# Executive Function Dysfunction in ADHD, Autism Spectrum Disorder, & Dyslexia

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Learning Disability Association of America Annual Conference

St. Louis, MO

Monday, February 16, 2026

## Executive Functions: Strategies, Stories, and Science Across the Lifespan

# PLEASE HOLD QUESTIONS TO THE END OF THE HOUR!

- The presenters will be available during the conference to answer questions, too.
- Each presenter has disclaimers/disclosures. Please refer to the slides for their disclaimers. We ask this in the interest of saving time.

# Disclaimer/Disclosure

- **Speaker Disclosure:**
- **Financial: Kevin Blake maintains an independent practice. He is a stockholder in Amgen, Inc. Dr. Blake receives a speaking honorariums from TPN.Health and royalties from PESI, Inc.**
- **Non-financial: Kevin Blake is a member of the Children and Adults with Attention Deficit Disorders (CHADD) (Chapter Coordinator of CHADD of Tucson), International Dyslexia Association (Orton Oak), Learning Disabilities Association of America, and American Psychological Association.**

# Baddeley's Executive Function Theory

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

# Baddeley's Executive Function Theory (Cont'd)

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

- **Visual-Spatial Sketchpad**: "…which manipulates visual images" (p. 556).

Baddeley, A. (January 31, 1992). Working Memory. Science, 255(5044), 556-559. DOI: 10.1126/science.1736359.

# Baddeley's Executive Function Theory (Cont'd)

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

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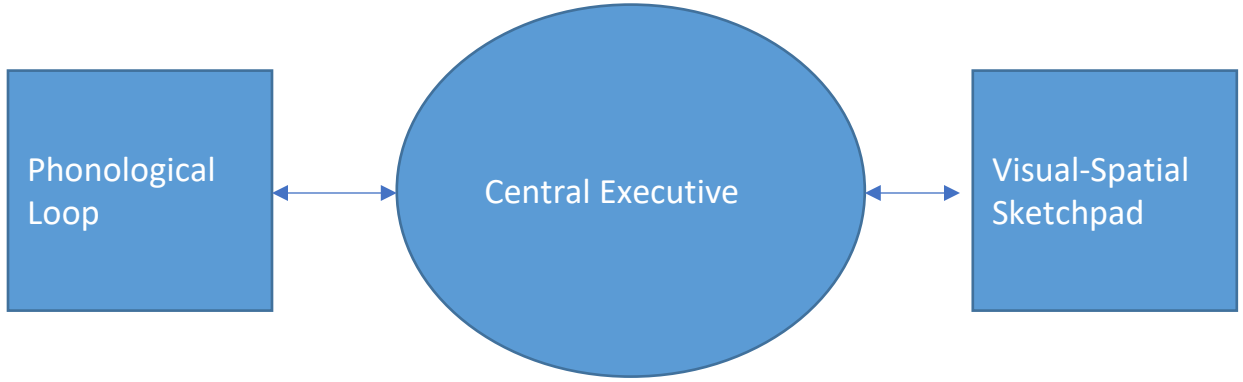
# Baddeley's Executive Function Theory (Cont'd)

