

## Speech and Language Disorders in ADHD

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### Introduction

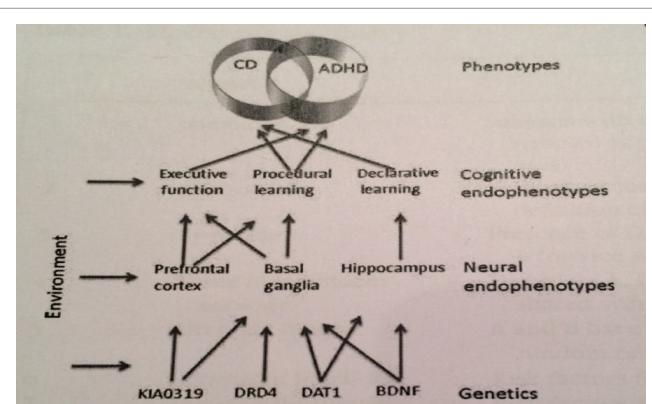
Attention Deficit Hyperactivity Disorder (ADHD) refers to the presence of pronounced difficulties in the areas of inattention, distractibility and hyperactivity that lead to significant impairment in academic and social functioning [1]. The prevalence estimate of ADHD is as wide as 3%-10% for school age children [2] and it is identified as one of the most commonly diagnosed clinical conditions affecting the student population [3]. Two-thirds of children with ADHD have an additional coexisting disorder [4] and more than one-third have at least three comorbid conditions [5]. Estimates of the overlap between speech and language disorders and ADHD vary from as low as 8% to as high as 90%, depending on the source and type of sample [2]. I will discuss the possible and levels of association between ADHD and speech and language disorders. Also, I will describe the link between the ADHD diagnosis and speech and language disorders in children, supported by evidence from several studies.

Although speech and language disorders are not among the fundamental features or required to fulfill the diagnostic criteria for ADHD, several research studies revealed a high prevalence of communication disorders among children with ADHD [6,7]. The evidence from the literature suggests that inattention, hyperactivity and impulsivity have their effects on different speech and language skills; 17 to 38% of children diagnosed with speech and language disorders also have ADHD (ASHA, 1997 and ASHA, 2008). The American Speech Language Hearing Association [8] claimed that co-occurring ADHD and speech and language disorders represent a frequently encountered challenge for school-based speech-language pathologists and other practitioners. Also, it is not uncommon to find that children with speech and language disorders are also being treated for ADHD [9]. Bruce et al. [10] reported that many of the children in their study group had been referred to a speech-language pathologist in their early preschool years which they used as evidence to suggest that children with ADHD are somewhat delayed in developing language skills compared to children without ADHD. However we need to consider that reported rates vary by referral source, makeup of the assessment protocol, and the criteria for language impairments that were used [9,11].

Baker and Cantwell [12] studied a sample of 65 3-16 year olds who had been clinically diagnosed with ADHD; they found that 17% had speech impairment, 22% had language impairment and 61% had a speech and language impairment. Also, Beitchman et al. [13] studied a sample of 17 clinical subjects who were attending kindergarten; they concluded that 76% had some form of speech and language impairment. The speech and language problems emerged as an early indicator for ADHD in toddlers, preschool, and kindergarten years [14]. Tomblin and Mueller [9] provide a background for the comorbidity of ADHD and speech and language disorders (Figure 1). They discussed the relationships between the communication disorders and the ADHD features that exist at the symptom level which they call the *phenotype* and the underlying systems that are associated with, or are the cause of these symptoms. In Figure 1, they show how the same underlying systems can provide an explanation for the symptoms of communication disorders and ADHD and also for the comorbidity that exists between the two disorders. The authors concluded, when

disorders share common symptoms “it is arguable that they may provide a clearer picture of the basis of comorbidity than the symptoms themselves” [9].

