impairment. 	Target clientele: All individuals. Pre-requisite abilities: <ul style="list-style-type: none"> - Using a mouse to point and click - Other pre-requisites: understanding written instructions and basic attention skills. - Some exercises require typing on a keyboard Language: English System requirements: Internet Contact information: www.lumosity.com Cost: (as of 2013) Free trial and registration online Monthly : 14.95/month Yearly : 6.95/month Two Year : 4.99/ month Lifetime cost: 299.95 30-day money back guarantee	

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	Planning	Problem-Solving	Inhibition	Working Memory	Divided Attention	Flexibility					
Posit Science: BrainHQ Program	X		X	X				<ul style="list-style-type: none"> ➤ Includes 29 online exercises that work on attention, brain speed, memory, people skills, navigation and intelligence. ➤ Uses auditory and visual stimuli ✓ The program automatically customizes the training progress/level of difficulty according to the client's performance during the exercise ✓ The client is able to design own program, choosing exercises and workouts that meet their personal interests, mood, and/or schedule. 	<ul style="list-style-type: none"> ➤ Developed by neuro- scientists, clinical collaborators and university partners. ➤ Some studies support the effectiveness of the BrainHQ exercises and assessment in outcomes such as memory and auditory processing speed particularly in the healthy aging population. 	<p>Target clientele: More extensively studied in the healthy aging population but can also be used with persons with various clinical conditions (e.g. mild cognitive impairment, traumatic brain injury, Alzheimer's Disease, schizophrenia, however not specifically studied in the stroke population).</p> <p>Pre-requisite abilities:</p> <ul style="list-style-type: none"> - All tasks require the use of a mouse to point and click; - Other pre-requisites: understanding written instructions, functional hearing ability (can be used with hearing aids), and basic attention skills. <p>Language: English</p> <p>System requirements:</p> <ul style="list-style-type: none"> - Internet access <p>Contact information: http://www.positscience.com/</p> <p>Cost: A <i>BrainHQ</i> subscription costs 8\$ per month for a yearly subscription and 14\$ per month for a monthly subscription.</p>	

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	Planning Problem-Solving Inhibition Working Memory Divided Attention Flexibility			
Psychological Software Services				
Cognitive Enhancement Training	X X X X	<ul style="list-style-type: none"> ➤ The Cognitive Enhancement Therapy collection includes 14 therapy exercises that focus on Attention, Memory and Problem Solving skills. ➤ Each of the exercises contains a parameter setup panel so that the difficulty of the exercise can be adjusted. ➤ If working with an individual exhibiting greater than a mild cognitive impairment, the authors recommend using either their Neuropsychonline or PSSCogRehab software products. 	<ul style="list-style-type: none"> ➤ Developed by clinical neuropsychologists and psychologists as a part of the overall Cognitive Enhancement Therapy program. ➤ CET is a performance based, comprehensive, developmental approach to the rehabilitation of social cognitive and neurocognitive deficits. Participants work at recovery through structured group and computer exercises. CET is designed as a recovery phase intervention for symptomatically stable persons with severe mental 	<p>Target clientele: developed for individuals with cognitive and mental health difficulties. Was specifically developed for individuals with Schizophrenia, but has been used more recently with individuals with other neuropsychiatric disorders including: Autism Spectrum Disorders.</p> <p>Pre-requisite abilities:</p> <ul style="list-style-type: none"> - Using a mouse to point and click - Other pre-requisites: understanding written instructions and basic attention skills. <p>Language: English</p> <p>System requirements: USB with password</p> <p>Contact information: https://www.psychological-software.com/products.html or 317/257-9672</p> <p>Cost: 250.00</p>

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			<p>illness, who nonetheless remain socially and vocationally disabled.</p> <ul style="list-style-type: none"> ➤ Published (peer-reviewed) research evidence clearly shows the effectiveness of this tool when used properly in a well formulated treatment program for individuals with Schizophrenia. A growing research base has begun demonstrating its efficacy for individuals with Autism Spectrum Disorders. 	
<p>Neuropsychonline</p>	<p>X X X X X X</p>	<ul style="list-style-type: none"> ➤ This is the online version of the PSSCogRehab software 	<ul style="list-style-type: none"> ➤ This compendium of programs was 30+ years in the making and has been used in over 5000 treatment facilities from around the world. ➤ Published (peer-reviewed) research evidence clearly shows the effectiveness of this tool when used properly in a well formulated treatment 	<p>Target clientele: developed for individuals with cognitive and mental health difficulties.</p> <p>Pre-requisite abilities:</p> <ul style="list-style-type: none"> - Using a mouse to point and click - Other pre-requisites: understanding written instructions and basic attention skills. <p>Language: English</p> <p>System requirements:</p> <ul style="list-style-type: none"> ➤ Internet ➤ Neuropsychonline should run on any up-to-date computer or tablet that can run HTML5 and javascript through a Google Chrome web browser.

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			program.	<p>Contact information: https://www.neuropsychonline.com/index.html or 317-257-9672</p> <p>Cost: Professional: 50.00 per month 275.00 semi-annual 525.00 per year Patient fee: In-office only: no charge Home use: 25.00 per month</p>
PSSCogRehab	X X X X X X	<ul style="list-style-type: none"> ➤ The eight software modules in the PSSCogRehab 2012 system include some sixty-seven computerized therapy tasks, most of which contain User modifiable parameters that extend the utility of each program to fit nearly any requirement presented by your patient or student. The focus of the individual exercises extends from simple attention and executive skills, through multiple avenues and modalities of visuospatial and memory skills, all the way up to problem solving skills ranging from the simple to extremely complex. ➤ The Eight Modules are: Foundations I; Foundations II; Memory I; Memory II; Problem Solving I; Problem Solving II; Visuospatial I; and Visuospatial II. 	<ul style="list-style-type: none"> ➤ This compendium of programs was 30+ years in the making and has been used in over 5000 treatment facilities from around the world. ➤ Published (peer-reviewed) research evidence clearly shows the effectiveness of this tool when used properly in a well formulated treatment program. 	<p>Target clientele: developed for individuals with cognitive and mental health difficulties.</p> <p>Pre-requisite abilities:</p> <ul style="list-style-type: none"> - Using a mouse to point and click - Other pre-requisites: understanding written instructions and basic attention skills. <p>Language: English, Spanish, and Korean</p> <p>System requirements:</p> <ul style="list-style-type: none"> ➤ USB Drive ➤ Windows XP or higher or Apple Mac OSX <p>Contact information: https://www.psychological-software.com/products.html or 317/257-9672</p> <p>Cost: \$2500 1st purchase \$800.00 each for same facility</p>

