Disclosure

This free session is sponsored by Pearson Clinical Assessment.

Dr. Scheller is an employee of Pearson. Several examples of assessments and interventions mentioned in this presentation are either published or distributed by Pearson Clinical Assessment.

Agenda

• Overview of executive functioning
  – What is it?
• Patterns of executive functioning weakness
  – Reading
  – Math
  – Writing
  – Behavior...
• EF assessment
• EF intervention tactics
• Case study
What is Executive Functioning?

- A.R. Luria (1973)
- Russ Barkley
- Andrewes (2001)
- Miyake et al. (2000)

- Evolving definitions
  - Micro level: e.g., Cognitive flexibility, Attentional control, Updating, Sequencing, Abstracting
  - Macro level: e.g., Inhibitory control, Problem solving, Organization, Planning, Concept Formation

Executive Functioning (EF) Taxonomy

- Executive Control
  - Inhibition or Disinhibition of behavior, emotions, speech, cognition, attention, etc.
  - Flexibility
    - Seeing another point of view
    - Metacognition
  - Working Memory
    - Directly affects processing speed
    - Control the "gate" of information

EF Taxonomy (cont.)

- Problem Solving
  - Plan, sequence, and self-monitor
  - Feedback loop, from which we can change the process to be either correct (if incorrect) or more efficient (faster).
- Organization
  - Ability to order, sort, categorize
- Concept Formation
  - Categorize
  - Abstracting
  - Situation based judgments
...with Executive Dysfunction

- Attention-Deficit/Hyperactivity Disorder
- Bipolar Disorder
- Depression
- Autism/Asperger’s Disorder
- Traumatic Brain Injury

...with Executive Difficulties

Development of Executive Functions

- Build-upon, layering, hierarchical
- Earliest executive abilities observed at 12 months
- Three major "growth spurts"
- Adolescent "flat(er) trajectory"
- Continued improvement (refinement) into adulthood
HOW DO EXECUTIVE FUNCTIONS AFFECT LEARNING?

Effects of EF Deficits on Learning

- Average or better IQ, but still having difficulties?
- Interrelated to other aspects of cognition
- Inhibition and...
  - School Readiness (Blair & Diamond, 2008; Blair & Razza, 2007; Diamond, et al., 2007)
  - Academic achievement (St Clair-Thompson & Gathercole, 2006)
- Working Memory* ([www.cogmed.com](http://www.cogmed.com))
- Multiple simultaneous tasks
- Dysfluency
Executive Functioning In the Process of Learning: Assessment Results and Intervention Tactics
Adam Scheller, Ph.D., NCSP

**WM Implications for Learning**

<table>
<thead>
<tr>
<th>Age</th>
<th>WM is crucial for...</th>
<th>Indicators that WM needs improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-school</td>
<td>- Learning the alphabet</td>
<td>- Unwillingness to learn</td>
</tr>
<tr>
<td></td>
<td>- Completing a puzzle independently</td>
<td></td>
</tr>
<tr>
<td>Elementary</td>
<td>- Understanding textual content (reading comprehension)</td>
<td>- Inability to understand what is read</td>
</tr>
<tr>
<td>School</td>
<td>- Mental arithmetic</td>
<td>- Problems memorizing the multiplication table</td>
</tr>
<tr>
<td>Middle School</td>
<td>- Completing homework independently</td>
<td>- Can’t complete homework without parental supervision and direction</td>
</tr>
<tr>
<td></td>
<td>- Complex math problems, especially word problems</td>
<td>- Inability to grasp/break down word problems</td>
</tr>
<tr>
<td>High School</td>
<td>- Writing essays</td>
<td>- Difficulty writing neat, coherent essays</td>
</tr>
<tr>
<td>College</td>
<td>- Studying for an exam</td>
<td>- Constantly procrastinates; panics the night before an exam</td>
</tr>
<tr>
<td></td>
<td>- Participation in group projects</td>
<td>- Doesn’t listen or participate during a group project</td>
</tr>
<tr>
<td></td>
<td>- Keeping focus/interest during a lecture</td>
<td>- Difficulty remaining attentive during lectures</td>
</tr>
</tbody>
</table>