ADHD diagnoses have been long associated with language difficulties in children, supported by evidence from several studies. Tirosh and Cohen [15,16] studied a sample of 3,208 participants aged 6-11 years in a clinical setting; they reported that 45% had a combined ADHD diagnosis and a language deficit. Also, Trautman et al. [17] reported that 68.2% of 67 children with a confirmed ADHD diagnosis had a language disorder as well. This is consistent with the results of the study by Gaultieri et al. [18] that reported 90% of 26 children with ADHD (age range 5-13) had language disorder and the study by Warr-Leeper et al. [19] that reported 80% with ADHD had previously undiagnosed language disorders. Regarding school aged children Tannock et al. [20] reported that 60% of ADHD school age children had language disorders as well. Also, it is important to mention that several studies concluded that the probability of children with ADHD having a diagnosis of language disorder is higher than children without ADHD, such as Cantwell et al. [21,22], Love and Thompson [23], Trautman et al. [17]. Furthermore, Cohen et al. [16] found that children who had been previously identified with language disorders were more likely subsequently to be identified as ADHD than children without language disorders. Daparma et al. [24] used a sample of 100 children with ADHD (ages 6-16) to investigate the prevalence of receptive and expressive language disorders. The results revealed that



**Figure 1:** A hypothetical etiological scheme demonstrating shared etiologies at multiple levels resulting in comorbidity between ADHD and communication disorders (CD).

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children with ADHD exhibited receptive language difficulties at the receptive measures with (12-21%) and expressive language difficulties at the expressive measures with (10-16%). In receptive difficulties, the children with ADHD had problems with following directions, understanding spoken language, and understanding grammatical relationships. In expressive difficulties, the children with ADHD had problems with sentence formulation, recalling words rapidly, and performing word association tasks. Children with ADHD are more likely to have delayed onset of language acquisition, compared to their age equivalent peers in terms of the appearance of the first words and using shorter sentences (6-35% of ADHD versus 2-6% in the general population) [25-27]. However the findings were not always consistent [28]. When compared to typically developing children, children with ADHD have been shown to be at increased risk for several markers of language impairment including: verbal behavior [29], delayed onset of first words and word combinations [25], poor performance on standardized tests (vocabulary, syntax, reading fluency and short term memory), disruptive speech, discourse limitations in producing cohesive narratives and pragmatic difficulties associated with inappropriate conversational participation [11,15,23,30]. Also, there is evidence to suggest how parents perceive their children with ADHD as having communication difficulties that is presented by Bruce et al. [10]. They found parents of children with ADHD rated their children's problems at the receptive level as three times worse than their expressive difficulties. Al-Haidar collected data from 416 patients (all under 19 years old) who attended the child psychiatric outpatient clinic at King Khalid University Hospital, Riyadh, Saudi Arabia. He found that 106 (25.5%) were diagnosed with ADHD and that 28.3% of the ADHD patients had presented with coexistent expressive language disorder [31]. Al-Dakroury and Gardner investigated verbal profile in children with attention deficit hyperactivity disorder (ADHD), quantitatively the verbal output, turns, and topic related skills in the children with ADHD compared to age-matched typically developing (TD) children. The results of the quantitative study showed that children with ADHD have a reduced verbal output with respect to total number of words, total number of verbal turns and average number of words per turn compared to typically developing children of similar age. The results of the qualitative study revealed that verbal skills are more challenging for children with ADHD relative to their unaffected peers which is presented by more frequent "no verbal response" than TD participants and use of more single word productions during their interactions with different interlocutor [32]. It is difficult to make generalizations about the prevalence of language difficulties in children with ADHD, because of the methodological variations of the studies discussed in this section (i.e., functional analysis and/or formal language testing tools).

Academic learning is usually negatively affected by a delay in acquiring language skills, especially the attention problems exhibited by children with ADHD [33]. Epidemiological studies using standardized language test batteries suggest that significant levels of language impairment can be expected to co-occur in 35-50% of children who present with ADHD symptoms and rates of up to 90% have been observed in studies using clinically referred samples [34]. Many students with ADHD exhibit language learning problems at the discourse level (ASHA, 1997; ASHA, 2008).

## The Role of the Speech-Language Pathologist with ADHD

According to the American Speech-Language-Hearing Association (ASHA) position statement (1997), the speech-language pathologist is often among the first to evaluate children suspected of having ADHD.

Speech-language pathologists play a vital role in the assessment, diagnosis, and treatment of people of all ages with ADHD. They serve as evaluators, educational program designers, collaborative consultants with classroom teachers, consultants to other disciplines, and primary interventionists facilitating the development of speech and language and learning strategies in children and adolescents with ADHD. More recently, the American Academy of Pediatrics, recommended that the best practice guidelines should include the assessment for other conditions that might coexist with ADHD containing developmental disorders such as speech and language disorders [35].

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