Academic underachievement

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Introduction

Overview

Academic underachievement is a common presenting symptom of developmental dysfunction in school-aged children. The differential diagnosis is broad and encompasses neurodevelopmental, psychiatric, social, and neurologic disorders. Many of the disorders associated with academic underachievement co-occur. A systematic analysis of the nature of the academic underachievement and a multimodal approach to management may lead to successful outcomes.

Key points

• Academic underachievement is common and affects at least 13% of school children in the United States.
• Academic underachievement has been associated with adverse social, economic, and vocational outcomes.
• There is no universally accepted definition of academic underachievement.
• The differential diagnosis is broad.
• Multimodal treatment programs involving academic interventions/accommodations, parent training, a preventive mental health program, and medication have been associated with successful outcomes.
• Failed treatment programs are often due to overlooking important comorbidities.

Historical note and terminology

The modern focus on academic achievement began in the 19th century with the work of Seguin with children who had intellectual disability. At the turn of the century, descriptions of pathologic hyperactivity and congenital word blindness expanded the spectrum of academic underachievement to children who did not have intellectual disability (Hinshelwood 1917; Still 2006). Binet and Simon published their test that identified French students who would require special education (Siegler 1992). In the mid-20th century, descriptions of novel syndromes by Kanner and Kirk, autism and learning disabilities, were respectively defined (Kanner 1943; Niolon 2014). In 1975, the Education for All Handicapped Children Act guaranteed all children a “free and appropriate” education in the “least restrictive environment.” Current advances in pediatric neuropsychology, genetics, epidemiology, and neuroimaging have increased our knowledge of the neurobiology of these disorders.

Clinical manifestations

Presentation and course

Academic underachievement encompasses a group of disorders that result in abnormal function in school. They may result in academic failure, but are often referred at the time that the child is underachieving and not responding to teacher interventions. There is no universally accepted definition of academic underachievement. Some authors distinguish students whose performance is discrepant from their potential, whereas others apply the term to low academic achievement for age or grade placement. Attempts to define academic underachievement using discrepancy criteria, years behind current grade placement, and response to intervention have not been successful. Academic underachievement is primarily identified by the classroom teacher and determined by performance relative to the student's classmates.

Academic underachievement occurs when the child is thought not to be meeting his or her academic potential. Referral for academic underachievement is not random and usually occurs when children do not meet objectives for
their current grade placement. Table 1 lists relevant grade objectives that often result in referral when not achieved.

**Table 1. Academic Expectations by School Placement**

<table>
<thead>
<tr>
<th>Age</th>
<th>Expectation</th>
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<tbody>
<tr>
<td>Preschool</td>
<td>Play</td>
</tr>
<tr>
<td></td>
<td>Language</td>
</tr>
<tr>
<td></td>
<td>Behavior</td>
</tr>
<tr>
<td></td>
<td>Fine motor (coloring, cutting, pasting, buttoning)</td>
</tr>
<tr>
<td>Early elementary</td>
<td>Reading (decoding)</td>
</tr>
<tr>
<td>Mid-elementary</td>
<td>Reading (comprehension)</td>
</tr>
<tr>
<td></td>
<td>Arithmetic</td>
</tr>
<tr>
<td>Late-elementary</td>
<td>Reading (inference)</td>
</tr>
<tr>
<td></td>
<td>Written language</td>
</tr>
<tr>
<td>Middle school</td>
<td>Organization</td>
</tr>
<tr>
<td></td>
<td>Reading (chapters)</td>
</tr>
<tr>
<td></td>
<td>Long-term assignments</td>
</tr>
<tr>
<td></td>
<td>Notebook maintenance</td>
</tr>
</tbody>
</table>

Distinguishing the cause of the academic underachievement may prove useful. Some children have difficulty with mastering the concepts that are being taught. Others have difficulty with the processes required for classroom performance, eg, attention, organization, and focus. Still others evidence behavioral disturbance.

Academic underachievement may present with disturbed behavior. Somatization (headaches or stomachaches), general unhappiness, bullying and other aggressive behavior, and oppositionality have all been associated with academic underachievement. School avoidance, truancy, and elopement are indicators of severe dysfunction.

Academic underachievement due to neurodevelopmental dysfunction is usually chronic in nature. Acute onset of academic underachievement suggests other etiologies.

