The Overlap Between Autism, ADHD, and Executive Functioning

Ericka Wodka, Ph.D., ABPP-CN

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Center for Autism and Related Disorders
at Kennedy Krieger Institute
Autism Spectrum Disorder

DSM-5

A. Language and Social Functioning

B. Repetitive and Rigid Patterns of Behavior
Other Childhood Disorders can 
**Look Like** Autism (Rule-outs)

- Receptive/Expressive Language Disorder
- Attention Deficit/Hyperactivity Disorder
- Anxiety
  - Specific Phobia
  - Social Phobia
- Intellectual Disability
- Learning Disability
- Tourette Syndrome
- Giftedness
- Many more…

http://drashokakela.blogspot.com/2015/05/zebra-colour-pattern-in-livestock.html
Other Childhood Disorders that **Come Along** with Autism (Comorbidities)

- Receptive/Expressive Language Disorder
- Attention Deficit/Hyperactivity Disorder
- Anxiety
  - Specific Phobia
  - Social Phobia
- Intellectual Disability
- Learning Disability
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Attention Deficit/Hyperactivity Disorder (ADHD)

DSM-5

A. 6 or more symptoms of **Inattention**
   (e.g., careless mistakes, poor attention to detail, limited sustained attention, trouble following-through with instructions, distracted, forgetful, loses important items)

B. 6 or more symptoms of **Hyperactivity/Impulsivity**
   (e.g., fidgety, overly active- out of seat, always on the move, cannot play quietly, talks excessively, difficulty waiting turn, interrupts others)
Social Difficulties: Similar but Different…

**Autism**
- Limited nonverbal communication
- Difficulty developing peer relationships
- Limited spontaneous seeking to share enjoyment
- Limited of social reciprocity

**ADHD**
- Interrupts and intrudes on others
- Talks excessively
- Difficulty playing quietly
- Difficulty listening when spoken to directly
- Difficulty sustaining attention to tasks or play
Repetitive Behaviors: Similar but Different...

Autism
• Stereotyped motor movements
• Lining up toys
• Flipping objects

ADHD
• On the go, as if driven by a motor
• Taps hands or feet
• Trouble sitting still
• Messy or disorganized work
Related Motor Similarities and Differences

Both ASD and ADHD show abnormalities in basic motor control...

But, deficits in motor skills requiring visuomotor integration and imitation are specific to ASD
Similar and Shared: Biological Factors

Sex distribution (predominantly male)
Genetics
Brain involvement
A Comparison of Structural Brain Imaging Findings in Autism Spectrum Disorder and Attention-Deficit Hyperactivity Disorder

Chase C. Dougherty¹ - David W. Evans² - Scott M. Myers¹ - Gregory J. Moore¹ ² ³ ⁴ - Andrew M. Michael¹ ³
Abnormal wiring of the connectome in adults with high-functioning autism spectrum disorder

Ulrika Roine¹,², Timo Roine², Juha Salmi¹,³, Taina Nieminen-von Wendt⁴, Pekka Tani⁵, Sami Leppämäki⁵,⁶, Pertti Rintahaka⁵, Karen Caeyenberghs⁷, Alexander Leemans⁸ and Mikko Sams¹,⁹

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But.. Trajectories are different

ASD:
Early rapid and pervasive increase in brain size in infancy and toddlerhood followed by arrested development in later childhood and a potential decline in preadolescence into adulthood

ADHD:
Cortical maturation that may be delayed by several years compared to typically developing (TD) children; however, typical cortical volumes may be attained by late adolescence or early adulthood
RESEARCH ARTICLE

Motor Circuit Anatomy in Children with Autism Spectrum Disorder With or Without Attention Deficit Hyperactivity Disorder

Rajneesh Mahajan, Benjamin Dirlikov, Deana Crocetti, and Stewart H. Mostofsky


A)

B)

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Similar & Shared: Behavioral Factors

ASD

ADHD

Executive Dysfunction

Inattention

Hyperactivity

Social Difficulties

Sensory Behavior

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What is Executive Functioning (EF)

It requires the ability to plan and sequence complex behaviors, simultaneously attend to multiple sources of information, grasp the gist of a complex situation, resist distraction and interference, inhibit inappropriate responses, and sustain behavior for prolonged periods (Denckla, 1996).
## EF Subdomains (Powell & Voeller, 2004)

