CHAPTER 1

Neurodevelopmental Disorders

In earlier DSMs, the name of this chapter was even more of a mouthful: "Disorders Usually First Evident in Infancy, Childhood, or Adolescence." Now the focus is on the individual during the formative period, when the development of the nervous system takes place, hence, and logically enough, neurodevelopmental. However, *DSM-5 Made Easy* emphasizes the evaluation of older patients—later adolescence to maturity, and beyond. For that reason, I've taken some liberties in arranging the conditions discussed in this chapter—placing those that I discuss at length at the beginning, and listing later just the prototypes (with some discussion) for others.

Of course, many of the disorders considered in subsequent chapters can be first encountered in children or young adolescents; anorexia nervosa and schizophrenia are two examples that spring to mind. Conversely, many of the disorders discussed in this chapter can continue to cause problems for years after a child has grown up. But only a few commonly occupy clinicians who treat adults. For the remainder of the disorders DSM-5 includes in its first chapter, I provide introductions and Essential Features, but no illustrative case example.

Quick Guide to the Neurodevelopmental Disorders

In every Quick Guide, the page number following each item always refers to the point at which a discussion of it begins. Also mentioned below, just as in any other competent differential diagnosis, are various conditions arising in early life that are discussed in other chapters.

Autism and Intellectual Disability

Intellectual disability. This condition usually begins in infancy; people with it have low intelligence that causes them to need special help in coping with life (p. 20).

Borderline intellectual functioning. This term indicates persons nominally ranked in the IQ range of 71–84 who do not have the coping problems associated with intellectual disability (p. 598).

Autism spectrum disorder. From early childhood, the patient has impaired social interactions and communications, and shows stereotyped behaviors and interests (p. 26).

Global developmental delay. Use when a child under the age of 5 seems to be falling behind developmentally but you cannot reliably assess the degree (p. 26).

Unspecified intellectual disability. Use this category when a child 5 years old or older cannot be reliably assessed, perhaps due to physical or mental impairment (p. 26).

Communication and Learning Disorders

Language disorder. A child's delay in using spoken and written language is characterized by small vocabulary, grammatically incorrect sentences, and/or trouble understanding words or sentences (p. 46).

Social (pragmatic) communication disorder. Despite adequate vocabulary and the ability to create sentences, these patients have trouble with the practical use of language; their conversational interactions tend to be inappropriate (p. 49).

Speech sound disorder. Correct speech develops slowly for the patient's age or dialect (p. 47).

Childhood-onset fluency disorder (stuttering). The normal fluency of speech is frequently disrupted (p. 47).

Selective mutism. A child chooses not to talk, except when alone or with select intimates. DSM-5 lists this as an anxiety disorder (p. 187).

Specific learning disorder. This may involve problems with reading (p. 51), mathematics (p. 51), or written expression (p. 52).

Academic or educational problem. This Z-code is used when a scholastic problem (other than a learning disorder) is the focus of treatment (p. 591).

Unspecified communication disorder. Use for communication problems where you haven't enough information to make a specific diagnosis (p. 54).

Tic and Motor Disorders

Developmental coordination disorder. The patient is slow to develop motor coordination; some also have attention-deficit/hyperactivity disorder or learning disorders (p. 43).

Stereotypic movement disorder. Patients repeatedly rock, bang their heads, bite themselves, or pick at their own skin or body orifices (p. 44).

Tourette's disorder. Multiple vocal and motor tics occur frequently throughout the day in these patients (p. 39).

Persistent (chronic) motor or vocal tic disorder. A patient has either motor or vocal tics, but not both (p. 42).

Provisional tic disorder. Tics occur for no longer than 1 year (p. 42).

Other or unspecified tic disorder. Use one of these categories for tics that do not meet the criteria for any of the preceding (p. 43).

Attention-Deficit and Disruptive Behavior Disorders

Attention-deficit/hyperactivity disorder. In this common condition (usually abbreviated as ADHD), patients are hyperactive, impulsive, or inattentive, and often all three (p. 33).

Other specified (or unspecified) attention-deficit/hyperactivity disorder. Use these categories for symptoms of hyperactivity, impulsivity, or inattention that do not meet full criteria for ADHD (p. 38).

Oppositional defiant disorder. Multiple examples of negativistic behavior persist for at least 6 months (p. 380).

Conduct disorder. A child persistently violates rules or the rights of others (p. 381).

Disorders of Eating, Sleeping, and Elimination

Pica. The patient eats material that is not food (p. 288).

Rumination disorder. There is persistent regurgitation and chewing of food already eaten (p. 289).

Encopresis. At age 4 years or later, the patient repeatedly passes feces into clothing or onto the floor (p. 294).

Enuresis. At age 5 years or later, there is repeated voiding of urine (it can be voluntary or involuntary) into bedding or clothing (p. 293).

Non-rapid eye movement sleep arousal disorder, sleep terror type. During the first part of the night, these patients cry out in apparent fear. Often they don't really wake up at all. This behavior is considered pathological only in adults, not children (p. 333).

Other Disorders or Conditions That Begin in the Developmental Period

Parent–child relational problem. This Z-code is used when there is no mental disorder, but a child and parent have problems getting along (for example, overprotection or inconsistent discipline) (p. 589).

Sibling relational problem. This Z-code is used for difficulties between siblings (p. 590).