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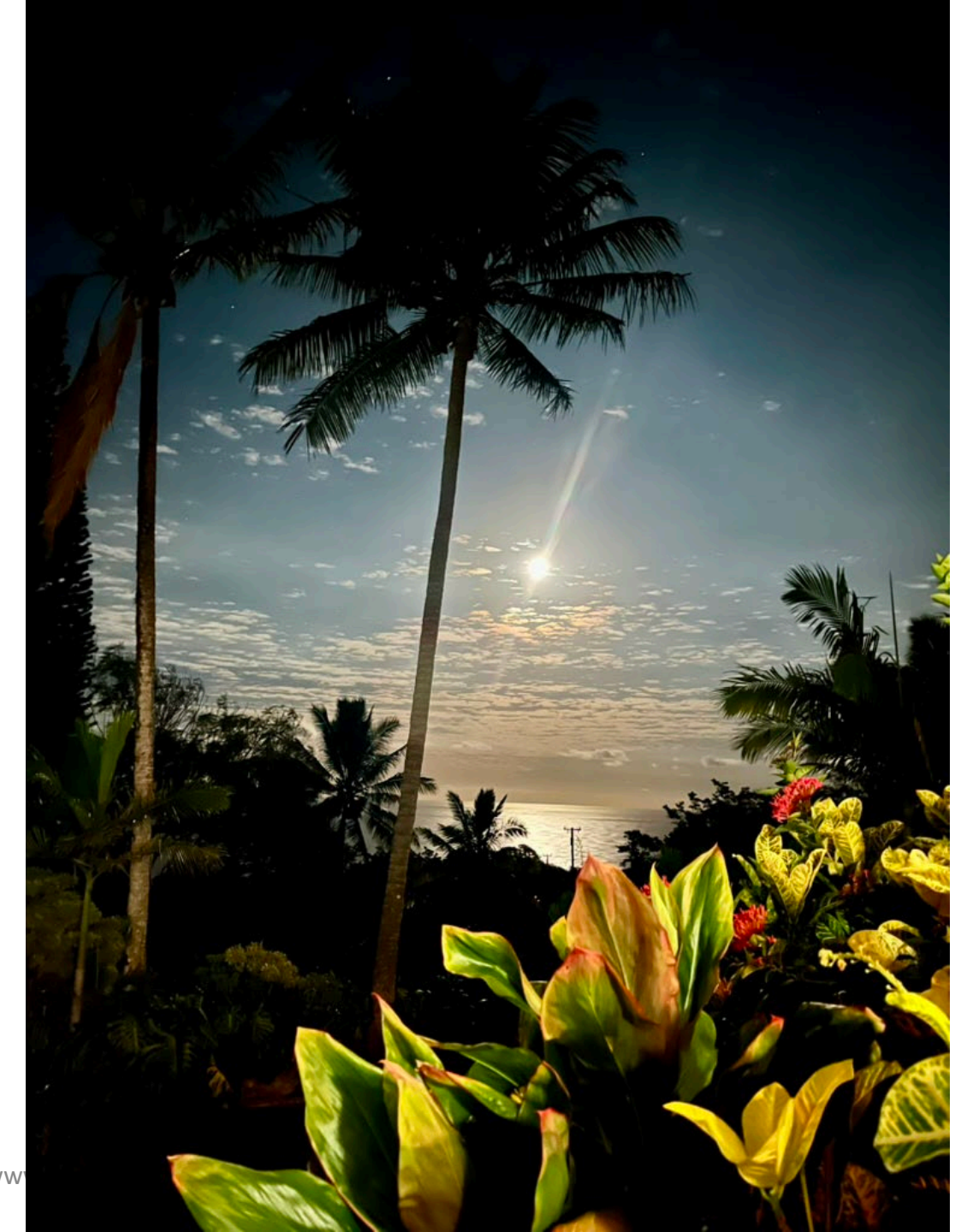
# ADHD & Executive Function

**(Note: The following covers this seminar's second objective)**



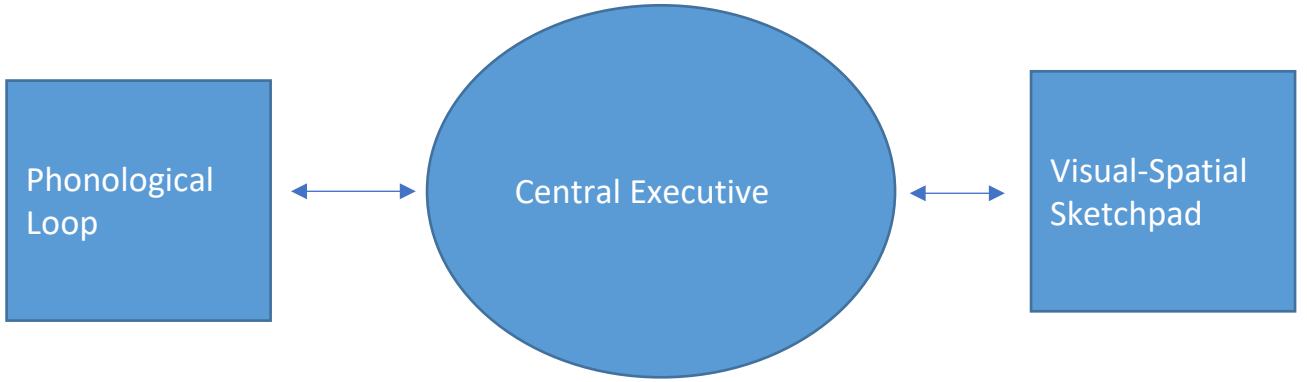
# Sluggish Cognitive Tempo (SCT) is Now Called Cognitive Disengagement Syndrome (CSD)