<table>
<thead>
<tr>
<th>Cognitive Regulation</th>
<th>Behavioral Regulation</th>
<th>Emotional Regulation</th>
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| • Attention regulation  
  • Goal setting/planning  
  • Organization  
  • Time management  
  • Novel problem solving  
  • Flexible thinking  
  • Judgment | • Task initiation  
  • Inhibition of automatic responses  
  • Sustaining effort  
  • Impulse control/delayed gratification  
  • Anticipation of future consequences of actions | • Modulation of emotional arousal  
  • Modulation of mood  
  • Self-soothing strategies |

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EF are controlled by the frontal lobes of the brain

Powell & Voeller 2004

Figure 1. Diagram of prefrontal cortex and related structures.
How EF presents in ASD +/- ADHD

• Rigid and routine bound ways of thinking
• Hyperfocused interests
• Behavioral inflexibility/preferred activities
• Rigidity in social dynamics
• Efficient and abstract reasoning (vs. getting stuck in the details)
Is EF a possible endophenotype, polyphenotype, or additive comorbidity?

Craig et al., 2016
Research suggests that individuals with ASD + ADHD demonstrate greater challenges than a single diagnosis.

There is also preliminary evidence that ASD + ADHD may be less responsive to standard treatments for either disorder.
So, what does this mean for our kids with multiple diagnoses and executive functioning challenges?
Research into behavioral interventions targeting EF in ASD is ongoing.

There is some initial evidence that there are methods for both supporting and improving EF.

Given that a child’s “job” is going to school, it is important that they be provided with support and reinforcement of techniques both at home and in the school setting.
Potential 504/IEP Accommodations and Goals

- Extended time
- Adult support with homework planner- color code subjects/folders
- Formalized study skills class
- (Online) graphic organizers/access to computer for written assignments
- Variety of organizational Apps, with timers and reminders
- Advanced warnings prior to changing activities/subjects
- Chunking information, teaching pneumonic strategies
School/Classroom-wide Accommodations

• Reminding and providing time for the entire class to proofread an assignment before turning it in.

• Proximity of the homework bin to students

• Posting visual schedules
Intervention strategies

Unstuck & On Target (Cannon et al., 2018)

- Provides strategies and vocabulary for teaching flexibility, goal-setting, and making/checking plans
  - Uses Four Primary Teaching Methods:
    - Memorize and repeatedly use scripts and key words
    - Teach by doing: model and coach to teach new scripts and skills
    - Make it fun
    - Provide visual supports
  - Can and Should be applied both at home and in school for children with a language level of at least 7-8 years
Intervention strategies continued…

Smart but Scattered (Dawson & Guare, 2010)

• Targets 11 areas of EF thought to be most related to school success.
• Improving EF is a process, involving setting short-term goals and building ongoing training, practice, and process monitoring.
• Teaches EF strategies through scaffolding.
• Behavioral Management strategies
  – Antecedents-Behaviors-Consequences (reinforcements)

• Cognitive Behavioral approaches
  – Recognizing and challenging unhelpful thoughts and replacing with positive thinking and coping strategies

• Medication Management

• Hybrid approaches
  – The Zones of Regulation (Kuypers 2011)
Intervention Strategies in Social Settings

Social Thinking Curriculum (Winner 2007)

- Applying strategies in social settings
- Breaks down complex concepts into doable parts to be applied in multiple settings
  - Self-regulation
  - Social-emotional learning
  - Executive functioning
  - Perspective taking
  - Social problem solving
• Evidence for these approaches is growing; however, there is certainly challenge to evaluating behavioral approaches.

• Historically (first published in 1999), the Multimodal Treatment Study of Children with ADHD (not necessarily ASD) found that combination treatment (medication and behavioral therapy) was the most successful approach.

• In the end, the best treatment for an individual child is best selected on evaluation of the child’s needs, considered within the larger environment in which that child needs to function. Often, these techniques are implemented by parents under the guidance of a professional.
References

  http://drashokakela.blogspot.com/2015/05/zebra-colour-pattern-in-livestock.html
- Kuypers (2011). The Zones of Regulation: A curriculum designed to foster self-regulation and emotional control.