Problems related to abuse or neglect. A variety of Z-codes can be used to cover difficulties that arise from neglect or from physical or sexual abuse of children (p. 594).

Disruptive mood dysregulation disorder. A child's mood is persistently negative between severe temper outbursts (p. 149).

Separation anxiety disorder. The patient becomes anxious when apart from parent or home (p. 188).

Posttraumatic stress disorder in preschool children. Children repeatedly relive a severely traumatic event, such as car accidents, natural disasters, or war (p. 223).

Gender dysphoria in children. A boy or girl wants to be of the other gender (p. 374).

Factitious disorder imposed on another. A caregiver induces symptoms in someone else, usually a child, with no intention of material gain (p. 269).

Other specified (or unspecified) neurodevelopmental disorder. These categories serve for patients whose difficulties don't fulfill criteria for one of the above disorders (pp. 53–54).

Autism and Intellectual Disability

Intellectual Disability (Intellectual Developmental Disorder)

Individuals with intellectual disability (ID), formerly called mental retardation, have two sorts of problems, one resulting from the other. First, there's a fundamental deficit in their ability to think. This will be some combination of problems with abstract thinking, judgment, planning, problem solving, reasoning, and general learning (whether from academic study or from experience). Their overall intelligence level, as determined by a standard individual test (not one of the group tests, which tend to be less accurate), will be markedly below average. In practical terms, this generally means an IQ of less than 70. (For infants, you can only subjectively judge intellectual functioning.)

Most people with such a deficit need special help to cope. This need defines the other major requirement for diagnosis: The patient's ability to adapt to the demands of normal life—in school, at work, at home with family—must be impaired in some important way. We can break down adaptive functioning into three areas: (1) the conceptual, which depends on language, math, reading, writing, reasoning, and memory to solve problems; (2) the social, which includes deploying such abilities as empathy, communication, awareness of the experiences of other people, social judgment, and self-regulation; and (3) the practical, which includes regulating behavior, organizing tasks, managing finances, and managing personal care and recreation. How well these adaptations succeed depends on the patient's education, job training, motivation, personality, support from significant others, and of course intelligence level.

By definition, ID begins during the developmental years (childhood and adolescence). Of course, in most instances the onset is at the very beginning of this period—usually in infancy, often even before birth. If the behavior begins at age 18 or after, it is often called a major neurocognitive disorder (dementia); of course, dementia and ID can coexist. Diagnostic assessment must be done with caution, especially in younger children who may have other problems that interfere with accurate assessment. Some of these patients, once they have overcome, for example, sensory impairments of hearing or vision, will no longer appear intellectually challenged.

Various behavioral problems are commonly associated with ID, but they don't constitute criteria for diagnosis. Among them are aggression, dependency, impulsivity, passivity, self-injury, stubbornness, low self-esteem, and poor frustration tolerance. Gullibility and naïveté can lead to risk for exploitation by others. Some patients with ID also suffer from mood disorders (which often go undiagnosed), psychotic disorders, poor attention span, and hyperactivity. However, many others are placid, loving, pleasant people whom others find enjoyable to live and associate with.

Although many patients with ID appear normal, others have physical characteristics that seem obvious, even to the untrained observer. These include short stature, seizures, hemangiomas, and malformed eyes, ears, and other parts of the face. A diagnosis of ID is likely to be made earlier when there are associated physical abnormalities (such as those associated with Down syndrome). ID affects about 1% of the general population. Males outnumber females roughly 3:2.

The many causes of ID include genetic abnormalities, chemical effects, structural brain damage, inborn errors of metabolism, and childhood disease. An individual's ID may have biological or social causes, or both. Some of these etiologies (with the approximate percentages of all patients with ID they represent) are given below:

Genetic causes (about 5%). Chromosomal abnormalities, Tay–Sachs, tuberous sclerosis.

Early pregnancy factors (about 30%). Trisomy 21 (Down syndrome), maternal substance use, infections.

Later pregnancy and perinatal factors (about 10%). Prematurity, anoxia, birth trauma, fetal malnutrition.

Acquired childhood physical conditions (about 5%). Lead poisoning, infections, trauma.

Environmental influences and mental disorders (about 20%). Cultural deprivation, early-onset schizophrenia.

No identifiable cause (about 30%).

Though measurement of intelligence no longer figures in the official DSM-5 criteria, in the prototypes below I have included IQ ranges to provide some anchoring for

the several severity specifiers. However, remember that adaptive functioning, not some number on a page, is what determines the actual diagnosis given to any individual.

Even individually administered IQ tests will have a few points of error. That's one reason why patients with measured IQs as high as 75 can sometimes be diagnosed as having ID: They still have problems with adaptive functioning that help define the condition. On the other hand, an occasional person with an IQ of less than 70 may function well enough not to qualify for this diagnosis. In addition, cultural differences, illness, and mental set can all affect the accuracy of IQ testing.

Interpretation of IQ scores also must consider the possibility of *scatter* (better performance on verbal tests than on performance tests, or vice versa), as well as physical, cultural, and emotional disabilities. These factors are not easy to judge; some test batteries may require the help of a skilled psychometrist. Such factors are among the reasons why definitions of ID have moved away from relying solely on the results of IQ testing.