- It is a separate and distinct disorder from ADHD.
  - Genetically
  - Anatomically
  - Neurotransmitter
  - Behaviorally and Symptoms
  - Outcomes
- About 39 to 54 percent of those with ADHD have comorbid CDS.
- About 2.5 percent of the general population has CDS.
- CDS in a lifetime disorder.

- CDS is *NOT* a disorder of Executive Function.
- CDS does not involve the frontal lobes as ADHD does.
  - CDS involves the posterior areas of the brain and the "Default Mode Network."
  - It is not related to the neurotransmitter dopamine, but is related to norepinephrine.

Becker, S.P. (July/August, 2025). Cognitive Disengagement Syndrome: A Construction at a Crossroads. American Psychologist. DOI: 10.1037/amp0001517.

# Baddeley's Executive Function Theory




**Those with ADHD have difficulties with the Central Executive, Phonological loop, and Visual-Spatial Sketchpad.**

**Baddeley, A. (January 31, 1992). Working Memory. Science, 255(5044), 556-559. DOI: 10.1126/science.1736359.**

**Dovis, S. et al. (August, 2013). What Part of Working Memory is not Working in ADHD? Short-Term Memory, the Central Executive and Effects of Reinforcement. Journal of Abnormal Child Psychology, 6, 901-917. From website: http://link.springer.com/article/10.1007%2Fs10802-013-9729-9.**

**Alderson, R. et al. (May, 2013). Working memory deficits in adults with attention deficit/hyperactivity disorder (ADHD): An examination of central executive and storage/rehearsal processes. Journal of Abnormal Psychology, 122(2), May 2013, 532541. doi:10.1037/a0031742.**

# AD/HD, Executive Function, & Working Memory

- **Individuals with AD/HD have significantly more difficulty with central executive, short-term memory, and working memory than non-ADHD people.**

# AD/HD, Executive Function, & Working Memory

- **There is a life long problem with working memory in those with AD/HD, however, the central executive difficulties abate somewhat.**

**Dovis, S. et al. (August, 2013). What Part of Working Memory is not Working in ADHD? Short-Term Memory, the Central Executive and Effects of Reinforcement. Journal of Abnormal Child Psychology, 6, 901-917. From website: http://link.springer.com/article/10.1007%2Fs10802-013-9729-9.**

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# Treatment of AD/HD

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

Ramsay, R. (2010). Nonmedication Treatments for Adult ADHD. Washington, DC: American Psychological Association Press, p. 3.

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

Barkley, R.A. (2006). Attention-Deficit Hyperactivity Disorder, Third Edition. New York, NY: Guilford.

# Other Executive Function Treatments for ADHD

- **Coaching to teach Executive Functions to those with ADHD can work.**
- **Twenty minutes of aerobic exercise increases dopamine levels and can help executive function more than one hour.**
- **Mindfulness training and practice.**

**Goldstein, S. (November 9, 2017). Understanding and Evaluating Executive Functioning in ADHD Across the Life Span. Paper presented at the CHADD International Conference, Atlanta, GA.**

**Pontifex, M.B. et al. (March, 2013). Exercise Improves Behavioral, Neurocognitive, and Scholastic Performance in Children with Attention-Deficit/Hyperactivity Disorder. Journal of Pediatrics, 162(3), 543-551.**

