

A Review of the Comorbidity of ADHD and Dyslexia

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Background

Academic success and other life outcomes are influenced by a person's reading ability. Reading is a complex multicomponent skill that must be taught, yet many children struggle to learn to read. It is estimated that 5-17.5% of the population struggle to learn to read due to dyslexia, a neurological condition that involves difficulty with accurate and/or fluent word recognition, poor spelling, and a slow response to instruction (Shaywitz & Shaywitz, 2004). Past research suggests dyslexia occurs along a continuum such that a given individual may exhibit a variety of both risk and protective factors that impact the extent of their reading struggles (Pennington et al., 2012). Factors within a person or within their environment that complicate the learning process may exacerbate reading difficulties. One of these factors involves a person's attention abilities. It is estimated that 5% of the population exhibit difficulties associated with attention-deficit/hyperactivity disorder, ADHD (Boada et al., 2012). Moreover, about 20-40% of children with ADHD or dyslexia experience symptoms of both disorders. Yet, there are questions about diagnosis, prognosis, and treatment for individuals who exhibit symptoms of both disorders. For the present project, the empirical literature was reviewed to gain insight into what is currently known about the co-occurrence of dyslexia and ADHD. Differences emerged in the diagnostic or identification procedures associated with each condition. Yet this literature also suggests that individuals with both dyslexia and ADHD often display similar deficits in academic and executive functioning as well as social impairments.

Goal of the Project

- Provide an understanding of multiple factors associated with each condition to inform diagnosis, prognosis, and treatment decisions to support a person's functioning across multiple areas of their lives.



ADHD Definition

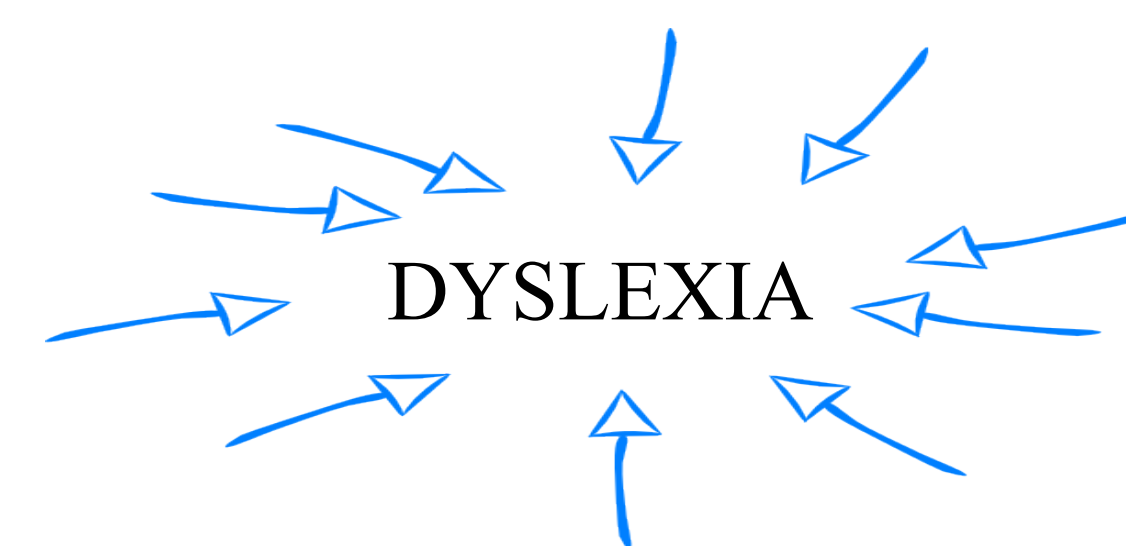
- Definition: persistent pattern of inattention and/or hyperactivity - impulsivity that interferes with functioning or development. Symptoms must have been present for at least 6 months and occur in 2 or more settings (DSM-5; APA, 2013).
- Diagnosed using parent/teacher reports and behavior assessments.
- Subtype labels can be used to indicate which symptom type is predominant, or if both are present.