Essential Features of **Intellectual Disability**

From their earliest years, people with ID are in cognitive trouble. Actually, it's trouble of two sorts. First, as assessed both clinically and with formal testing, they have difficulty with cognitive tasks such as reasoning, making plans, thinking in the abstract, making judgments, and learning from formal studies or from life's experiences. Both clinical judgment and the results of one-on-one intelligence tests are required to assess intellectual functioning. Second, their cognitive impairment leads to difficulty adapting their behavior so that they can become citizens who are independent and socially accountable. These problems occur in communication, social interaction, and practical living skills. To one degree or another, depending on severity, they affect the patient across multiple life areas—family, school, work, and social relations.

F70 [317] Mild. As children, these individuals learn slowly and lag behind schoolmates, though they can be expected to attain roughly sixth-grade academic skills by the time they are grown. As they mature, deficiencies in judgment and solving problems cause them to require extra help managing everyday situations—and personal relationships may suffer. They usually need help with such tasks as paying their bills, shopping for groceries, and finding appropriate accommodations. However, many work independently, though at jobs that require relatively little cognitive involvement. Though memory and the ability to use language can be quite good, these patients become lost when confronted with metaphor or other examples of abstract thinking. IQ typically ranges from 50 to 70. They constitute 85% of all patients with ID.

F71 [318.0] Moderate. When they are small children, these individuals' differences from nonaffected peers are marked and encompassing. Though they can learn to read, to do simple math, and to handle money, language use is slow to develop and relatively simple. Far more than mildly affected individuals do, in early life they need help in learning to provide their own self-care and engage in household tasks. Relationships with others (even romantic ones) are possible, though they often don't recognize the cues that govern ordinary personal interaction. Although they require assistance making decisions, they may be able to work (with help from supervisors and co-workers) at relatively undemanding jobs, typically at sheltered workshops. IQ will range from the high 30s to low 50s. They represent about 10% of all patients with ID.

F72 [318.1] Severe. Though these people may learn simple commands or instructions, communication skills are rudimentary (single words, some phrases). Under supervision, they may be able to perform simple jobs. They can maintain personal relationships with relatives, but require supervision for all activities; they even need help dressing and with personal hygiene. IQs are in the low 20s to high 30s. They make up roughly 5% of the total of all patients with ID.

F73 [318.2] Profound. With limited speech and only rudimentary capacity for social interaction, much of what these individuals communicate may be through gestures. They rely completely on other people for their needs, including activities of daily living, though they may help with simple chores. Profound ID usually results from a serious neurological disorder, which often carries with it sensory or motor disabilities. IQ ranges from the low 20s downward. About 1–2% of all patients with ID are so profoundly affected.

The Fine Print

Don't forget the D's: • Duration (from early childhood) • Differential diagnosis (autism spectrum disorder, cognitive disorders, borderline intellectual functioning, specific learning disorders)

Coding Notes

Specify level of severity (and code numbers) according to descriptions above.

Grover Peary

Grover Peary was born when his mother was only 15. She was an obese girl who hadn't even realized she was pregnant until she was 6 months along. Even then, she hadn't bothered to seek prenatal care. Born after 30 hours of hard labor, Grover hadn't breathed right away. After the delivery, his mother had lost interest in him; he had been reared alternately by his grandmother and an aunt.

Grover walked at 20 months; he spoke his first words at age 2½ years. A pediatrician pronounced him "somewhat slow," so his grandmother enrolled him in an infant school for children with developmental disabilities. At the age of 7, he had done well enough to be mainstreamed in his local elementary school. Throughout the remainder of his school career, he worked with a special education teacher for 2 hours each day; otherwise, he attended regular classes. Testing when he was in the 4th and 10th grades placed his IQ at 70 and 72, respectively.

Despite his disability, Grover loved school. He had learned to read by the time he was 8, and he spent much of his free time poring over books about geography and natural science. (He had a great deal of free time, especially at recess and lunch hour. He was clumsy and physically undersized, and the other children routinely excluded him from their games.) At one time he wanted to become a geologist, but he was steered toward a general curriculum. He lived in a county that provided special education and training for individuals with ID, so by the time he graduated, he had learned some manual skills and could navigate the complicated local public transportation. A job coach helped him to find work washing dishes at a restaurant in a downtown hotel and to learn the skills necessary to maintain the job. The restaurant manager got him a room in the hotel basement.

The waitresses at the restaurant often gave Grover a few quarters out of their tips. Living at the hotel, he didn't need much money—his room and food were covered, and the tiny dish room where he worked didn't require much of a wardrobe. He spent most of his money on expanding his CD collection and going to baseball games. His aunt, who saw him every week, helped him with grooming and reminded him to shave. She and her husband also took him to the ball park; otherwise, he would have spent nearly all of his free time in his room, listening to music and reading magazines.

When Grover was 28, an earthquake hit the city where he lived. The hotel was so badly damaged that it closed with no notice at all. Thrown out of work, all of Grover's fellow employees were too busy taking care of their own families to think about him. His aunt was out of town on vacation; he had nowhere to turn. It was summertime, so he placed the few possessions he had rescued in a heavy-duty lawn and leaf bag and walked the streets until he grew tired; he then rolled out some blankets in the park. He slept this way for nearly 2 weeks, eating what he could scrounge from other campers. Although federal emergency relief workers had been sent to help those hit by the earthquake, Grover did not request relief. Finally, a park ranger recognized his plight and referred him to the clinic.