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Software	Executive Function Components							<ul style="list-style-type: none"> ➤ Description of the software ➤ Characteristics of the cognitive training 	<ul style="list-style-type: none"> ➤ Development and scientific validity ➤ Effectiveness 	Clinical utility <ul style="list-style-type: none"> ○ Target clientele ○ Pre-requisite abilities ○ Language ○ System requirements ○ Ordering information ○ Cost
	Planning	Problem-Solving	Inhibition	Working Memory	Divided Attention	Flexibility				
RehaCom	X	X	X	X	X	X	<ul style="list-style-type: none"> ➤ More than 20 computerized therapy modules are available to help your clients improve cognitive function and compensatory skills in attention, memory, executive functions, and visual field. ➤ Screening— Choose from nine screening modules to test cognitive impairment ➤ Specialized modules— Choose appropriate therapy modules, each with hundreds of tasks 	<ul style="list-style-type: none"> ➤ RehaCom is a computerized therapy tool developed by experts and therapists that focuses on the rehabilitation of cognitive impairments. No specific information was provided about the developers on the website. ➤ No published studies on the effectiveness of this software were found. 	<p>Target clientele: Developed for individuals 8 years to adult who have had a stroke, traumatic brain injury, or who have a degenerative neurological disorder.</p> <p>Pre-requisite abilities:</p> <ul style="list-style-type: none"> - Using a mouse to point and click - Other pre-requisites: understanding written instructions and basic attention skills. <p>Language: Available in 20+ language at no extra cost including English</p> <p>System requirements: Utilizes a propriety interface panel for responses</p> <p>Contact information: http://www.pearsonclinical.com/psychology/products/100001914/rehacom-for-cognitive-therapy-after-stroke-or-tbi.html#tab-details or 1-888-783-6363</p> <p>Cost:</p> <p>Annual Licenses: 1 year license with panel: 1495.00 2 year license with panel: 2495.00 3 year license with panel: 3495.00</p>	

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		<p>featuring different levels of difficulty from very simple to highly complex</p> <ul style="list-style-type: none">➤ Custom settings— Individualize the therapy with parameters that can be adjusted to control duration, number of tasks, working speed, feedback, etc.➤ Client workflow— Introduce therapy tasks and allow the client to work independently for 15 to 60 minutes as the computer provides monitoring and feedback		
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Appendix 6: Speech Therapy Software Companies Whose Programs May Benefit Individuals with Executive Functioning Deficits

Bungalow Software: <http://bungalowsoftware.com/>

- **Direction Following +Outloud:** Patient hears and/or reads directions and follows them by moving shapes on the screen with the mouse or keyboard. If the patient answers incorrectly, program provides helpful suggestions in a human voice, like "*that's the wrong shape. You should be moving the large red triangle*". Improves ability to understand, remember, and execute instructions, both written and verbal (out loud in a human voice).
- **Categories and Words:** Teaches patient which words or concepts belong together (apple, orange, banana: all fruit). At the higher level, the patient just deduce what several objects have in common and what other objects might belong in that group.
- **Moriarity Mystery Dinner:** This is a challenging program for cognitive therapy. Provides a nearly unlimited selection of puzzles in wide variety of difficulty settings. If the puzzle is too difficult the user can get unlimited hints and even have the puzzles solved automatically. Exercises cognitive/logical/ deductive reasoning skills

Parrot Software: <http://www.parrotsoftware.com/>

- **Cause and Effect:** A situation is presented: There is a rip in a feather pillow, what will probably happen? The user chooses between 4 options that could happen: "The pillowcase cover will fade; The pillowcase will shrink; The feathers will come out; and The feathers will smell." The user must choose the most likely option given the circumstances.
- **Category Discrimination and Reasoning:** In the 1st step, a list of words is presented in which all but one belong to the same category and the user must identify the one that does not belong. In the 2nd step the user finds the reason the word does not belong. In the 3rd step, the user finds a word that belongs in the first list.

The stimuli are graded from simple to complex vocabulary and degree of abstractness. 20 informative lessons are provided.

- **Conditional Statements:** This program presents a challenging language task. A hierarchy of conditional statements is presented either visually or auditorily. A simple instruction would be: If sun is in box 12 click rain. Otherwise click clouds. A complex instruction would be: if sun is not in box 3 or rain is in box 20, click clock. Otherwise click car. The program provides stimuli within the following five different lesson types: Simple Conditional, Negative Conditional, Conditional Conjunctive and, Conditional Conjunctive or, Negative/Positive Conditional Conjunctive
- **Deductive Reasoning:** Deductive Reasoning was designed to facilitate reasoning skills in relatively high level cognitively impaired people. Each problem has a set of rules that describe a class of words. The user is presented with words and asked to determine whether each is a member of the class. For example, in one class, lion and dog belong but desk and tree do not belong. (Obviously the class is animals) The user is asked: Does elephant belong? What about flower? Finally, the user is asked to identify the class.
- **Logical Thinking:** Users are asked to move a picture to a certain location. Lesson types include: Put baseball on a red square that is not even numbered; Put baseball on a red, even numbered square; If 10 is an odd number then put baseball below box 10. Otherwise put baseball above box 10; If box 18 is blue or box 4 is green then put baseball in the upper-right hand corner. Otherwise put baseball in box 4.; If box 19 is yellow put baseball in the upper right hand corner. Otherwise put baseball in box 19.; If box 19 is not yellow put baseball in the upper right hand corner. Otherwise put baseball in box 19.
- **Problem Solving:** A problem is presented like 'A couple with three children wants to have a quiet weekend together. What is the best way to ensure that?' The user chooses between a list of four options that could theoretically all be solutions like: Tranquilize the children; Send the children outside to play; Tell the children to watch TV all weekend; and Send the children to a relative's home. The user chooses the most likely and solution.
- **Situational Reasoning:** A real-life situation is presented like 'You burn your hand. What is the first thing to do?' The user chooses between a list of 4 alternatives like: Put on a mitten; Put on a Band-Aid; Put your hand under cold water; and Put your hand under hot water. The user is instructed to choose the best alternative.
- **Auditory and Visual Instructions:** Four geometric forms are displayed. Then, a description of one of the geometric forms is presented using the attributes of size, color, and shape, e.g. large, yellow, and square. The user must identify the geometric form that fits the description. Four levels of lessons of varying degrees of

difficulty are included. Problems are generated randomly. The difficulty of the task is related to the similarity between the geometric forms displayed. The more similar the form, the fewer the distinguishing features between geometric forms and therefore, the easier the task. For example, if all four geometric forms are large circles, the only difference between them can be a color difference.