**Prognosis and complications**

Most adults who experienced academic underachievement as children integrate into the larger society; however, academic underachievement has been associated with adverse social outcomes. Unemployment, delinquency/criminality, and mental health disorders may be higher in populations who experienced academic underachievement (Polderman et al 2010; Kempe et al 2011; Hoffmann et al 2013). Early academic underachievement is a risk factor for not completing high school. Although these associations exist, the relationships are not direct, and many confounding factors affect prognosis. Gender, socioeconomic status, severity of underachievement, support systems, and school factors have all been related to outcome (Ewen and Shapiro 2008).

**Clinical vignette**

John was an 8-year-old third-grade student who had recently started complaining about headaches and not wanting to go to school. He had a history of inattention and increased activity. His reading was below grade level. Although he was able to match sounds and symbols, he had difficulty blending the sounds into words. His general fund of knowledge was good. His handwriting was poor, and he did not perform well on timed math tests. Early developmental milestones were met on time. His teacher made a referral to the Individualized Education Plan team, whose evaluation revealed attention deficit/hyperactivity disorder, combined type, developmental coordination disorder, and specific reading disability. John was provided educational accommodations and special instruction in reading. He was enrolled in a martial arts program where he was the best student. His somatic complaints abated with these interventions, and his self-esteem improved.

**Biological basis**

**Anatomic localization**

Academic underachievement results from many different disorders. Consequently, there is no localization for this symptom.

**Pathophysiology**
Although extensive research in specific entities has been conducted, no physiological measures have been shown to be clinically relevant. Genetic investigations that focus on cognition and neurodevelopmental disease, rather than specific disease entities, may hold promise (Kiser et al 2015; Johnson et al 2016).

**Epidemiology**

The epidemiology of academic underachievement can only be approximated because there is no universally accepted definition of the term. There are limitations to defining underachievement relative to chronological age or grade placement. IQ is not a good predictor of achievement for individual children. Defining underachievement as the percentage of public school children who receive services under the Individuals with Disability Education Act (IDEA) (12.9% in 2013-2014) is likely to be an underestimate because the IDEA requires a diagnosis, and there may be significant underachievement before a diagnosis can be established (National Center for Educational Statistics 2017a). High school graduation rates (81.9% in 2012-2013) are a complex construct influenced by many factors in addition to academic achievement (National Center for Educational Statistics 2017b).

Some authors question the independence of the syndromes associated with academic underachievement (Rispens and van Yperen 1997; Dyck et al 2011). In clinical practice the syndromes rarely exist in pure form; symptomatic overlap is the rule. For example, one third of children with attention deficit hyperactivity disorder have coexisting language disorders (Feldman et al 2015). A similar relationship is also seen for children with specific language impairment and specific reading disability (McArthur et al 2000). The large overlaps question whether the disorders are unique (comorbidity) or a differential expression of the same disorder (coexistence). Other terms such as “developmental brain disorder” or “early symptomatic syndromes eliciting neurodevelopmental clinical examinations” (ESSENCE) are promoted to recognize the overlapping symptomatology (Gillberg 2010; Moreno-De-Luca et al 2013).

**Differential diagnosis**

The differential diagnosis for academic underachievement includes the following disorders (American Psychiatric Association 2013).

**Specific learning disabilities.** Specific learning disabilities are a group of disorders that manifest as academic underachievement despite the student having adequate academic instruction and no intellectual disability. The Individuals with Disabilities Education Improvement Act of 2004 defines specific learning disability as "... a disorder in one or more of the basic psychological processes involved in understanding or in using language, spoken or written, that may manifest itself in an imperfect ability to listen, think, speak, read, write, spell or do mathematical calculations..." (20 U.S.C. § 1400). Specific learning disabilities may be noted in basic reading (decoding), reading comprehension, mathematical calculation, mathematical reasoning, written expression, listening comprehension, and oral expression.

**Attention deficit hyperactivity disorder (ADHD).** ADHD is characterized by developmentally inappropriate levels of inattention and/or hyperactivity/impulsivity that have persisted for more than 6 months, with onset before the age of 12. For diagnosis, the child must manifest 6 or more of the 9 characteristics of inattention and/or 6 or more characteristics of hyperactivity/impulsivity contained in the *Diagnostic and Statistical Manual of Mental Disorders*, 5th edition; significant functional impairment must be present as well. ADHD must be distinguished from secondary causes of inattention and hyperactivity (eg, the difficulty of the material as may be seen in children with intellectual disability, specific learning disabilities, or language disorders).

**Intellectual disability.** Intellectual disability, previously called mental retardation, is characterized by significant limitations in both intellectual functioning and adaptive behavior, which covers many everyday social and practical skills and originates before the age of 18.