During that first interview, Grover's shaggy hair and thin face gave him the appearance of someone much older. Dressed in a soiled shirt and baggy pants—they appeared to be someone's castoff—he sat still in his chair and gave poor eye contact. He spoke hesitantly at first, but he was clear and coherent, and eventually communicated quite well with the interviewer. (Much of the information given above, however, was obtained later from old school records and from his aunt upon her return from vacation.)

Grover's mood was surprisingly good, about medium in quality. He smiled when

he talked about his aunt, but looked serious when he was asked where he was going to stay. He had no delusions, hallucinations, obsessions, compulsions, or phobias. He denied having any panic attacks, though he admitted he felt "sorta worried" when he had to sleep in the park.

Grover scored 25 out of 30 on the Mini-Mental State Exam. He was oriented except to day and month; he spent a great deal of effort subtracting sevens, and finally got two correct. He was able to recall three objects after 5 minutes, and managed a perfect score on the language section. He recognized that he had a problem with where to live, but, aside from asking his aunt when she returned, he hadn't the slightest idea how to go about solving the problem.

Evaluation of Grover Peary

Had Grover been evaluated before the hotel closed, he might not have fulfilled the criteria for ID. At that time he had a place to live, food to eat, and activities to occupy him. However, his aunt had to remind him about shaving and staying presentable. Despite low scores on at least two IQ tests (criterion A in DSM-5), he was functioning pretty well in a highly, if informally, structured environment.

Once his support system quite literally collapsed, Grover could not cope with change. He didn't make use of the resources available to others who had lost their homes. He was also unable to find work; only through the generosity of others did he manage even to eat—a pretty clear deficit of adaptive functioning (B). Of course, his condition had existed since early childhood (C). Therefore, despite the fact that his IQ had hovered in the low 70s, he seemed impaired enough to warrant a diagnosis of ID. (Note that, as an alternative, Grover would also comfortably match the prototype for mild ID.)

The differential diagnosis of ID includes a variety of learning and communication disorders, which are presented later in this chapter. **Dementia,** or **major neurocognitive disorder** in DSM-5, would have been diagnosed if Grover's problem with cognition had represented a marked decline from his previous level of functioning. (Dementia and ID sometimes coexist, though they can be difficult to discriminate.) At his IQ level, Grover might have been diagnosed as having **borderline intellectual functioning** had he not had such obvious difficulties in coping with life.

Youngsters and adults with ID often have associated mental disorders, which include **attention-deficit/hyperactivity disorder** and **autism spectrum disorder**; these conditions can be diagnosed concurrently. **Mood** and **anxiety disorders** are often present, though clinicians may not recognize them without adequate collateral information. Personality traits such as stubbornness are also sometimes concomitant. Patients with ID may have physical conditions such as **epilepsy** and **cerebral palsy**. Patients with Down syndrome may be at special risk for developing **major neurocognitive disorder due to Alzheimer's disease** as they approach their 40s. Adding in his homelessness (and a GAF score of 45, Grover's diagnosis would be as follows:

F70 [317]	Mild intellectual disability
Z59.0 [V60.0]	Homelessness
Z56.9 [V62.29]	Unemployed

Intellectual developmental disorder is the name for ID being proposed for use in—brace yourself!—ICD-11. The various editions of the DSM have recorded more than 200 changes in the names of mental disorders (a figure that doesn't even include new disorders added over the years). But the case of ID may be the only time that the name of a mental disorder was changed pursuant to an act of Congress.

During the 2009–2010 legislative session, Congress approved, and President Obama signed, a statute replacing in law the term *mental retardation* with *intellectual disability*. The inspiration was Rosa Marcellino, a 9-year-old girl with Down syndrome who, with her parents and siblings, worked to expunge the words *mentally retarded* from the health and education codes in Maryland, her home state.

Note further that the term *developmental disability* as it is used in law is not restricted to people with ID. The legal term applies to anyone who by age 22 has permanent problems functioning in at least three areas because of mental or physical impairment.

F88 [315.8] Global Developmental Delay

Use the category of global developmental delay for a patient under age 5 years who has not been adequately evaluated. Such a child may have delayed developmental milestones.

F79 [319] Unspecified Intellectual Disability

Use the category of unspecified ID for a patient 5 years of age or older who has additional disabilities (blindness, severe mental disorder) too severe to allow full evaluation of intellectual abilities.

F84.0 [299.00] Autism Spectrum Disorder

Autism spectrum disorder (ASD) is a heterogeneous neurodevelopmental disorder with widely varying degrees and manifestations that has both genetic and environmental causes. Usually recognized in early childhood, it continues through to adult life, though the form may be greatly modified by experience and education. The symptoms fall into three broad categories (DSM-5 lumps together the first two).

Communication. Despite normal hearing, the speech of patients with ASD may be delayed by as much as several years. Their deficits vary greatly in scope and severity, from what we used to call Asperger's disorder (these people can speak clearly

and have normal, even superior, intelligence) to patients so severely affected that they can hardly communicate at all. Others may show unusual speech patterns and idiosyncratic use of phrases. They may speak too loudly or lack the prosody (lilt) that supplies the music of normal speech. They may also fail to use body language or other nonverbal behavior to communicate—for example, the smiles or head nods with which most of us express approval. They may not understand the basis of humor (the concept that the words people use can have multiple or abstract meanings, for instance). Autistic children often have trouble beginning or sustaining conversation; rather, they may talk to themselves or hold monologues on subjects that interest them, but not other people. They tend to ask questions over and again, even after they've obtained repeated answers.