# Executive Function and ADHD

- Some computer-based EF training programs have been shown to work with those with ADHD. However, Research results have not been consistent. More research is needed (Robledo-Castro, et al., 2023).
- The Active Memory Intervention (AMIN) computer program has shown some promise in improving working memory and inhabitation (Robledo-Castro, et al., 2023).
- A review of the use of aerobic exercise with those with ADHD has demonstrated it can improve attention, motor skills, and executive function (Sun, et al., May, 2022).
- Hippotherapy (Therapeutic horse riding) has been found to improve EF, and reduce anxiety, as well as increase self-advocacy in those with ADHD (Helmer, et al. , 2025).

# Additional References for ADHD


**Helmer, A., Delore, E. & Bart, O. (2025). Horses and ADHD: the ASTride intervention for cognitive and emotional growth. Child and Adolescent Psychiatry and Mental Health. 19, 131 https://doi.org/10.1186/s13034-025-00990-6**

**Robledo-Castro, C., Lerma-Castaño, P. R., & Bonilla-Santos, G. (2023). Effect of Cognitive Training Programs Based on Computer Systems on Executive Functions in Children With ADHD: A Systematic Review. Journal of Attention Disorders, 27(13), 1467-1487. https://doi.org/10.1177/10870547231187164 (Original work published 2023)**

**Sun, W. et al. (March 14, 2022). Effects of physical exercise on attention deficit and other major symptoms in children with ADHD: A meta-analysis. Psychiatry Research. DOI: 10.1016/j.psychres.2022.114509**

# Executive Function & Autism Spectrum Disorder

## (Note: The following covers this seminar's second objective)

# Executive Function and Autism Spectrum Disorder (ASD)

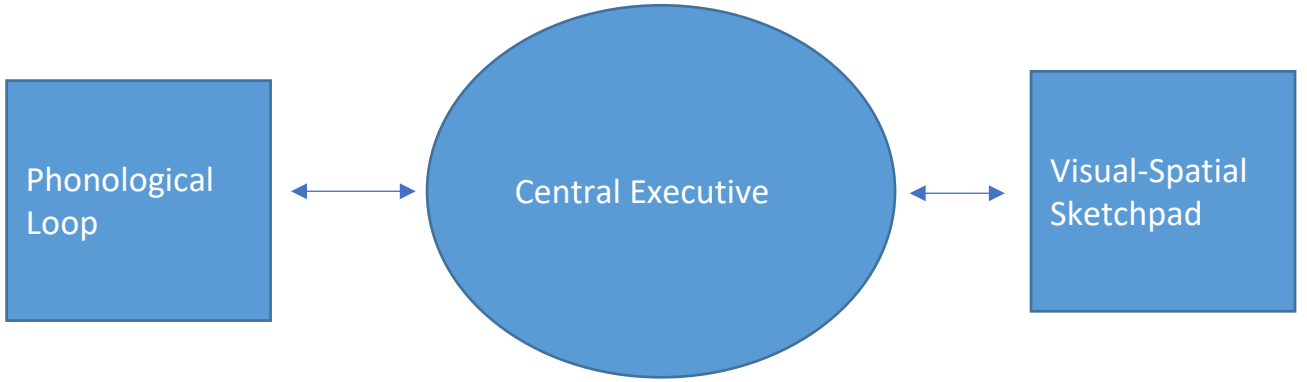
- Parents of adults with ASD and average/above IQ report their challenged children with ASD have significant problems with Executive Function at school, work and in their adaptive function.
- This is typically paired with significant depression and anxiety.
- The profile of Executive Function difficulties in an ASD adult matches those seen in ASD children and adolescents: especially high weaknesses in flexibility and planning/organization.
- It appears the Executive Function flexibility problems are related to anxiety.