**Language disorders.** Language disorders are one of the specific developmental disorders. They are characterized by weakness in language functions that impairs life activities. In young children, deficient vocabulary and poor grammar are common, whereas older children often show impairments in discourse, pragmatics, and other higher language function. Expressive language disorders are a group of disorders in language production with relative sparing of language understanding and general cognition. By contrast, speech disorders are difficulties producing speech sounds or problems with voice quality.

**Social (pragmatic) communication disorders/pervasive developmental disorders.** This category encompasses many of...
the children who were previously diagnosed with pervasive developmental disorder, high-functioning autism, or Asperger syndrome. It is characterized by a primary difficulty with the social use of language and communication and is manifested by deficits in understanding and following social rules of communication in naturalistic contexts, changing language according to the needs of the listener or situation, and following rules for conversations and storytelling.

**Autism spectrum disorders.** Autism spectrum disorders show persistent deficits in social communication and social interaction across multiple contexts and restricted, repetitive patterns of behavior. It is distinguished from language disorders and social (pragmatic) communication disorder by abnormality of nonverbal communication and the presence of restricted repetitive behaviors. In the classroom, children with autism spectrum disorders may decode well, but have difficulties with comprehension and inference.

**Developmental coordination disorders.** Developmental coordination disorders are characterized by acquisition and execution of coordinated motor skills that are substantially below what's expected for the child's age and opportunity. In the classroom, they often impair handwriting, note taking, and timed activities. In early school years, coloring, cutting, and pasting may be affected.

**Tourette syndrome.** Tourette syndrome is defined by the presence of multifocal tics (including vocal) that have been present for more than a year and have their onset before the age of 18. Vocal tics may be misinterpreted as attention seeking or disruptive behavior, but are not responsible for academic underachievement. Tourette syndrome is often associated with ADHD and obsessive compulsive disorder.

**Epilepsy.** Academic dysfunction is common in children with epilepsy. Although this has been attributed to cognitive blunting due to antiepileptic drugs (AEDs), some investigators have found improved performance when AEDs were instituted, and others have found cognitive dysfunction in newly diagnosed children who were not exposed to AEDs (Jones et al 2010; Jackson et al 2013). Children with academic dysfunction who show inattention may be thought to have lapses in consciousness and are evaluated for partial complex epilepsy. Distinguishing inattention from brief lapses in consciousness may be difficult. However, the strongest association between academic performance and epilepsy is found with non-absence generalized seizures (Reilly and Neville 2011). Children with electrical status epilepticus during slow-wave sleep may evidence decline in academic trajectory (Yilmaz et al 2014).

**Adjustment disorders.** Adjustment disorders are defined by the development of emotional or behavioral symptoms within 3 months of the onset of stressors. Adjustment disorders may have many causes in school children. Chronic inability to meet expectations, abuse (including bullying), divorce, and other family issues are common.

**Anxiety disorders.** Anxiety disorders are characterized by more than 6 months of excessive anxiety and worry that is difficult for the individual to control. They may be accompanied by restlessness and difficulty concentrating and misdiagnosed as ADHD. Anxiety disorders may be subcategorized as separation anxiety disorders, social phobias, or selective mutism.

**Affective disorder.** Affective disorders include major depressive disorder, bipolar disorder, and persistent depressive disorder (dysthymia). Sadness, low energy, poor concentration, and decreased social interaction are often seen. Disruptive mood dysregulation disorder is a group of disorders that have onset before the age of 10 and manifest with chronic, severe, and persistent irritability with frequent temper outbursts.

**Substance abuse.** Substance abuse disorders must be considered in adolescents who did not have an earlier history of academic underachievement, but who have shown an abrupt change in their classroom behavior, poor homework performance, and apathy.

**Hearing loss.** Not all hearing loss is present at birth. Although conductive hearing loss is not associated with long-term academic underachievement, sensorineural hearing loss may be progressive in early childhood and may impede academic progress if not detected.

**Visual impairment.** Most visual impairment is associated with refractive errors and is detected through screening or recognized when children have difficulty with seeing materials on the board. Isolated visual impairment is a rare cause of academic underachievement.

**Sleep disorders.** Although insufficient prospective data make causal inferences difficult to ascertain, clear and
consistent associations have been found between sleep loss, sleepiness, and lower academic achievement among younger children and older adolescents worldwide (Shochat et al 2014).