- Concentration: Users are presented with a grid of randomly placed picture pairs. Users try to remember where each pair is located. The pictures in the grid are then hidden and the user must identify the location of each pair, one at a time.
- Inhibiting Repetitive Behaviors: A word is presented and the user is given a short time to respond to the question 'Does this word belong to the category?' Users respond by clicking on the word if it belongs to the category or doing nothing if the word does not belong to the category. Users learn to inhibit the clicking response for words that do not belong to the category.
- Multi-Tasking: Multitasking is a program that requires users to keep track of from 2 to 5 different events. Users select the number of events and then geometric shapes are presented one at a time. Users must keep track of how many times each shape was presented.
- Remembering Auditory Patterns: A 16 item grid is displayed. Users then hear a sound while one of the squares in the grid moves side to side. Another item is presented in the same manner. Then the user is asked to identify the square associated with the first sound and then the square associated with the second sound. In lesson 2, 3 sounds are presented, lesson 3 has 4 sounds and so on.
- Remembering Written Directions: Written directions are given requesting the user to move small pictures to special locations on the screen. The pictures are moved with a mouse. If a picture is moved to the correct screen location, a positive reinforcement is provided. The number of different directions can be set between one and five to increase the difficulty of the task
- Remembering Spoken Directions: Written directions are given requesting the user to move small pictures to special locations on the screen. The pictures are moved with a mouse. If a picture is moved to the correct screen location, a positive reinforcement is provided. The number of different directions can be set between one and five to increase the difficulty of the task
- Remembering Sounds: Between 2 and 6 sounds are presented and the user is instructed to remember this list of sounds. Next, a new sound is presented and the user must determine whether this sound was in the list of sounds to be remembered.

- Remembering Spoken Letters: This program is designed to test and exercise short-term memory skills. A list of between 1 and 7 letters is spoken and the user must recall the entire list in the correct order
- Remembering Spoken Numbers: This program is designed to test and exercise short-term memory skills. A list of between 1 and 7 numbers is spoken and the user must recall the entire list in the correct order.
- Remembering Visual Patterns: The format is to present a picture grid of 16 pictures and then to temporarily remove some of the pictures revealing a pattern comprised of between 1 and 9 pictures. The user is asked to remember the pattern displayed. The original 16 pictures are then displayed again to hide the pattern. The user is asked to click the pictures that formed the pattern.
- Remembering Written Letters: This program is designed to test and exercise short-term memory skills. A list of between 1 and 7 letters is displayed and the user must recall the entire list in the correct order.
- Remembering Written Numbers: This program is designed to test and exercise short-term memory skills. A list of between 1 and 7 numbers is displayed and the user must recall the entire list in the correct order.
- Two Letter Cancellation: Letter cancellation tasks are widely used in clinical and research to combat dysfunction of attention/concentration, visual-spatial scanning, and spatial neglect. User are shown a large grid of random letters and asked to click on every occurrence of two different letters.
- Visual Attention Training: Visual Attention and Training was designed to provide support for individuals with attention deficits. Three types of visual attention training are provided representing varying degrees of difficulty. The attention conditions from simplest to most difficult are: Focused Attention, Selective Attention, and Alternating Attention. Focused Attention requires watching for one event to occur and responding only when it does. Selective Attention is similar to Focused Attention except that an element of visual distraction is added. Alternating Attention requires attending to one stimulus for a period of time and then switching attention to another stimulus
- Visual Distraction: In this activity the user is shown 5 colored rectangles with incorrect color labels. For example the blue square may be labeled “green”. The instruction to the user is to click on the box with a specific color. The labels are distractions and force the user to inhibit the natural tendency to click on the label rather than the actual color

Appendix 7: Games/Apps for Working on Selected Executive Functioning Skills

<http://learningworksforkids.com/>

Executive Function	Games	Apps
Flexibility	Ticket to Ride Minecraft-Story Mode Lifeline Evoland Pokemon Go Never Alone Lightbot: Code Hour Thomas Was Alone Social Chess ZigZag Brain Rush Flow Free Mazement TinkerBox	iMaschine Inspire Photoblend Snapchat PicLab Vivoom CodeAcademy Pixplit Seene Magistro Keezy SpacePaint Versu Xtranormal
Working Memory	Whispering Willows Trivia Crack Back to Bed Icomania The Room Stealth Inc Cordy QuizUp Pivvot Hidden Chronicles Layton Brothers: Mystery Room Letris and Friends Tap Tap Revenge Tour Super Hexagon	StudyBlue Pines to Vines Elevate City Guides by National Geographic Roblox Quizlet Musyc Graphs Poems by Heart Dyscalculator Bitsboard Vocabulary SkyView

Appendix 8: Apps that Can be Used in Therapy

App	Impulse Control	Flexibility	Working Memory
Tactus Apps <ul style="list-style-type: none"> • Number therapy • Category therapy • Visual attention • Spaced retrieval 	X	X	X X X
CogMed			X
Zones of Regulation	X	X	
Zones of Regulation: Exploring Emotions	X		
Social Detective	X	X	
Virtual Speech Center <ul style="list-style-type: none"> • Auditory workout • Word retrieval • Comprehension Aphasia • Functional listening 			X X X X
Let's Talk About Self-Control	X		
Memorise	X		X
Brain Trainer Working Memory Training			X
n-back			
Double Dynamo	X	X	X
NeuroNation Brain Training	X	X	X
Lumosity	X	X	X

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App	Impulse Control	Flexibility	Working Memory
360 Thinking Time Tracker	X	X	X
Tanzen	X	X	X
Tangram Block Puzzle by Boy Howdy		X	X
SET	X	X	X
Trail Making Test J		X	X
Wisconsin Card Sorting Test J		X	X
BAC/BACS Cognitive Assessment		X	X
C.A.T Rapid			
Standardized Touchscreen Assessment of Cognition	X	X	X
Functional Standardized Touchscreen Assessment of Cognition		X	X
Memorado Brain Training	X	X	X

Appendix 9: Board and Card Games

Games	Impulse Control	Flexibility	Working Memory
Apples to Apples		X	
Blink	X	X	X
Blokus		X	
Brick by Brick		X	X
Concept		X	
Consequences	X		
Creative Color Cubes			X
Create-a-Maze		X	X
Distraction			X
Emotes Rescue Quest	X	X	
Forbidden Island		X	
iTrax		X	X
Kimochi	X	X	
Mad Dragon	X		
Mandala Coloring Books	X	X	
Mental Blox		X	X
Mindful Matters	X	X	
On the Dot		X	
Pixy Cubes		X	X
Rush Hour		X	

Games	Impulse Control	Flexibility	Working Memory
Sequence		X	X
Set Cards	X	X	X
Shape by Shape		X	X
Simon	X		X
Square by Square			X
Stare		X	X
Stop, Relax, and Think	X		
Swish		X	
Telestrations		X	
Visual Brainstorms		X	X
Ryuu Cards	X	X	