# Executive Function and Autism Spectrum Disorder (ASD)

- **Depressive symptoms seem to be related to metacognitive processing problems and impaired adaptive functioning.**
- **None of the above appears to be related to possible comorbid AD/HD.**

**Wallace, G.L. et al. (September 16, 2016). Chapter Three-Assessment and Treatment of Executive Function Impairments in Autism Spectrum Disorder: An Update. International Review of Research in Developmental Disabilities. 51, 2016, Pages 85-122.**

# Baddeley's Executive Function Theory




**Those with autism spectrum disorder have very significant difficulties in their central executive in Baddeley's model.**

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# Treating Autism Spectrum Disorder (ASD)

- Currently there is no medical/mental health treatment that treats the central difficulties of autism spectrum disorder of social communication deficits and restrictive repetitive behaviors.
- Psychoeducation is the foundation of all treatments for ASD.
- To reduce the intensity and frequency of difficult behaviors mental health professionals use behavioral, cognitive behavioral, and other rehabilitative strategies (Applied Behavioral Analysis, etc.) are used.
- Medical interventions are palliative and are designed to reduce symptoms. Such interventions are designed to reduce the symptoms of anxiety and depression, or to treat epilepsy and sleep disorders.

Durand, V.M. (2014). Autism Spectrum Disorder: A Clinical Guide for General Practitoners. Washington, D.C.: American Psychological Association.

# What a Multidisciplinary Clinic for ASD Needs: You Need a Village of Professionals to Help

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

Frye, R.E. (March 20, 2022). A Personalized Multidisciplinary Approach to Evaluating and Treating Autism Spectrum Disorder. Journal of Personalized Medicine. DOI: 10.3390/jpm12030464

# Executive Function (EF) and Autism (ASD)

- **EF difficulties are common in those with ASD, especially poor flexibility, problem-solving.**
  - **These can lead to poor educational and employment outcomes (Pugliese eta al., 2024)**
- **A variety of techniques have been found to improve EF in those with ASD (Cavalli et al, 2022).**
- **Unstuck & On Target: School curriculum that teaches independence, flexible problem-solving, planning, and self-advocacy to those with ASD (Pugliese eta al., 2024).**
- **Cognitive behavioral interventions can improve EF in those with ASD (Kurr at al., 2024)**

# Executive Function (EF) and Autism (ASD)

- **Aerobic exercise can significantly overall EF, especially in cognitive flexibility and inhibition (Liang, et al, 2022).**
- **Training with a computerized EF training program guided by a "coach" can significantly improve EF in those with ASD (Faja, et al., 2022).**
- **Virtual reality physical training is just as good as physical training groups in improving EF in children with ASD (Yang, et al. , 2022).**

# Additional References for Autism Spectrum Disorder (ASD)


**Cavalli, G., Galeoto, G., Sogos, C., Berardi, A., & Tofani, M. (2022). The efficacy of executive function interventions in children with autism spectrum disorder: a systematic review and meta-analysis. Expert Review of Neurotherapeutics, 22(1), 77–84. https://doi.org/10.1080/14737175.2022.2011215**

**Faja, S., Clarkson, T., Gilbert, R., Vaidyanathan, A., Greco, G., Rueda, M. R., Combita, L. M., & Driscoll, K. (2021). A preliminary randomized, controlled trial of executive function training for children with autism spectrum disorder. Autism, 26(2), 346-360. DOI: 10.1177/1362361321101499O (Original work published 2022)**

**Ji, C., Yang, J., Lin, L., & Chen, S. (2022). Executive Function Improvement for Children with Autism Spectrum Disorder: A Comparative Study between Virtual Training and Physical Exercise Methods. Children, 9(4), 507.DOI: 10.3390/children9040507**

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Kaur, K., Pany, S., Mohanty, S. P., Sahoo, P. K., & Rana, S. (2024). Efficacy of Cognitive Behavioral Intervention in Improving Executive Function of Children with High Functioning Autism Spectrum Disorder: A Meta-analysis. International Journal of Special Education, 39(1), 11–20.