**Chronic diseases.** Chronic conditions such as premature birth, sickle cell anemia, thyroid disease, diabetes, and metabolic syndrome have been associated with academic underachievement (Yates et al 2012; King et al 2014).

**Neurodegenerative/neurometabolic disorders.** Neurodegenerative/neurometabolic disorders are rare causes of academic underachievement. Their progressive course may not be obvious initially. Niemann Pick type C, adrenoleukodystrophy, Batten disease, and mitochondrial disorders may present with academic underachievement.

**Diagnostic workup**

The evaluation of academic underachievement needs to be comprehensive and address multiple areas of function. Ultimately, the history must address 3 questions:

1. What is the nature of the academic problem(s)?
2. Is the child experiencing difficulty outside of the school setting?
3. What is the etiology of the underachievement?

Consequently, data must be derived from multiple sources. Information derived from parents must be validated and supplemented by teacher reports, report cards, and any formal evaluations that may have been conducted.

A detailed history is the most important part of the medical evaluation. Is the academic underachievement chronic, or did it have a clear onset? Has the child failed subjects or repeated a grade? Was there a delay in achieving early developmental milestones? What are his/her strengths? Is the issue related to failure to grasp the material, or difficulty with organization and processes, or a combination? Is there a discrepancy between the child’s ability to discuss a subject and write about it? Does he/she perform poorly on tests? Is the difficulty specific to one subject (eg, reading) or broad? Is the child’s performance variable on a day to day basis? What evaluations have been conducted? What interventions have been attempted? Are the child’s academic problems associated with classroom behavior problems?

Homework is a sensitive marker of academic achievement. Tears and parental frustrations during homework are common manifestations of academic underachievement. Requiring more than typical supervision, spending an excessively long time, failing to grasp concepts, and failing to transport the homework between home and school are some of the symptoms that may be seen.

Is the difficulty limited to the classroom, or does it pervade the child’s life? Behavioral history should include measures of inattention and hyperactivity/impulsivity. Truancy, excessive absences, detentions, suspensions, and expulsions should be noted. Mood, anxiety, perseveration/stereotypies, routines, ability to modulate responses (humor and anger), and aggression should be evaluated. Does he/she exhibit empathy, a sense of humor, or fair play? The review should include performance with peers during extracurricular activities and independent play. Is he/she participating in extracurricular activities? With what aged children does he/she play best? Is he a leader or a follower? Does he/she get into fights? Are there issues with bullying, stealing, lying, or fire setting? How is discipline delivered?

Academic underachievement is rarely attributable to one specific etiology. Most often, academic underachievement is seen in conjunction with multiple disorders. ADHD, language disorders, and developmental coordination disorders coexist in almost half of cases. Additionally, the disorders associated with academic underachievement are functionally defined and may have multiple mechanisms. For example, disorders of written language may result from the motor coordination difficulties seen in developmental coordination disorder, the organizational difficulties of ADHD, or the lack of words that are seen in language disorders.

Family history of academic underachievement is common. Parental performance in the early grades of school should be noted as well as their ultimate level of education. The performance of siblings, aunts, uncles, cousins, and grandparents should be ascertained. Family history should review disorders associated with academic underachievement, such as neurofibromatosis (Ewen and Shapiro 2008).

Academic underachievement may be the earliest manifestation of a chronic disorder. A thorough review of systems (including sleep, mood, tics, and other movements) needs to be explored, in addition to past history of neonatal abnormalities, brain trauma, infections, toxic exposure (eg, lead), and underlying chronic disease such as sickle cell anemia or diabetes. Loss of skills must be queried.
The physical examination of the child with academic underachievement should assess growth, head circumference, and evaluation for dysmorphisms of skin and craniofacial and musculoskeletal systems. The neurologic examination should be comprehensive, with special focus on symmetry, coordination, and subtle abnormalities of tone. Hearing and vision screening should be performed.

Psychological evaluation is undertaken to determine global cognitive function, evaluate specific aspects of cognitive function (eg, working memory, listening comprehension, executive function), and quantify behavioral/emotional and adaptive function. Direct classroom observation may be part of the psychological evaluation. Educational evaluations measure the child's academic achievement. Standard measures of reading (decoding and comprehension), writing, and mathematics (reasoning and calculation) may be used to better understand why the child is experiencing difficulty. Additional measures of fluency, visual motor skills, and phonological processing may prove useful. Speech and language evaluations complement psychological and educational testing. In addition to speech and vocabulary size, speech and language evaluations evaluate language usage, pragmatics, discourse, and the higher language functions that are the foundations of social interactions. Occupational therapists provide useful tools that quantify fine motor abilities and offer interventions that remediate or circumvent the deficits that are associated with developmental coordination disorder.