**EF and Reading**

- Reading
  - Difficulty with Reading Comprehension/Inferring meaning/Abstraction
  - Dyslexics often have affected Inhibition, Working Memory, and design and verbal Fluency (Reiter, Tucha, & Lange, 2005)
- Fluency
  - Link to executive functioning and attention
  - Difference from Word Identification and Word Attack (WRMT-III)
  - Link to comprehension

**EF and Math**

- Math
  - Difficulties with multiple steps, algebraic equations, word problems
  - “Careless Errors”
  - Fluency
EF and Writing

- Writing
  - Difficulties organizing written output, including format of arguments, and grammatical and spelling errors
  - Dysfluent writing, doesn’t transition well within text
  - Bullet-point writing
  - "Slow" writing

HOW DO WE ASSESS EXECUTIVE FUNCTIONS?

Learning Behavior

OLAI-2 (Gentile, 2011)

The student interacts positively with the teacher/peer/parent and succeeds in the task.

The student exhibits inappropriate behaviors that interrupt the task.

The student fails to follow task instructions and interacts with the teacher/peer/parent inappropriately.
Executive Functioning In the Process of Learning: *Assessment Results and Intervention Tactics*
Adam Scheller, Ph.D., NCSP

**EF Assessment is Difficult**

- Process vs. singular construct
- Assessment challenges (Dawson & Guare, 2010)
  - Ecological Validity?
  - Initiation and sustained attention
  - Adult monitoring vs. self-monitoring
  - Close-ended tasks limit creativity/problem solving
  - Real world EF vs. Lab EF

**Assessment of EF**

- Assess outcomes to uncover the process.
  - Skill deficit vs. EF
  - Congruence vs. incongruence
- Observation of functional performance to verify process.
  - How does weakness affect functional outcome?
  - What outcomes are affected...in what areas?
    - Look for Patterns
  - Behavior to validate assessment findings
  - Behavior to understand real world executive functioning

**Formal Norm-Referenced Assessment**

- NEPSY-2
- D-KEFS
- CVLT-C
- WISC-IV Integrated
- WPPSI-IV
- KABC-II
- WRAML2
- TEA-Ch
- Rey CFT
- BADS-C
- Achievement measures
Executive Functioning In the Process of Learning: *Assessment Results and Intervention Tactics*
Adam Scheller, Ph.D., NCSP

**EF Assessment Process**

- Rating Forms
  - Broad vs. Narrow
  - D-REF
  - Brown ADD
  - Conners 3
  - BASC-2
  - BRIEF

- Observations
  - Do test findings present in-situ?
  - Qualitative and quantitative data
  - Evaluate congruence of test data with the observed

---

**HOW DO WE DEVELOP EFFECTIVE INTERVENTIONS FOR EXECUTIVE FUNCTIONING WEAKNESSES?**

...LET'S BREAK...THIS...DOWN...

Think of all things that have multiple steps...  
...require understanding the main idea

...require us to use multiple skills at once  
...require us to process multiple factors simultaneously

---
The goal of EF interventions

- One at a time...OK, but three at a time...
- Make tasks less complex
- High expectations, but attainable
- “Retrain the Brain”
- Build skills!

Brain-based interventions

- Behavioral
- Cogmed
  - Researchers posit that Cogmed training transfers to executive functioning, supporting link with executive control and WM. (Diamond et al., 2011; Thorell et al. 2009)
  - For more information on Cogmed research, free webinars and demonstrations go to: www.cogmed.com

Behavioral EF Interventions

- Two-pronged Interventions:
  - Internally focused
    - Skill acquisition, development, refinement
  - Externally focused
    - Modification of environment or tasks
Executive Functioning In the Process of Learning: Assessment Results and Intervention Tactics
Adam Scheller, Ph.D., NCSP

Externally-Focused Interventions

- Reinforce skill development through focus on learning skills
  - Interventions can become THE skill
  - Reliance on adaptations and modifications
- Examples of Externally-Focused Interventions

Internally-Focused Interventions

- “Internalize” rather than use of external structure or modification.
- Rely less on outside assistance over time
- Examples of Internally-Focused Interventions

Social Problem Solving

- Process of problem solving in the “natural” environment
- Cognitive-behavioral
- Concepts
  - Problem Solving
  - Problem
  - Solution
- Problem Solving vs. Solution Implementation
  (Chang, D’Zurilla, & Sanna, 2004)
Executive Functioning In the Process of Learning: Assessment Results and Intervention Tactics
Adam Scheller, Ph.D., NCSP

Remember...