Liang, X., Li, R., Wong, S.H.S. *et al.* (2022). The Effects of Exercise Interventions on Executive Functions in Children and Adolescents with Autism Spectrum Disorder: A Systematic Review and Meta-analysis. Sports Medicine,52, 75–88. DOI: 10.1007/s40279-021-01545-3

Pugliese, C.E., Werner, M.A., Alexander, K.C. *et al.* (2024). Development of a High School-Based Executive Function Intervention for Transition-Age Autistic Youth: Leveraging Multi-level Community Partnerships. School Mental Health.16, 862–878 DOI: 10.1007/s12310-024-09661-x

# Dyslexia & Executive Function

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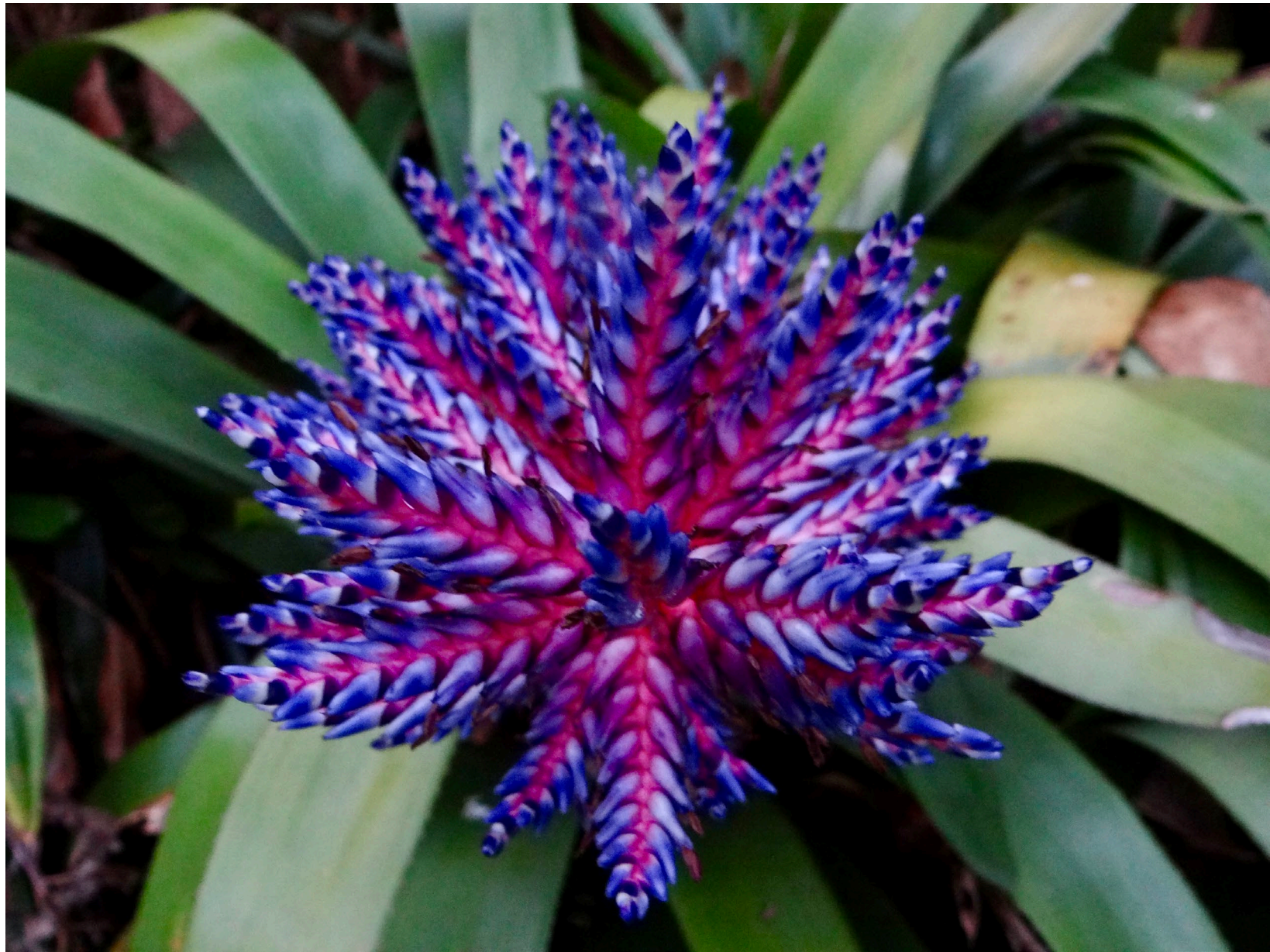