**Management**

There are at least 6 distinct roles that physicians have in the care of children with academic underachievement. They include the following:

**Identify.** Most children with academic underachievement will be referred for neurologic/neurodevelopmental evaluation; however, academic underachievement is often seen in children with other neurologic disorders. Incorporating questions about school performance in the evaluation of new and followed patients with neurologic disorders is likely to have a high yield.

The substrate for academic underachievement exists before the symptoms manifest. Parental, social, and economic factors predict poor school readiness (Nelson et al 2016). Low birth weight, fetal exposures, early behavioral disturbance, and delayed achievement of developmental milestones, even in children who "catch up," may presage academic difficulty.

**Establish diagnoses.** The evaluation of academic underachievement is interdisciplinary by nature. No single discipline is able to make all of the diagnoses that comprise the differential diagnosis of academic underachievement, but each discipline has an important role to play in the diagnostic process. In addition to bringing their expertise to the problems confronting the child, the consultant needs to ensure that additional psychological and educational evaluations and, if needed, speech and language and occupational therapy evaluations, are performed.

**Delineate coexisting conditions.** Most children with academic underachievement are diagnosed with more than one disorder. Brain dysfunction in childhood has diffuse manifestations that affect multiple functions. As a consequence, multiple diagnoses are the rule. The most common reason for a failed treatment program is overlooking an important coexisting condition (Kube and Shapiro 1996). For example, ADHD has been linked to disorders of oral and written language, specific learning disabilities, anxiety, affective disorder, sleep disturbances, epilepsy, and developmental coordination disorders. Children who face the additive problems of multiple disorders are at greater risk for academic failure, psychosocial consequences, and poor long-term outcomes that persist into adulthood (Sexton et al 2012).

**Evaluate possible etiologies.** Medicine is the only discipline that is charged with determining the etiology of the child's disorders. In selected cases, neuroimaging, EEGs, and genetic and metabolic testing may be indicated. Additional specialty consultation may be warranted based on the history and physical findings.

**Treat.** A comprehensive management program for students with academic underachievement must address 3 major goals:

1. Enable the student to achieve his maximal potential.
2. Prevent the academic liabilities from creating a secondary disability by limiting the acquisition of knowledge.
3. Prevent the academic disability from becoming a social handicap.

The wide number of disorders that cause academic underachievement and the frequent coexistence of these disorders require an individualized multimodal approach. Generally, a successful program includes parent education, educational
accommodations, behavioral monitoring, and, if needed, medication.

Parent education is the most important aspect of the management program. Parents need to understand the nature of the child's disorder, that he/she is not lazy or unmotivated, and that this is not the result of poor parenting. Parents will need to adapt daily routines so that the child can be successful in everyday life. Finally, parents need to be knowledgeable about their rights so that they can advocate effectively for their child. Parent groups that are sponsored by national organizations are helpful in supplying professionally vetted information about specific issues, providing a venue to learn more about their child's disorder(s), providing the opportunity to interchange with other parents who have dealt with similar issues, and identifying providers who can help parents and their children.

Educational accommodations are often required and span a spectrum ranging from simple adaptations in the classroom, such as preferential seating, to tutoring, special instruction, special classes, and special schools. These accommodations are governed by 2 federal laws: the Individuals with Disability Education Improvement Act (IDEA) and Section 504 of the Rehabilitation Act of 1973. A physician who is knowledgeable about these laws can advocate effectively and secure the needed educational interventions for their patients.

IDEA affirms the right to a "free and appropriate" education in the "least restrictive environment" that was promised by the Education for All Handicapped Children Act of 1975 (20 U.S.C. § 1400 et seq.). Children who have a disability that impedes academic progress are entitled to services under this law. The establishment of a disability is accomplished by an interdisciplinary team process, and the resulting document is called an individualized education plan (IEP). This document must establish a disability, describe the child's current level of function, and outline the necessary special education and related services and supplementary aids and services. The plan must be based on peer-reviewed research and must identify behaviorally measurable objectives and projected times of achievement (at most annual goals). The document must also establish the time of the child's next progress review and consider the settings in which the program is delivered. The following disabilities are covered:

- Autism
- Deafness
- Deaf-blindness
- Developmental delay (restricted to children aged 3 through 9)
- Emotional disturbance
- Hearing impairment
- Intellectual disability
- Multiple disabilities
- Orthopedic impairment
- Other health impairment
- Specific learning disability
- Speech or language impairment
- Traumatic brain injury
- Visual impairment, including blindness

Section 504 of the Rehabilitation Act of 1973 is an antidiscrimination statute that states, "No otherwise qualified individual with a disability in the United States. . . shall, solely by reason of her or his disability, be excluded from the participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance. . ." In the educational setting, Section 504 mandates that accommodations be provided to students with a disability that would enable them to function in the least restrictive environment. A disability is defined as a mental or physical impairment that significantly limits one or more major life functions. There are many different types of accommodations that can be provided, and they are easily found by searching for "Section 504" on the Internet. The accommodations can be grouped as follows:

1. Accommodations that affect how the material is presented (eg, repeat directions, read aloud, simplified language, large print, braille, study buddy)
2. Equipment and material (eg, calculator, amplification equipment, computers, manipulatives, second set of books)
3. Response (eg, mark answers in book, scribe records response, dictate, point, word processors, oral testing)
4. Setting (eg, small group, adaptive furniture, study carrel, student's home, separate room, etc.)
5. Timing/Scheduling (eg, extended time, frequent breaks)

Retention in grade is an ineffective intervention that may cause harm to children. The relative advantage in math, language, science, and social studies achievement with which repeaters have been found to start their retention year in comparison to younger, similarly at-risk grade-mates has been shown to diminish or disappear entirely with time.
Behavioral monitoring. Behavior is an important marker of the congruence between the demands of the situation and the child's capacity. Young children may be seen as oppositional when they are actually unable and not unwilling. Self-deprecating remarks ("I'm dumb," "I can't do anything," or "I wish I were dead") are red flags that indicate that the situation is untenable. Older children may express their feelings through frequent visits to the school nurse, leaving the classroom or the school. Adolescents may just give up. Depression often coexists with academic underachievement and needs to be considered in the differential of new-onset behavioral disturbance.

Children with academic underachievement have to work harder and do not see the same results achieved by their classmates. As a consequence, they often have poor self-esteem. A comprehensive management program will seek to bolster self-esteem by focusing on the child's strengths and identifying productive activities that enable the student to achieve a position of status within his/her class (e.g., crossing guard, hall monitor, tutor for younger students). Extracurricular sports should be encouraged, but individual activities such as swimming, martial arts, running, tennis, or golf should be considered if the child does not do well with team sports. Some children have talents in art, music, chess, or photography; some volunteer.

Medication. Medication may be an important component of a management program. Stimulants can have markedly positive effects on the academic performance of children with ADHD. Selective serotonin reuptake inhibitors may be warranted for depression and anxiety. The use of medication is implemented after an appropriate diagnosis is established, a discussion of the risks and benefits is had, the target behaviors to be addressed are identified, and a plan for monitoring of the medication is made. Parents who are reticent about using medication may agree to a therapeutic trial.

Ongoing monitoring. Comprehensive treatment programs must be monitored and adjusted as the child ages. Monitoring visits provide the opportunity to review progress, address current issues, and facilitate long-term planning. Performance expectations and cognitive and executive function demands increase as the child progresses through school. Reevaluations may be required if progress plateaus.

All of the issues that impact a management program may not be present at the initial consultation. Comorbid conditions, e.g., anxiety or mood or tic disorders, may appear. Parent-child interaction issues may require intervention.

Outcomes

Data relating to the long-term outcome of children with academic underachievement are lacking. Issues relating to definition, case finding, and treatment preclude a general statement. Outcome data for specific disorders exist and suggest that, as a group, people diagnosed with disorders that are associated with academic underachievement have poorer academic, vocational, economic, social, and health outcomes.

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**References especially recommended by author or editor for general reading.

Profile

Age range of presentation

02-05 years
06-12 years
13-18 years
19-44 years

Differential diagnosis list

Specific learning disabilities
Attention deficit/hyperactivity disorder (ADHD)
Intellectual disability
Language disorders
Social (pragmatic) communication disorders/ pervasive developmental disorders
Autism spectrum disorders
Developmental coordination disorders
Tourette syndrome
Epilepsy
Adjustment disorders
Anxiety disorders
Affective disorder
Substance abuse
Hearing loss
Visual impairment
Sleep disorders
Chronic diseases
Neurodegenerative/neurometabolic disorders

Other topics to consider
Developmental language disorder
Intellectual disability

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