Socialization. The social maturation of patients with ASD occurs more slowly than for normal children, and developmental phases may occur out of the expected sequence. Parents often become concerned in the second 6 months, when their child doesn't make eye contact, smile reciprocally, or cuddle; instead, the baby will arch away from a parent's embrace and stare into space. Toddlers don't point to objects or play with other children. They may not stretch out their arms to be picked up or show the normal anxiety at separation from parents. Perhaps as a result of frustration at the inability to communicate, ASD often results in tantrums and aggression in young children. With little apparent requirement for closeness, older children have few friends and seem not to share their joys or sorrows with other people. In adolescence and beyond, this can play out as a nearly absent need for sex.

Motor behavior. The motor milestones of patients with ASD usually arrive on time; it's the types of behavior they choose that mark them as different. These include compulsive or ritualistic actions (called *stereotypies*)—twirling, rocking, hand flapping, head banging, and maintaining odd body postures. They suck on toys or spin them rather than using them as symbols for imaginative play. Their restricted interests lead them to be preoccupied with parts of objects. They tend to resist change, preferring to adhere rigidly to routine. They may appear indifferent to pain or extremes of temperature; they may be preoccupied with smelling or touching things. Many such patients injure themselves by head banging, skin picking, or other repetitive motions.

Apart from the subtype formerly known as Asperger's disorder, ASD wasn't recognized at all until Leo Kanner introduced the term *early infantile autism* in 1943. Since then, the concept has expanded in scope and grown new subdivisions (DSM-IV listed four types plus the ubiquitous *not otherwise specified*), though it has now contracted again into the unified concept presented by DSM-5. Although the degree of disability varies widely, the effect upon the lives of most patients and their families is profound and enduring.

ASD is often associated with intellectual disability; discriminating these two dis-

orders can be difficult. Sensory abnormalities occur in perhaps 90% of patients with ASD; some children hate bright lights or loud sounds, or even the prickly texture of certain fabrics or other surfaces. A small minority have cognitive "splinter" skills—special abilities in computation, music, or rote memory that occasionally rise to the level of savantism.

Physical conditions associated with ASD include phenylketonuria, fragile X syndrome, tuberous sclerosis, and a history of perinatal distress. Mental health comorbidity issues include anxiety disorders (especially prevalent) and depression (2–30%), obsessive–compulsive behavior (in about one-third), attention-deficit/hyperactivity disorder (over half), intellectual disability (about half), and seizures (25–50%). Some patients complain of initial insomnia or a reduced need for sleep; a few even sleep days and remain awake nights. Researchers have recently reported an association of a form of autism with a gene responsible for kidney, breast, colon, brain, and skin cancer.

Incorporating the former diagnoses of autistic, Rett's, Asperger's, and childhood disintegrative disorders, ASD's overall prevalence is about 6 per 1,000 children in the general population; some studies report even higher figures. And the numbers have increased in recent years, at least in part due to increased awareness of ASD. Autism affects all cultural and socioeconomic groups. Although boys are twice (perhaps up to four times) as often affected as girls, the latter are more likely to be severely affected. (The former Asperger's disorder, it should be said, is more heavily weighted toward girls.) Siblings of patients with ASD have a greatly elevated risk for the same disorder.

Note that ASD's impressive range of severity can be reflected in separate ratings for the social communication and behavioral components. Though the DSM-5 definitions for severity levels are a bit fussy, they boil down to *mild*, *moderate*, and *severe*. That's how I've listed them, but DSM-5 hasn't for a practical reason: Some members of the committee that wrote the criteria worried that a label of *mild* could give an insurance company leverage to deny services. Of course, that reasoning could cover just about any disorder in the book.

Essential Features of **Autism Spectrum Disorder**

From early childhood, contact with others affects to some extent nearly every aspect of how these patients function. Social relationships vary from mild impairment to almost complete lack of interaction. There may be just a reduced sharing of interests and experiences, though some patients fail utterly to initiate or respond to the approach of others. They tend to speak with few of the usual physical signals most people use—eye contact, hand gestures, smiles, and nods. Relationships with other people founder, so that patients with ASD have trouble adapting their behavior to

different social situations; they may lack general interest in other people and make few, if any, friends.

Repetition and narrow focus characterize their activities and interests. They resist even small changes in their routines (perhaps demanding exactly the same menu every lunchtime or endlessly repeating already-answered questions). They may be fascinated with movement (such as spinning) or small parts of objects. The reaction to stimuli (pain, loud sounds, extremes of temperature) may be either feeble or excessive. Some are unusually preoccupied with sensory experiences: They are fascinated by visual movement or particular smells, or they sometimes fear or reject certain sounds or the feel of certain fabrics. They may use peculiar speech or show stereotypies of behavior such as hand flapping, body rocking, or echolalia.

The Fine Print

Note that there are varying degrees of ASD, some of which received separate diagnoses and codes in DSM-IV but no longer do. In particular, what was formerly called Asperger's disorder is relatively milder; many of these people communicate verbally quite well, yet still lack the other skills needed to form social bonds with others.