ADHD Prognosis

- Symptoms can be seen as early as preschool age but sometimes are not diagnosed until the child is in grade school (CDC, 2020).
- About 5 % of children are diagnosed with ADHD.
- Deficits in executive function are prominent (Martinussen, 2015).
- Treatments includes behavioral therapy and/or medication (CDC, 2020).

Table 1. Example Symptoms of ADHD

Inattention	Hyperactivity - impulsivity
Trouble holding attention on tasks	Fidgets, taps hands or feet, or squirms
Distracted when being spoken to	Leaves seat often
Fails to complete tasks or assignments	Talks excessively and blurts out answers
Difficulty organizing tasks and/or activities	Difficulties with waiting their turn
Is often forgetful in activities	Interrupts or intrudes on others often



Dyslexia Definition

- Definition: specific learning disability that is neurological in origin. It is characterized by difficulties in accurate and/or fluent word recognition, poor spelling and decoding abilities. It typically results from a phonological deficit and may lead to secondary consequences of reading comprehension problems (Lyon et al., 2003; adopted by IDA and TN DOE).
- Diagnosed using tests of achievement and documenting response to appropriate instruction.

Dyslexia Prognosis

- About 5 -17.5% of children are diagnosed with dyslexia (Shaywitz & Shaywitz, 2004).
- Treatments focus on providing direct, explicit, and systematic instruction in reading and literacy skills (TN DOE, 2016).

Table 2. Skill Areas Associated with Dyslexia

Skill	Definition (Ability to ...)
Word Reading Accuracy	read real words
Phonological Decoding Accuracy	use knowledge of the correspondences between written letters and sounds to read
Reading Fluency	read words quickly, accurately, and with appropriate prosody
Encoding Skills	spell written words
Phonemic Awareness	distinguish, segment, blend, and manipulate sounds within words
Rapid Naming	efficiently retrieve phonological information from long-term memory
Reading Comprehension	gain meaning from text

Theories about Underlying Causal Factors

- Genetic and environmental factors have been implicated for both ADHD and dyslexia (Catt et al., 2017).
- Pennington et al (2012) proposed a multiple deficit model that included potential deficits in phoneme awareness, language skill, processing speed, and naming speed as prominent causes of dyslexia.
- Catts et al (2017) also agreed that a phonological deficit along with issues with rapid naming and oral language could cause dyslexia.
- Pennington (2006) discussed how single deficit models are not sufficient to explain either dyslexia or ADHD. Further, there appear to be unique and shared deficits present across both conditions.

Shared Difficulties in Executive Functions

- Individuals with either ADHD, or dyslexia, or both conditions sometimes exhibit difficulties with some types of executive function.

Table 3. Example Areas of Executive Functioning

Skill	Definition
Verbal Working Memory	Temporary preservation of verbal information
Inhibition	Ability to control automatic responses
Processing Speed	Time it takes an individual to complete a mental task

Co-Occurrence of ADHD & Dyslexia

- 20 to 40% of children with ADHD and dyslexia experience symptoms of both (Willcutt & Pennington, 2000).
- A combination of factors are more likely to be a cause of the co-occurrence of ADHD and dyslexia.
- Children with both ADHD and dyslexia exhibit a larger number of symptoms of each condition, more social difficulties, and greater impairment in academic functioning.
- Inattention problems are one risk factor that suggest a greater potential for problems with later reading achievement.
- Children identified with comorbid ADHD and dyslexia show slower processing speed compared to children with only ADHD or dyslexia.



Discussion

- Research exploring the comorbidity of dyslexia and ADHD highlights some of the difficulties shared between these conditions.
- There is a limited amount of information and research that focuses on the intervention and treatment of both ADHD and dyslexia.
- Future directions of this research can address questions such as how do professionals establish and administer an effective treatment and/or intervention program for children with ADHD and dyslexia.



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