Appendix 10: Examples of Assistive Technology Tools

Tool	Impulse Control	Flexibility	Working Memory
Smartwatches <ul style="list-style-type: none"> • Apple Watch • Samsung Gear • Casio Smart Outdoor Watch 	X	X	X
Talking Photo Albums	X		X
Livescribe Pens			X
White Noise Machine	X		
FM System	X		
iLs/Listening Program	X	X	
Voice Recorder			X
Post-It Notes			X
Vibrating Alarm Watch	X		X
Noise-canceling headphones	X	X	
Endeavor Mobile Independence	X		X
Biofeedback	X	X	
Neuropage	X		X

Tool	Impulse Control	Flexibility	Working Memory
Planning and Execution Assistant and Trainer	X		X
Micro-prompting technologies			X
Word Prediction Software	X		
Mind/Concept Mapping		X	X
Smartphone/Electronic Organizer	X		X

Adapted from: (Scherer, 2012), (Dewar, Kobelman, Kapur, & Wilson, 2015), (Jamieson & Evans, 2015), (LoPresti, Bodine, & Lewis, 2008) and (O'Neill & Manly, 2015)

Appendix 11: Complementary and Alternative Medical Approaches that May Benefit Individuals with Deficits in Executive Functions

CAM Approach	➤ Description of the CAM Approach	<ul style="list-style-type: none"> ○ Target clientele ○ Contact information
<p>Forbrain (information from the Forbrain website)</p>	<p>FORBRAIN® headphones leverage high frequency vibration to help the user create and process sound. The patented electronic dynamic filter blocks out environmental noise—isolating and amplifying the user’s voice, giving the nervous system a solid sensory workout. It also enhances long vowels and other sounds critical to the construction of language. The resulting sound is delivered through the bones and bone conduction, not the ears or air conduction, to the nervous system and brain.</p>	<p>Forbrain is suitable from 3 years old to adult (with some exceptions – please see details in this section). The voice and the ear plays an important role in our ability to communicate. Forbrain is used in a personal developmental approach (public speaking, improvement of the spoken and singing voice) and also as a therapeutic approach to help people with more severe disorders.</p> <p>Forbrain is a painless and noninvasive sensory stimulation apparatus. Like any stimulation, Forbrain can excite and tire the user during the sessions. Forbrain is not suitable for:</p> <ul style="list-style-type: none"> • Children under 3 years • For people with Parkinson's disease • People with hearing loss in both ears of 80% • People carrying a Cochlear Implant • People with epilepsy (except on advice of a specialist) <p>Contact Information: https://www.forbrain.com</p>
<p>Integrated Listening System (iLs) (information from the Integrated Listening System website)</p>	<p>iLs is a complementary approach which can be integrated into a broad variety of practices such as occupational therapy, speech therapy, physical therapy, ADHD coaching, Autism specialties, psychology/counseling, neurofeedback, sports coaching, chiropractic care and others. iLs programs are based on the principle of neuroplasticity, providing gentle and specific stimulation (music and movement) in order to activate the neural pathways used in the processing of sensory information. iLs trains for brain/body integration through a staged approach, starting with the fundamentals of sensory integration and then extending through more</p>	<p>Integrated Listening may benefit a wide variety of individuals of various ages who might exhibit difficulties with:</p> <ul style="list-style-type: none"> • Attention • Regulation • Auditory Processing • Learning • Reading • Sensory Processing • Speech <p>Contact Information:</p>

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	complex cognitive functions, including language, self-expression and social skills.	http://integratedlistening.com/ or (303) 741-4544
<p>Interactive Metronome (IM)</p> <p>(information from Interactive Metronome website)</p>	Interactive Metronome® (IM) is an evidence-based assessment and training tool that helps strengthen the brain’s ability to synchronize thought and movement to a steady metronome beat. IM responds to a client’s physical performance by providing real-time auditory and visual millisecond feedback indicating whether they are hitting before, after or in sync with the beat. The overall goal of IM training is to improve timing in the brain, or Neurotiming, through rhythm and repetition.	<p>Interactive Metronome may benefit a wide variety of individuals of various ages who might exhibit:</p> <ul style="list-style-type: none"> • ADHD • Autism Spectrum Disorder • Sensory Processing Disorder • Learning Disabilities • Developmental Delays • Cerebral Palsy • Auditory Processing Disorder • Dyslexia • Brain Injury and Concussion • Stroke • Parkinson’s • Dementia <p>Contact Information:</p> <p>https://www.interactivemetronome.com or (877) 994-6776</p>
<p>The Listening Program</p> <p>(information from Advanced Brain Technologies The Listening Program website)</p>	The Listening Program®(TLP) is a music listening method, personalized to improve brain fitness at any age or level of ability. Used and trusted by hundreds of thousands of people in over 35 countries, TLP is offered through our international network of trained providers.	<p>TLP has global effects on the brain, and is commonly used to support changes in a wide range of brain performance areas:</p> <ul style="list-style-type: none"> • Executive Function • Communication • Auditory Processing • Social & Emotional Function • Stress Response • Motor Coordination • Creativity <p>Contact information:</p> <p>http://a.advancedbrain.com/tlp/the_listening_program.jsp or 888-228-1798</p>
<p>Therapeutic Listening</p>	<i>Therapeutic Listening</i> is a specific sound-based intervention that is embedded in a developmental and sensory integration perspective. The music in Therapeutic Listening gives the listener unique and precisely	<p><i>Therapeutic Listening may benefit a wide variety of individuals of various ages who might exhibit:</i></p> <ul style="list-style-type: none"> • poor attention • difficulties interacting with peers and limited play skills

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<p>(information from vitallinks.com website)</p>	<p>controlled sensory information. The music is electronically modified to highlight the parts of the sound spectrum that naturally capture attention and activate body movement, synchronizing it with the environment. Therapeutic Listening uses electronic modifications, along with the organized, rhythmical sound patterns inherent in music, to trigger the self-organizing capacities of the nervous system.</p>	<ul style="list-style-type: none"> • challenges with transitions or changes in routine • difficulty communicating (both verbal and non-verbal) • struggles with sleep, bowel and bladder control, and eating • trouble following directions • challenges perceiving and navigating space • poor timing and sequencing of motor skills • difficulties with irritability, mood • difficulties with regulating their energy level (i.e. too low arousal or hyperactive) • postural insecurity (fear of heights, playing on playground equipment) • abnormal responses to various sensory stimuli (sounds, touch, taste, pain) • poor praxis and motor planning: coming up with an idea, planning, and completing the task • difficulty responding to sounds and verbal directions <p>Contact Information:</p> <p>https://vitallinks.com/ or (608) 270-5424</p>
<p>Tomatis Method</p>	<p>The Tomatis® Method is a pedagogical method used to improve the listening of a person whose hearing functions correctly. It works thanks to a device that causes musical contrasts by suddenly and unpredictably changing the timbre and intensity of the music.</p>	<p><i>The Tomatis Method</i> may benefit a wide variety of individuals of various ages who might exhibit:</p> <ul style="list-style-type: none"> • Learning Difficulties and Language Disorders • Attention Disorders • Affective and Emotional Disorders • Communication Disorders • Psychomotor Difficulties • Pervasive Developmental Disorder • Need for improvement of the voice and of musicality • Need to integrate foreign languages <p>Contact Information:</p> <p>http://www.tomatis.com/</p>

Appendix 12: Websites

1. <http://cognitiveconnectionstherapy.com/>--Sarah Ward's website for her innovative Executive Functioning training and approach. Includes links to executive function websites, materials, and products that will benefit anyone working with individuals struggling with executive functioning skills.
2. <http://www.crporegon.org/Page/280>--Columbia Regional Programs ASD Transition Toolkit website Unit 3.3: Executive Function and Organization
3. <http://executivefunctioningsuccess.com/>--Marydee Sklar's website for her Seeing My Time program.
4. <http://efscoach.com/>--wonderful product for working on planning and time management.
5. <http://www.smartbutscatteredkids.com/>--Peg Dawson and Richard Guare's website for their formative works on executive functioning.