Deal with the D's: • Duration (from early childhood, though symptoms may appear only later, in response to the demands of socialization) • Distress or disability (work/academic, social, or personal impairment) • Differential diagnosis (ordinary children may have strong preferences and enjoy repetition; consider also intellectual disability, stereotypic movement disorder, obsessive–compulsive disorder [OCD], social anxiety disorder, language disorder)

Coding Notes

Specify:

{With}{Without} accompanying intellectual impairment
{With}{Without} accompanying language impairment
Associated with a known medical or genetic condition or environmental factor
Associated with another neurodevelopmental, mental, or behavioral disorder
With catatonia (see p. 100)

Specify severity (separate ratings are required for social communication and restricted, repetitive behavior).

Social communication

Level 1 (mild). The patient has trouble starting conversations or may seem less interested in them than most people. Code as "Requiring support."

Level 2 (moderate). There are pronounced deficits in both verbal and nonverbal communication. Code as "Requiring substantial support."

Level 3 (severe). Little response to the approach of others markedly limits functioning. Speech is limited, perhaps to just a few words. Code as "Requiring very substantial support."

Restricted, repetitive behaviors

Level 1 (mild). Change provokes some problems in at least one area of activity. Code as "Requiring support."

Level 2 (moderate). Problems in coping with change are readily apparent and interfere with functioning in various areas of activity. Code as "Requiring substantial support."

Level 3 (severe). Change is exceptionally hard; all areas of activity are influenced by behavioral rigidity. Causes severe distress. Code as "Requiring very substantial support."

Temple Grandin

Temple Grandin's career would have been noteworthy even had she not been born with ASD. Her life story serves as an inspiration for patients, for their families, and for all of us who would offer help. The following information, intended not to present a full picture of her life but to illustrate the features of ASD, has been abstracted from several of her own books.

Born in 1947, Temple began walking shortly after her first birthday. Even as a toddler, she didn't like to be picked up, and would stiffen when her mother tried to hold her. In her autobiographies, she recalls that she would sit and rock for long periods; rocking and spinning helped calm her when she felt overstimulated. Much later, she remembered that being touched by other people caused such sensory overload that she would struggle to escape; hugging was "too overwhelming." She couldn't even tolerate the feel of edges of clothing, such as seams of her underwear.

Temple was alert and well coordinated, and she had normal hearing; yet she didn't speak until after her fourth birthday. Later, she recalled her frustration at understanding what was said but being unable to respond. For many years thereafter, her voice was toneless and uninflected, without lilt or rhythm. Even as a college student, she would speak too loudly, unaware of the effect her voice was having on others.

As a small child, Temple was taken to a psychiatrist who diagnosed her as having "childhood schizophrenia"; her parents were advised that she might need institutionalization. Instead, she was given the benefit of private schooling, where her teachers taught the other students to accept her—and her eccentricities.

For example, she was unable to meet the gaze of others and lacked the sense of feelings attached to personal relationships. She would even hold a cat too tightly, not recognizing the signals of distress it was giving her. With no interest in playing with other children, she would instead sit and spin objects such as coins or the lids of cans

or bottles. She had an intense interest in odors, and was fascinated by bright colors and the movement of sliding doors and other objects.

Sameness was balm for her. At school age, she resisted change in her routines and would repeatedly ask the same questions. She reacted badly to Christmas and Thanksgiving, because they entailed so much noise and confusion. As an older child, she became fixated on particular issues such as elections—the campaign buttons, bumper stickers, and posters for the governor of her state held special interest for Temple.

But emotional nuance escaped her. With no internal compass for navigating personal relationships, understanding normal social communication was, for her, like being "an anthropologist on Mars." Because she didn't have the feelings normal people attach to others, her social interactions had to be guided by intellect, not emotion. To communicate, she would use lines scripted in advance, because she didn't have the instinct to speak in a socially appropriate manner. What she has learned of empathy was attained by visualizing herself in the other person's place.

Although Temple had always rejected human contact, she nonetheless craved comfort. She found it one summer she spent on a farm, after observing that a device used to hold cattle so that they could be immunized appeared to calm them. As a result, she designed and built a squeezing machine that applied mechanical pressure to her own body; the result was tranquility she hadn't found by other means. Refined over the years, her invention led to her eventual career in creating devices used in animal husbandry.

As an adult, Temple still had trouble responding to unexpected social situations, and she would have severe panic attacks were they not controlled with a small dose of the antidepressant imipramine. But she became salutatorian of her college graduating class; eventually she earned a PhD and ran her own company. She is world-famous as a designer of machinery that helps calm animals on their road to slaughter. And she is a sought-after speaker on autism. But if someone's pager or cell phone goes off when she's giving a lecture, it still causes her to lose her train of thought.

Evaluation of Temple Grandin

Temple's books (and the HBO film named for her) provide a treasure trove of data bearing on the diagnosis of ASD. However, it would be better if we had had multiple sources of information—for her, as for any patient. I'll just touch on the basic material we'd use for diagnosis.

Working our way through the diagnostic criteria, I think we can agree, first of all, that she has had persistent problems in social interaction and communication (criterion A). They include social and emotional reciprocity (didn't want/need to be hugged—A1); use of nonverbal behaviors (poor eye contact—A2); and relationships (lacking interest in other children—A3). Although the DSM-5 criteria are not carefully worded, there must be deficits in each of these three areas for a person to be diagnosed as having ASD. That reading brings DSM-5 fully in line with the DSM-IV diagnostic criteria for autistic disorder.