- Give them time, don’t give up
- Implement in multiple settings
- Start basic, then move to more complex

Laura 12 years old
Grade 7, Private Middle School

See NEPSY-II Case Study
www.pearsonassessments.com

Referral Concerns

- Laura was referred for a neuropsychological evaluation due to her mother’s concern over Laura’s consistently poor grades in Mathematics and Science and her recent retention in the 7th grade.

- Laura received a failing grade in Mathematics and a D minus in Science at the conclusion of her 7th grade year.
**Referral Concerns**

- Her primary physician requested an ADHD evaluation due to Laura’s apparent attentional difficulties.

- In addition to general ability, the evaluation focused on processing speed, impulse control, and working memory, all factors associated with ADHD.

**WISC-IV**

<table>
<thead>
<tr>
<th>Index</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Ability Index (GAI)</td>
<td>107</td>
</tr>
<tr>
<td>Verbal Comprehension Index (VCI)</td>
<td>108</td>
</tr>
<tr>
<td>Perceptual Reasoning Index (PRI)</td>
<td>104</td>
</tr>
<tr>
<td>Working Memory Index (WMI)</td>
<td>97</td>
</tr>
<tr>
<td>Processing Speed Index (PSI)</td>
<td>80</td>
</tr>
</tbody>
</table>

**NEPSY-II**

**Attention and Executive Functioning**

- *Auditory Attention and Response Set*

<table>
<thead>
<tr>
<th>Measure</th>
<th>Scaled Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>AA Combined Score</td>
<td>10</td>
</tr>
<tr>
<td>RS Combined Score</td>
<td>6</td>
</tr>
<tr>
<td>AA vs. RS Contrast Score</td>
<td>5</td>
</tr>
</tbody>
</table>
### NEPSY-II

**Attention and Executive Functioning**

- **Inhibition**

<table>
<thead>
<tr>
<th>Test</th>
<th>Scaled Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Naming Combined Score</td>
<td>9</td>
</tr>
<tr>
<td>Inhibition Combined Score</td>
<td>6</td>
</tr>
<tr>
<td>INN vs. INI Contrast Score</td>
<td>6</td>
</tr>
<tr>
<td>Switching Combined Score</td>
<td>3</td>
</tr>
<tr>
<td>INI vs. INS Contrast Score</td>
<td>4</td>
</tr>
</tbody>
</table>

### NEPSY-II

**Attention and Executive Functioning**

- **Animal Sorting and Clocks**

<table>
<thead>
<tr>
<th>Test</th>
<th>Scaled Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>AS Combined Score</td>
<td>8</td>
</tr>
<tr>
<td>CL Score</td>
<td>8</td>
</tr>
</tbody>
</table>

### Behavior Rating

**D-REF**

- Clinically significant **Core Index Scores**:
  - Behavioral Functioning $T=62$
  - Executive Functioning $T=65$
  - Total Composite $T=61$

- Clinically significant **Clinical Index Scores**:
  - Attention/Working Memory $T=66$
  - Abstract Thinking/Problem Solving $T=64$
Laura Conclusions

- Strengths
- Specific Weaknesses
  - Link to referral concerns
- Diagnosis
- Recommendations

References...

Executive Functioning In the Process of Learning: *Assessment Results and Intervention Tactics*
Adam Scheller, Ph.D., NCSP

References...


Pearson Customer Service

1-800-627-7271 (USA)
1-866-335-8418 (Canada)

Specific Webinar-Related Comments or Questions

Adam Scheller, PhD, NCSP
Pearson Clinical Assessment
adam.scheller@pearson.com