Bibliography

- Aduen, P. A., Rich, B. A., Sanchez, L., O'Brien, K., & Alvord, M. K. (2014). Resilience Builder Program Therapy Addresses Core Social Deficits and Emotion Dysregulation in Youth with High-Functioning Autism Spectrum Disorder. *Journal of Psychological Abnormalities*.
- Agrell, B., & Dehlin, O. (1998). The clock-drawing test. *Age and Aging*, 399-403.
- Alloway, T. P. (2006). How does working memory work in the classroom? . *Educational Research and Reviews* , 134-139.
- Alloway, T. P., Rajendran, G., & Archibald, L. M. (2009). Working Memory in Children with Developmental Disorders. *Journal of Learning Disabilities*, 372-382.
- Aspy, R., Grossman, B. G., Myles, B. S., & Henry, S. A. (2016). *FBA to Z: Functional Behavior and Intervention Plans for Individuals with ASD*. Lenexa: AAPC Publishing.
- Axelrod, E., Barnes, J., Baum, J., Burke, S., Burn, L., Colucci, M. A., . . . Xenakis, M. (2012, August). *Executive Functioning: A Handbook for Grades K-12 Jericho Public Schools Office of Pupil Personnel Services* . Récupéré sur Jericho Schools: http://www.jerichoschools.org/UserFiles/Servers/Server_5887727/File/Special%20Education/ExecutiveFunctioning.pdf
- Barkley, R. A. (2012). *Executive Functions: What They Are, How They Work, and Why They Evolved*. New York: The Guilford Press.
- Benigas, J. E., Brush, J. A., & Elliot, G. M. (2016). *Spaced Retrieval Step by Step: An Evidence-Based Memory Intervention*. Baltimore: Health Professions Press, Inc.
- Bernard-Opitz, V., & HauBler, A. (2011). *Visual Support for Children with Autism Spectrum Disorders: Materials for Visual Learners*. Shawnee Mission: AAPC Publishing.
- Best, J. R., & Miller, P. H. (2010). A Developmental Perspective on Executive Function. *Child Development*, 1641-1660.
- Blakemore, S.-J., & Choudhury, S. (2006). Development of the adolescent brain implications for executive function and social cognition. *Journal of Child Psychology and Psychiatry*, 296-312.
- Blakemore, S.-J., & Robbins, T. W. (2012). Decision-making in the adolescent brain. *Nature Neuroscience*, 1184-1191.
- Bownds, D. (2008, February 29). *A primer on executive function in the prefrontal cortex*. Consulté le August 1, 2008, sur mindblog.dericbownds.net: mindblog.dericbownds.net/2008/2/primer-on-executive-function-in.html

- Canas, J. J., Fajardo, I., & Salmeron, L. (2006). Cognitive Flexibility. Dans W. Karwowski (Éd.), *International encyclopedia of ergonomics and human factors* (pp. 296-300). Boca Raton: CRC Press.
- Carr, E. G., Levin, L., McConnachie, G., Carlson, J., Kemp, D. C., & Smith, C. E. (1994). *Communication-Based Intervention for Problem Behavior: A User's Guide for Producing Positive Change*. Baltimore: Paul H Brookes Publishing Co.
- Cartwright, K. B. (2015). *Executive Skills and Reading Comprehension: A Guide for Educators*. New York: The Guilford Press.
- Cohen, M. J., & Sloan, D. L. (2007). *Visual Supports for People with Autism: A Guide for Parents & Professionals*. Bethesda: Woodbine House.
- Cozolino, L. (2006). *The Neuroscience of Human Relationships*. New York: W.W. Norton & Company.
- Crosby, G., & Lippert, T. (2015). *Transforming ADHD: Simple, Effective Attention and Action Regulation Skills to Help You Focus and Succeed*. Oakland: New Harbinger Publications, Inc.
- Dajani, D. R., & Uddin, L. Q. (2015). Demystifying cognitive flexibility: Implications for clinical and developmental neuroscience. *Trends in Neurosciences*, 1-8.
- Dawson, P., & Guare, R. (2009). *Smart but Scattered*. New York: The Guilford Press.
- Dawson, P., & Guare, R. (2010). *Executive Skills in Children and Adolescents: A Practical Guide to Assessment and Intervention, Second Edition*. New York: The Guilford Press.
- Dawson, P., & Guare, R. (2012). *Coaching Students with Executive Skills Deficits*. New York: The Guilford Press.
- Dawson, P., & Guare, R. (2014). Interventions to Promote Executive Development. Dans S. Goldstein, & J. A. Naglieri (Éds.), *Handbook of Executive Functioning*. New York: Springer.
- Dawson, P., & Guare, R. (2016). *The Smart but Scattered Guide to Success: How to Use Your Brain's Executive Skills to Keep Up, Stay Calm, and Get Organized at Work and at Home*. New York: The Guilford Press.
- Deak, G. O. (2003). The Development of Cognitive Flexibility and Language Abilities. *Advances in Child Development*, 271-327.
- Dehn, M. J. (2008). *Working Memory and Academic Learning: Assessment and Intervention*. Hoboken: John Wiley & Sons, Inc.
- Dehn, M. J. (2011). *Helping Students Remember: Exercises and Strategies to Strengthen Memory*. Hoboken: John Wiley & Sons, Inc.
- Dehn, M. J. (2014). Supporting and Strengthening Working Memory in the Classroom to Enhance Executive Functioning. Dans S. Goldstein, & J. A. Naglieri (Éds.), *Handbook of Executive Functioning*. New York: Springer.