Temple's restricted behavior and interests included examples of all four symptoms in the criterion B category (only two are required for diagnosis): stereotyped spinning of coins and other objects (she even twirled herself—B1); a rejection of change in routine (dislike of holiday festivities—B2); fixed, restricted interests in, for example, sliding doors and the paraphernalia of political campaigns (B3); and hyperreactivity to sounds and fascination with smells (B4). Temple's symptoms were present from early childhood (C); her biography and other books richly document the degree to which they dominated and impaired her everyday functioning (D). However, she eventually surmounted them brilliantly, thereby disposing of the final possible objection (E) that the symptoms must not be better accounted for by intellectual disability.

Patients with **stereotypic movement disorder** will exhibit motor behaviors that do not fulfill an obvious function, but the criteria for that diagnosis specifically exclude ASD. Temple spoke late and had difficulty communicating verbally, but the criteria for **social communication disorder** also exclude ASD. Her parents were supportive and sensitive to her needs, eliminating **severe psychosocial deprivation** as a possible etiology. We'd also need to consider general **medical problems** such as a **hearing deficit**, which Temple herself explicitly denies having.

She does have a history of severe anxiety, well controlled with medication, that would probably qualify for a comorbid diagnosis of **panic disorder**, though it cannot account for the vast majority of her past symptoms. (I'm leaving the details of that diagnosis as an exercise.) Although some aspects of her history are reminiscent of **obsessive–compulsive disorder**, she has many other symptoms that it cannot explain, either.

Besides panic and other anxiety disorders, ASD can be comorbid with intellectual disability, attention-deficit/hyperactivity disorder, developmental coordination disorder, specific learning disorders, and mood disorders. I'd judge Temple's childhood GAF score as about 55. Though today she may no longer meet DSM-5's diagnostic standards, she clearly did as a child, permitting us to list her diagnosis then as follows:

F84.0 [299.00]	Autism spectrum disorder
F41.0 [300.01]	Panic disorder

With the elimination of Asperger's disorder (and other specific autism diagnoses) from DSM-5, patient support groups have been up in arms. Asperger's disorder, used since 1944, has a history as extensive as autism. It seemed to define a group of people who, though clearly burdened by their symptoms, also possess a sometimes remarkable intelligence and range of capabilities that may even be superior. It's tempting to regard Asperger's as a sort of "autism lite." However, that would be a mistake, for patients with Asperger's have many of the same deficits as do other individuals with ASD. Perhaps desiring friends, but lacking the empathy necessary for normal social interaction, these solitary individuals might like to change but have no idea how to go about it.

So useful has the concept of Asperger's been, and so ingrained in the common usage

of patients and professionals alike has it become, that it seems unlikely to disappear—even though it hasn't been blessed by the latest DSM. It is an irony that because of her language delay, DSM-IV criteria would have deemed Temple Grandin ineligible for a diagnosis of Asperger's, though she remains the poster person for that diagnosis. This is a great example in support of the prototype-matching method of diagnosis I have described in the Introduction (p. 2). Using it, I'd rate Temple (when she was a child) a 4 out of 5 for the diagnosis of Asperger's disorder. However, DSM-5, in a nod to vehement objections from the community of patients with Asperger's, does state that those who were formerly diagnosed as Asperger's can now be regarded as having ASD, whether or not they meet current criteria. That's the second irony in one paragraph.

Attention-Deficit/Hyperactivity Disorder

Attention-deficit/hyperactivity disorder (ADHD) has borne a long string of names since it was first described in 1902. Though it is one of the most common behavioral disorders of childhood, only recently—within a few decades, at most—have we recognized the persistence of ADHD symptoms into adult life.

Although this disorder usually isn't diagnosed until the age of 9, symptoms typically begin before a child starts school. (DSM-5 criteria require some symptoms before age 12.) Parents sometimes report that their children with ADHD cried more than their other babies, that they were colicky or irritable, or that they slept less. Some mothers will even swear that these children kicked more before they were born.

Developmental milestones may occur early; these children may be described as running almost before they could walk. "Motorically driven," they have trouble just sitting quietly. They may also be clumsy and have problems with coordination. At least one study found that they require more emergency care for injuries and accidental poisonings than children without ADHD do. They often cannot focus on schoolwork; therefore, though intelligence is usually normal, they may perform poorly in school. They tend to be impulsive, to say things that hurt the feelings of others, and to be unpopular. They may be so unhappy that they also fulfill criteria for persistent depressive disorder (dysthymia).

These behaviors usually decrease with adolescence, when many patients with ADHD settle down and become normally active and capable students. But some use substances or develop other forms of delinquent behavior. Adults may have continuing interpersonal problems, alcohol or drug use, or personality disorders. Adults may also complain of trouble with concentration, disorganization, impulsivity, mood lability, overactivity, quick temper, and intolerance of stress.

Until recently, ADHD was said to affect perhaps 6% of children in the United States, with a male preponderance ratio of 2:1 or greater. A (disputed) 2013 survey from the Centers for Disease Control and Prevention estimated the rate at closer to 11% of

high school boys. The DSM-5 criteria identify perhaps 2.5% of adults age 17 and over, though the range reported in various studies is great. The male–female ratio is far less among adults, for reasons that are obscure.

