Executive Function and Processing Speed

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“We did that last year - how come we have to do it again this year?”
"Could I see you in my office, Mr. King?"
Maybe I can bluff my way through.”
Executive Function (EF)

• CEO of the brain
• Umbrella term involving related skills – not a unitary construct
• Mental Regulation
• Work Efficiency
What does it let you do?

- Plan
- Organize
- Initiate
- Sequence
- Monitor
- Inhibit impulsivity
- Develop efficient strategies
EF – an Analogy

• Orchestra
• Many distinct skills
• Many distinct sections
• Conductor – unifies the skills and sections to be productive and produce beautiful music, emphasizes certain skills or sections at different times according to the match with the music.
Diagnosis – DSM IV

• No diagnostic category yet in the Diagnostic and Statistical Manual
• Not a handicapping condition – often served under Other Health Impaired/Attention Disorder
Characteristics of EF

- Inconsistent performance
- Failure to turn in completed work
- Disorganization - at school and at home
- Problems with homework completion
- Impulsivity – Social and Academic
- Problems with time management
That Sounds Like an Attention Disorder!

- ADHD – Inattentive Type – weaknesses in initiation, planning, organization, working memory and self-monitoring

- ADHD – Hyperactive-Impulsive Type – weaknesses related to inhibition, shifting and emotional control
How are EF and ADHD Related?

• Martel, Nicolas, Nigg, 11/2007 – EF related to Inattentive Type but not Hyperactive, Impulsive Type

• Nigg et al., - symptoms of EF related to Inattentive but not hyperactive

• Inattentive – slower response speed

• Hyperactive – faster output speed
Dual Pathway Model

- Cognitive – Inattentive, EF
- Behavioral – Impulsive, Conduct Problems
What is Processing Speed?

• Ability to perform automatic tasks quickly
• Measurement of perceptual speed
• Speed of semantic processing
• Sustained attention under pressure
• Speed and efficiency of information processing
Why is Processing Speed Important?

• Speed and efficiency may be very basic components of information processing
• Academic tasks are hierarchal so speed matters
• Time constraints exacerbate problems – particularly timely task completion and accuracy
Perception

- Impression obtained through the senses
- Transposition of numbers/letters
- Reversals
- Larger or smaller?
Sustained Attention

• Maintain focus of consciousness/receptivity and application of the mind to the task
• Attention to detail
• Attention to sequence
• Maintaining focus when doing tasks that involve demanding mental effort
Semantic Processing

- Processing for comprehension or meaning
- Quantity
- Complexity
Fluency

- Retrieval fluency – the ability to access information rapidly (such as word retrieval)

- Fluency – the ability to integrate and use skills quickly (such as reading)
Processing Speed – Schrank, et al.

- Semantic Processing Speed, Perceptual Speed, Naming Facility
- Slow execution
- Slow acquisition of new material
- Need for extra time even for well-practiced tasks
- Trouble making conceptual decisions quickly
Executive Processes - Shrank, et al.

- Poor problem solving skills
- Poor self-regulation
- Poor inhibitory control
- Poor planning
- Poor self-monitoring
How do EF and PS Affect Performance?

- Disorganization
- Slow speed of processing
- Inaccurate or inconsistent performance
- Self-monitoring
- Careless errors
- Splintered skills
- Inefficient strategies
Academic Applications

• Reading
• Writing
• Math
• Listening
• Test-taking
• Grades
Is the first page of the story part of the story?

Is Growth of the Renaissance the same as Growth of Renaissance?
Reading

- Word Level – letter scanning, recognize words quickly
- Sentence Level – maneuvering sequences of adjectives, adverbs, phrases and clauses rapidly and accurately
Reading Solutions

- Advance organizers
- Background review
- Overviews
- Previewing
- Study guides in advance

- Use of charting
- Books on CD
- Strategy training
- Use of format
- Notetaking in small units
“Don’t be so negative, mom. Think of it as desktop publishing.”
Writing Solutions

- Multiple checkpoint interviews early on
- Advance organizers
- Organizers done in class
- Computer programs
- Use of technology
- Sentence-building activities
- Upgrade Proofing
"But why make up a problem when there's no problem to begin with?"
Math Solutions

- Prerequisite skill review night before for homework
- Use of calculator
- Prepare for tests with practice tests under actual test conditions
- Concept Cards – first homework assignment is to make card with topic and explanation in child’s words – review daily
Listening Supports

- Think time
- Authentic Visual Support
- Structured Questioning
- Visual sources of information
- Reduced Notetaking Strategy
Taking Tests

- Use of computer
- Extended time limits
- Checkpoints – time left signals
- Multiple Choice Test Strategy – Get answer in mind and look at the choices
- Use of cover sheet to support focus and completion
“Sorry Ms. Tuttle. We ran out of paper last night, and I had to write my report on sticky notes.”
Organization

• External organizers
• Authentic Visual Support
• One Stop Shopping approach
• Pre-made, one page charts or picture cues made by child
Task Completion

- Multiple completion points
- Catch-up-Enrichment Times
- Fast Finish Activities
- Sample Selection Tasks
- Structured Question Guides
“A highway? Isn’t there a path for those of us who would just like a nice, easy stroll.”