# Dyslexia and EF

- People with dyslexia have weaknesses in the central executive and phonological loop. This negatively effects reading comprehension.
- The visual-spatial sketchpad controls orthographic processing - SPELLING
- Spelling involves phonological loop, visual-spatial sketchpad and central executive-All weaknesses in dyslexics

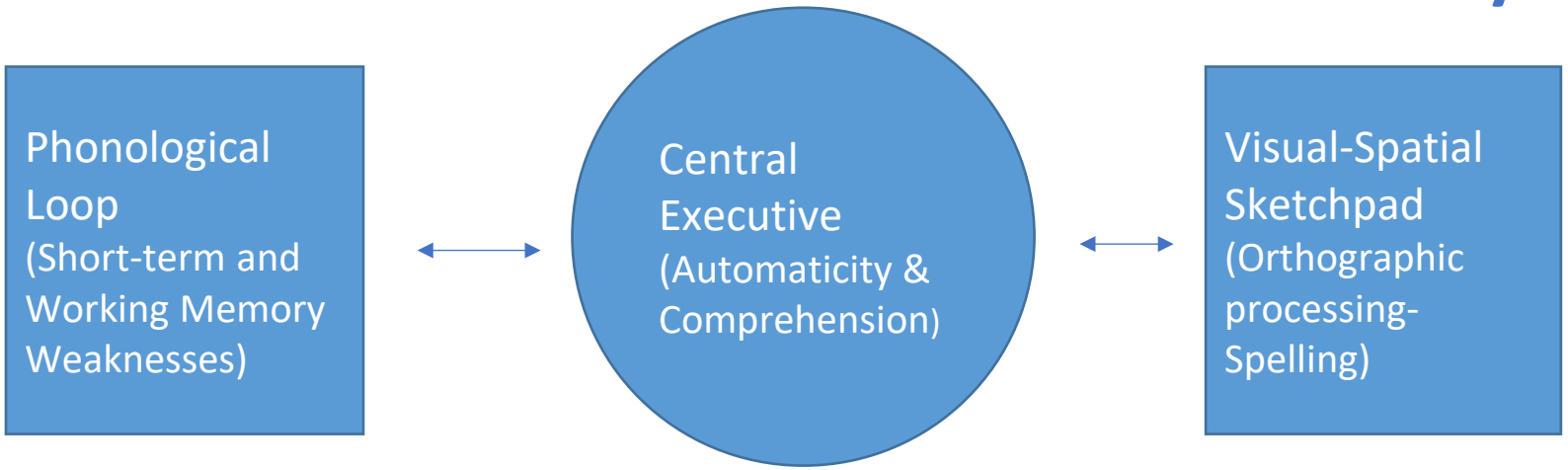
- Dyslexics-STM & WM problems
- Central EF difficulties with automatization (learning behaviors to the automatic level).
- For reading-Synthetic Multi-Sensory Phonics (i.e., Orton-Gillingham, etc.)

Berg, M. (November 12, 2014). Working Memory and The Dyslexic Learner. Paper presented as part of the Understanding and Remediating Working Memory Deficits in Students With Dyslexia Symposium (W6 Symposium) At the 65th Annual International Conference of the International Dyslexia Association, San Diego, CA.

Dehn, M.J. (2014). Essentials of Processing Assessment, Second Edition. Hoboken, NJ: Wiley.

Smith-Spark, J. et al. (June-July, 2016). Executive functions in adults with developmental dyslexia. Research in Developmental Disorders. DOI: https://doi.org/10.1016/j.ridd.2016.03.001

# Executive Function Weaknesses in Those with Dyslexia

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# Thank You! Next!

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