- Denes, G. (2016). *Neural Plasticity Across the Lifespan: The the brain can change*. New York: Routledge.
- Denys, K., Kerns, K., Pei, J., MacSween, J., Rasmussen, C., Treit, S., & Beaulieu. (2011). *Executive Functioning Training in Children with Fetal Alcohol Spectrum Disorders*. Victoria, Alberta, Canada.
- Dewar, B.-K., Kobelman, M., Kapur, N., & Wilson, B. A. (2015). Assistive Technology for memory. Dans B. O'Neill, & A. Gillespie (Éds.), *Assistive Technology for Cognition: A handbook for clinicians and developers*. New York: Psychology Press.
- Diamond, A. (2012). Activities and Programs That Improve Children's Executive Functions. *Current Directions in Psychological Science*, 335-341.
- Diamond, A. (2013). Executive Functions. *Annual Review of Psychology*, 135-168.
- Diamond, A. (2014). Want to Optimize Executive Functions and Academic Outcomes? Simple, Just Nourish the Human Spirit. Dans *Minnesota Symposia on Child Psychology: Developing Cognitive Control Processes--Mechanisms, Implications, and Interventions* (pp. 2015-2030). New York: Wiley.
- Diamond, A., & Lee, K. (2011). Interventions shown to Aid Executive Function Development in Children 4-12 Years Old. *Science*, 959-964.
- DiPipi-Hoy, C., & Steere, D. (2016). *Teaching Time Management to Learners with Autism Spectrum Disorder*. Lenexa: AAPC Publishing.
- Drazinski, L. A. (2011). *Executive Functions Training Adolescent*. LinguiSystems.
- Durand, V. M. (1990). *Severe Behavior Problems: A Functional Communication Training Approach*. New York: The Guilford Press.
- Elbert, T., & Rockstroh, B. (2004). Reorganization of Human Cerebral Cortex: The Range of Changes following Use and Injury. *The Neuroscientist*, 10(2), 129-141.
- Feuerstein, R., Falik, L. H., Feuerstein, R. S., & Bohacs, K. (2013). *A Think-Aloud and Talk-Aloud Approach to Building Language*. New York: Teachers College Press.
- (2015). *Findings and conclusions: National standards project, phase 2*. Randolph: National Autism Center.
- Forgan, J. W., & Richey, M. A. (2015). *The Impulsive, Disorganized Child: Solutions for Parenting Kids with Executive Functioning Difficulties*. Waco: Prufrock Press, Inc.
- Fralick-Ball, S. (2012). *Executive Dysfunction: Effective Strategies & Interventions for Children & Adolescents*. Eau Claire: CMI Education.
- Gagnon, E., & Myles, B. S. (2016). *The Power Card Strategy 2.0: An Evidence-Based Practice*. Shawnee Mission: AAPC Publishing.

- Gallagher, R., Abikoff, H. B., & Spira, E. G. (2014). *Organizational Skills Training for Children with ADHD*. New York: The Guilford Press.
- Gathercole, S. E., Lamont, E., & Alloway, T. P. (2006). Working Memory in the Classroom. Dans S. J. Pickering (Éd.), *Working Memory and Education* (pp. 219-240). Oxford: Elsevier.
- Gioia, G. A., & Isquith, P. K. (2013). Behavior Rating Inventory of Executive Function (BRIEF). WPS.
- GLOOM. (2017, January 18). *What is Cognitive Flexibility?* Récupéré sur Mental Health Daily: <http://mentalhealthdaily.com/2015/07/24/what-is-cognitive-flexibility/>
- Goldstein, S., Naglieri, J. A., Princiotta, D., & Otero, T. M. (2014). Introduction: A History of Executive Functioning as a Theoretical and Clinical Construct. Dans S. Goldstein, & J. A. Naglieri (Éds.), *Handbook of Executive Functioning*. New York: Springer.
- Gottschall, C. P. (2011). *Executive Functions Training Elementary*. LinguiSystems.
- Granpeesheh, D., Tarbox, J., Najdowski, A. C., & Kornack, J. (2014). *Evidence-Based Treatment for Children with Autism: The CARD Model (Practical Resources for the Mental Health Professional)*. Waltham: Academic Press.
- Gray, C. (1994). *Comic Strip Conversations: Illustrated interactions that teach conversation skills to students with autism and related disorders*. Arlington: Future Horizons.
- Gray, C. (2010). *The New Social Story Book: Over 150 Social Stories that Teach Everyday Social Skills to Children with Autism or Asperger's Syndrome, and their Peers*. Arlington: Future Horizons.
- Guare, R., Dawson, P., & Guare, C. (2013). *Smart but Scattered Teens*. New York: The Guilford Press.
- Hadani, H. (2013). *shared discoveries: positive parent-child relationships and child development*. Sausalito: Center for Childhood Creativity.
- Henry, L. (2012). *The Development of Working Memory in Children*. London: Sage Publications Ltd.
- Herman, K. C., Reinke, W. M., Frey, A. J., & Shepard, S. A. (2014). *Motivational Interviewing in Schools: Strategies for Engaging Parents, Teachers, and Students*. New York: Springer Publishing Company, LLC.
- Hickmott, P. W., & Ethell, I. M. (2006). Dendritic Plasticity in the Adult Neocortex. *Neuroscientist*, 16-28.
- Hodgdon, L. (1995). *Visual Strategies for Improving Communication: Practical Supports for School and Home*. Troy: QuirkRoberts Publishing.
- Hodgdon, L. A. (1999). *Solving Behavior Problems in Autism: Improving Communication with Visual Strategies*. Troy: QuirkRoberts Publishing.

Executive Functioning and Cognitive Control ~ Joseph Falkner, MST/CCC-SLP

- Hunter, S. J., Hinkle, C. D., & Edidin, J. P. (2012). The neurobiology of executive functions. Dans S. J. Hunter, & E. P. Sparrow (Éds.), *Executive Function and Dysfunction: Identification, Assessment and Treatment*. Cambridge: Cambridge University Press.
- Hutaff, S. E., & Henry, B. S. (2013, November 20-22). From A to Z Successfully: Improving Executive Skills in children. Greensboro, North Carolina, United States.
- Hwang, Y.-S., & Kearney, P. (2015). *A Mindfulness Intervention for Children with Autism Spectrum Disorder: New Directions in Research and Practice*. New York: Springer.
- Jacques, S., & Zelazo, P. (2005). Language and the Development of Cognitive Flexibility: Implications for Theory of Mind. Dans *Why Language Matters for Theory of Mind*. Oxford: Oxford University Press.
- Jamieson, M., & Evans, J. J. (2015). Assistive technology for executive functions. Dans B. O'Neill, & A. Gillespie (Éds.), *Assistive Technology for Cognition: A handbook for clinicians and developers*. New York: Psychology Press.
- Jensen, E. (1998). *Teaching with the brain in mind*. Alexandria: Association for Supervision and Curriculum Development.
- Johnston-Tyler, J. (2014). *The CEO of Self: An Executive Functioning Workbook*. Clara: EvoLibri Consulting.
- Kashdan, T. B., & Rottenberg, J. (2010). Psychological flexibility as a fundamental aspect of health. *Clinical Psychology Review*, 865-878.
- Kaufman, C. (2010). *Executive Function in the Classroom: Practical Strategies for Improving Performance and Enhancing Skills for All Students*. Baltimore: Paul H Brookes Publishing Co.
- Kenworthy, L., Anthony, L. G., Alexander, K. C., Werner, M. A., Cannon, L., & Greenman, L. (2014). *Solving Executive Function Challenges: Simple Ways to Get Kids with Autism Unstuck and On Target*. Baltimore: Paul H Brookes Publishing Co.
- Kiep, M., Spek, A. A., & Hoeben, L. (2015). Mindfulness-Based Therapy in Adults with an Autism Spectrum Disorder: Do Treatment Effects Last? *Mindfulness*.
- Kleim, J., & Jones, T. (2008). Principles of Experience-Dependent Neural Plasticity: Implications for Rehabilitation After Brain Damage. *Journal of Speech, Language, and Hearing Research*, 51, S225-S239.
- Kreslins, A., Robertson, A. E., & Melville, C. (2015). The effectiveness of psychosocial interventions for anxiety in children and adolescents with autism spectrum disorder: a systematic review and meta-analysis. *Child and Adolescent Psychiatry and Mental Health*, 1-12.
- Kulman, R. (2012). *Train Your Brain for Success: A Teenager's Guide to Executive Functions*. Plantation: Specialty Press, Inc.

Executive Functioning and Cognitive Control ~ Joseph Falkner, MST/CCC-SLP

- Livanis, A., Mertturk, A., Benvenuto, S., & Mulligan, C. A. (2014). Treatment Integrity in Interventions That Target the Executive Function. Dans S. Goldstein, & J. A. Naglieri (Éds.), *Handbook of Executive Functioning*. New York: Springer.
- LoPresti, E., Bodine, C., & Lewis, C. (2008). Assistive Technology for Cognition: Understanding the Needs of Persons with Disabilities. *IEEE Engineering in Medicine and Biology Magazine*, 29-39.
- McCloskey, G. (2016). *Improving Executive Functions*. Eau Claire: PESI, Inc.
- McCloskey, G., Perkins, L. A., & Divner, B. V. (2009). *Assessment and Intervention for Executive Function Difficulties*. New York: Routledge.
- McLeod, A. (2013, April). CBT in Autism Spectrum Disorders: The Role of the Speech and Language Therapist. Dublin, Ireland.
- Meltzer, L. (2010). *Promoting Executive Function in the Classroom*. New York: The Guilford Press.
- Merzenich, M. M., Nahum, M., & Van Vleet, T. M. (Éds.). (2013). *Changing Brains: Applying Brain Plasticity to Advance and Recover Human Ability: 206 (Progress in Brain Research)*. Oxford: Elsevier.
- Mitchell, C. (2015, January 30). "You Can't Make Me!"-Effective Techniques for Managing Highly Resistant Clients. Poway, CA, United States.
- Moraine, P. (2012). *Helping Students Take Control of Everyday Executive Functions: The Attention Fix*. Philadelphia: Jessica Kingsley Publishers.
- Naar-King, S., & Suarez, M. (2011). *Motivational Interviewing with Adolescents and Young Adults*. New York: The Guilford Press.
- Ochsner, K., & Gross, J. (2008). Cognitive emotion regulation: Insights from social cognitive and affective neuroscience. *Current directions in psychological science*, 153-158.
- O'Neill, B., & Manly, T. (2015). Assistive technology for arousal, alertness, and attention. Dans B. O'Neill, & A. Gillespie (Éds.), *Assistive Technology for Cognition: A handbook for clinicians and developers*. New York: Psychology Press.
- Ory, N. (2006, February 24). The meaning of and the use of "structure". Cobble Hill, British Columbia, Canada.
- Ory, N. (2007). *Working with People with Challenging Behaviors: A Guide for Maintaining Positive Relationships, 2nd Edition*. New Lennox: High Tide Press.
- Paxton, K., & Estay, I. A. (2007). *Counselling People on the Autism Spectrum: A Practical Manual*. Philadelphia: Jessica Kingsley Publishers.
- Perry-Parrish, C., Copeland-Linder, N., Webb, L., Shields, A. H., & Sibinga, E. M. (2016). Improving self-regulation in adolescents: current evidence for the role of mindfulness-based cognitive therapy. *Adolescent Health, Medicine and Therapeutics*, 101-108.

Executive Functioning and Cognitive Control ~ Joseph Falkner, MST/CCC-SLP

- Peters, K. (2013). *Hierarchy of Social/Pragmatic Skills as Related to the Development of Executive Function*. Récupéré sur <http://www.seattlechildrens.org/pdf/peters-executive-functions-hierarchy-handout.pdf>
- Peterson, E., & Welsh, M. C. (2014). The Development of Hot and Cool Executive Functions in Childhood and Adolescence: Are We Getting Warmer? . Dans S. Goldstein, & J. A. Naglieri (Éds.), *Handbook of Executive Functioning*. New York: Springer.
- Poland, S. E., Monks, C. P., & Tsermentseli, S. (2015). Cool and hot executive function as predictors of aggression in early childhood: Differentiating between the function and form of . *British Journal of Developmental Psychology*, 1-16.
- Prochaska, J., & DiClemente, C. (1983). Stages and processes of self-change in smoking: toward an integrative model of change. *Journal of Consulting and Clinical Psychology*, 390-395.
- Ramsay, J. R., & Rostain, A. L. (2008). *Cognitive-Behavioral Therapy for Adult ADHD: An Integrative Psychosocial and Medical Approach*. New York: Routledge.
- Raskin, S. A. (Éd.). (2011). *Neuroplasticity and Rehabilitation*. New York: The Guilford Press.
- Rogers, L. (2013). *Visual Supports for Visual Thinkers: Practical Ideas for Students with Autism Spectrum Disorders and Other Special Educational Needs*. Philadelphia: Jessica Kingsley Publishers.
- Ruiz-Robledillo, N., Sariñana-González, P., Pérez-Blasco, J., González-Bono, E., & Moya-Albiol, L. (2015). A Mindfulness-Based Program Improves Health in Caregivers of People with Autism Spectrum Disorder: a Pilot Study. *Mindfulness*, 767-777.
- Safran, S. A., Perlman, C. A., Sprich, S., & Otto, M. (2005). *Mastering Your Adult ADHD: A Cognitive-Behavioral Treatment Program Therapist Guide*. New York: Oxford University Press.
- Satpute, A. B., & Lieberman, M. D. (2006). Integrating automatic and controlled processes into neurocognitive models of social cognition. *Brain Research*, 86-97.
- Scarpa, A., Williams White, S., & Attwood, T. (Éds.). (2013). *CBT for Children and Adolescents with High-Functioning Autism Spectrum Disorders*. New York: The Guilford Press.
- Scherer, M. J. (2012). *Assistive Technologies and Other Supports for People with Brain Impairment*. New York: Springer Publishing Company.
- Schetter, P. (2004). *Learning the R.O.P.E.S. for Improved Executive Function*. Redding: ABTA Publications and Products.

- Selles, R. R., Ung, D., Nadeau, J., & Storch, E. A. (2014). Cognitive-Behavioral Therapy. Dans J. K. Luiselli, *Children and Youth with Autism Spectrum Disorder (ASD): Recent Advances and Innovations in Assessment, Education, and Intervention* (pp. 222-236). New York: Oxford University Press.
- Shao, Z., Janse, E., Visser, K., & Meyer, A. S. (2014). What do verbal fluency tasks measure? Predictors of verbal fluency performance in older adults. *frontiers in Psychology*.
- Sibley, M. H. (2017). *Parent-Teen Therapy for Executive Function Deficits and ADHD: Building Skills and Motivation*. New York: The Guilford Press.
- Singh, N. N., Lancioni, G. E., Karazsia, B. T., & Myers, R. E. (2016). Caregiver Training in Mindfulness-Based Positive Behavior Supports (MBPBS): Effects on Caregivers and Adults with Intellectual and Developmental Disabilities. *Frontiers in Psychology*.
- Singh, N. N., Lancioni, G. E., Manikam, R., Winton, A. S., Singh, A. N., Singh, J., & Singh, A. D. (2011). A mindfulness-based strategy for self-management of aggressive behavior in adolescents with autism. *Research in Autism Spectrum Disorders*, 1153-1158.
- Singh, N. N., Lancioni, G. E., Singh, A. D., Winton, A. S., Singh, A. N., & Singh, J. (2011). Adolescents with Asperger syndrome can use a mindfulness-based strategy to control their aggressive behavior. *Research in Autism Spectrum Disorders*, 1103-1109.
- Singh, N. N., Lancioni, G. E., Winton, A. S., Fisher, B. C., Wahler, R. G., McAleavey, K., . . . Sabaawi, M. (2006). Mindful Parenting Decreases Aggression, Noncompliance, and Self-Injury in Children With Autism. *JOURNAL OF EMOTIONAL AND BEHAVIORAL DISORDE*, 169-177.
- Solanto, M. V. (2011). *Cognitive-Behavioral Therapy for Adult ADHD*. New York: The Guilford Press.
- Spain, D. S. (2015). Cognitive Behaviour Therapy for adults with autism spectrum disorders and psychiatric co-morbidity: A review. *Research in Autism Spectrum Disorders*, 151-162.
- Sparrow, E. P. (2012). Assessment and identification of executive dysfunction. Dans S. J. Hunter, & E. P. Sparrow (Éds.), *Executive Function and Dysfunction: Identification, Assessment and Treatment*. Cambridge: Cambridge University Press.
- Sparrowhawk, K. (2016). *Executive Function: Cognitive Fitness for Business*. London: LID Publishing.
- Storch, E. A. (2014). A Randomized Controlled Trail of Cognitive Behavioral Therapy Versus Treatment as Usual for Adolescents with Autism Spectrum Disorders and Comorbid Anxiety. *Depression and Anxiety*, 1-8.
- Suchy, Y. (2016). *EXECUTIVE FUNCTIONING A Comprehensive Guide for Clinical Practice*. New York: Oxford University Press.

- Suchy, Y., Kraybill, M. L., & Gidley Larson, J. C. (2010). Understanding design fluency: motor and executive contributions. *Journal of the International Neuropsychological Society*, 26-37.
- Tracy, J. I., Hampstead, B. M., & Sathian, K. (Éds.). (2015). *Cognitive Plasticity in Neurological Disorders*. Oxford: Oxford University Press.
- Treatment., C. f. (1999). *Enhancing Motivation For Change in Substance Abuse Treatment*. Rockville: Substance Abuse and Mental Health Services Administration.
- Tuckman, A. (2009). *More Attention, Less Deficit: Success Strategies for Adults with ADHD*. Plantation: Specialty Press, Inc.
- Tuckman, A. (2012). *Understand Your Brain, Get More Done: The ADHD Executive Functions Workbook*. Plantation: Specialty Press, Inc.
- Vygotsky, L. (1978). Interaction between learning and development. Dans *Mind and Society* (pp. 79-91). Cambridge: Harvard University Press.
- Walters, S., Loads, M., & Russell, A. (2016). A Systematic Review of Effective Modifications to Cognitive Behavioural Therapy for Young People with Autism Spectrum Disorders. *Review Journal of Autism and Developmental Disorders*, 137-153.
- Ward, S. (2013). *Practical Strategies to Improve Executive Function Skills*. Denmark.
- Warren, E. (2014). *Working Memory, Hemisphere Integration and Attention Building Activities for Optimal Learning*. Putnam Valley: Erica Warren Publications.
- Warren, E. (2014). *Mindful Visualization for Education: Teaching Students How to Visualize and Use the Senses for Improved Reading, Writing, and Learning*. Putnam Valley: Erica Warren Publications.
- Weston, L., Hodgekins, J., & Langdon, P. E. (2016). Effectiveness of cognitive behavioural therapy with people who have autistic spectrum disorders: A systematic review and meta-analysis. *Clinical Psychology Review*, 41-54.
- Wilkins, S., & Burmeister, C. (2015). *FLIPP The Switch: Strengthen Executive Function Skills*. Shawnee Mission: AAPC Publishing.
- Woltering, S., Lishak, V., Hodgson, N., Granic, I., & Zelazo, P. D. (2015). Executive function in children with externalizing and comorbid internalizing behavior problems. *The Journal of Child Psychology and Psychiatry*.
- Yeager, M., & Yeager, D. (2013). *Executive Function & Child Development*. New York: W. W. Norton & Company.
- Zelazo, P. D. (2006). The Dimensional Change Card Sort (DCCS): a method of assessing executive function in children. *Nature Protocols*, 297-301.
- Zelazo, P. D. (2015). Executive function: Reflection, iterative reprocessing, complexity, and the developing brain. *Developmental Review*, 1-14.

Zelazo, P. D., & Carlson, S. M. (2012). Hot and Cool Executive Function in Childhood and Adolescence: Development and Plasticity. *Child Development Perspectives*, 354-360.

Zelazo, P. D., & Lyons, K. E. (2012). The Potential Benefits of Mindfulness Training in Early Childhood: A Developmental Social Cognitive Neuroscience Perspective. *CHILD DEVELOPMENT PERSPECTIVES*, 154-160.

Zelazo, P. D., & Muller, U. (2002). Executive Function in Typical and Atypical Development. Dans U. Goswami (Éd.), *Handbook of Childhood Cognitive Development* (pp. 445-469). Oxford: Blackwell.

Notes :