The condition tends to run in families: Parents and siblings are more likely than average to be affected. Alcoholism and divorce, as well as other causes of family disruption, are common in the family backgrounds of these people. There may be a genetic association with antisocial personality disorder and somatic symptom disorder. Also associated with ADHD are learning disorders, especially problems with reading. In adults, look for substance use, mood, and anxiety disorders.

Several other disorders are likely to co-occur with ADHD. These include oppositional defiant disorder and conduct disorder, each of which will be present in a substantial minority of patients with ADHD. A newly devised condition, disruptive mood dysregulation disorder, may be even more strongly associated. Also look for specific learning disorders, obsessive–compulsive disorder, and tic disorders. Adults may have antisocial personality disorder or a substance use problem.

Essential Features of **Attention-Deficit/Hyperactivity Disorder**

Teachers often notice and refer for evaluation these children, who are forever in motion, disrupting class by their restlessness or fidgeting, jumping out of their seats, talking endlessly, interrupting others, seeming unable to take turns or to play quietly.

In fact, hyperactivity is only half the story. These children also have difficulty paying attention and maintaining focus on their work *or* play—the inattentive part of the story. Readily distracted (and therefore disliking and avoiding sustained mental effort such as homework), they neglect details and therefore make careless errors. Their poor organization skills result in lost assignments or other materials and an inability to follow through with chores or appointments.

These behaviors invade many aspects of their lives, including school, family relations, and social life away from home. Although the behaviors may be somewhat modified with increasing age, they may accompany these individuals through the teen years and beyond.

The Fine Print

Determine the D's: • Duration and demographics (6+ months; onset before age 12) • Disability (work/educational, social, or personal impairment) • Differential diagnosis (intellectual disability, anxiety and mood disorders, autism spectrum disorder, conduct disorder, oppositional defiant disorder, intermittent explosive disorder, specific learning disorders, disruptive mood dysregulation disorder, psychotic disorders, or other mental or personality disorders)

Coding Notes

Specify (for the past 6 months):

F90.0 [314.00] Predominantly inattentive presentation. Inattentive criteria met, but not hyperactive/impulsive criteria.
F90.1 [314.01] Predominantly hyperactive/impulsive presentation. The reverse.
F90.2 [314.01] Combined presentation. Both criteria sets are met.

Specify if:

In partial remission. When the condition persists (perhaps into adulthood), enough symptoms may be lost that the full criteria are no longer met but impairment persists.

Specify current severity:

Mild. Relatively few symptoms are found.
Moderate. Intermediate.
Severe. Many symptoms are experienced, far more than required for diagnosis.

If you read the actual DSM-5 criteria carefully, you'll encounter this anomaly: Criterion D specifies that the symptoms "interfere with, or reduce the quality of" the patient's functioning (p. 60), whereas nearly every other disorder in the book specifies "impairment" of functioning. The subcommittee that wrote the criteria apparently decided that "impairment" was too much influenced by culture. This, of course, prompts the question: Why should the diagnosis of ADHD pay more attention to cultural influences than does every other disorder in DSM-5?

The answer is, also of course, that it shouldn't, and neither should we. Stick with the Essential Features: They might just keep you sane.

Denis Tourney

"I think I've got what my son has."

Denis Tourney was a 37-year-old married man who worked as a research chemist. Throughout his life, Denis had had trouble focusing his attention on any task at hand. Because he was bright and personable, he had been able to overcome his handicap and succeed at his job for a major pharmaceutical manufacturer.

At home one evening the week before this appointment, Denis had been working on plans for a new chemical synthesis. His wife and children were in bed and it was quiet, but he had been having an unusually hard time keeping his mind on his work. Everything seemed to distract him—the ticking of the clock, the cat jumping up onto

the table. Besides, his head was beginning to pound, so he grabbed what he thought were two aspirin tablets and washed them down with a glass of milk.

"What happened next seemed like magic," he told the clinician. "It was as if somebody had put my brain waves through a funnel and squirted them onto the paper I was working on. Within half an hour I had shut out everything but my work. In 2 hours I accomplished what would ordinarily take a day or more to get done. Then I got suspicious and looked at the pill bottle. I had taken two of the tablets that were prescribed last month for Randy."

Denis's son was 8, and until a month ago he had been considered the terror of the second grade. But after 4 weeks on Ritalin, he had seemed less driven: his grades had improved; and he had become "almost a pleasure to live with."

For years, Denis had suspected that he himself might have been hyperactive as a child. Like Randy, during the first few grades of elementary school he had been unable to sit still in his seat—bouncing up to use the pencil sharpener or to watch a passing ambulance. His teacher had once written a note home complaining that he talked constantly and that he "squirmed like a bug on a griddle." It was part of the family mythology that he had "crawled at 8 months, run at 10." On questioning, Denis admitted that as a kid he was always on the go and could hardly tolerate waiting his turn for anything ("I felt like I was going to climb right out of my skin").

He was almost stupifyingly forgetful. "Still am. I really can't recall much else about my attention span when I was a kid—it was too long ago," he said. "But I have the general impression that I didn't listen very well, just like I am today. Except when I took those two pills by mistake."

The remainder of Denis's evaluation was unremarkable. His physical health was excellent, and he had had no other mental health problems. Apart from some fidgeting in his chair, his appearance was unremarkable. His speech and affect were both completely normal, and he earned a perfect score on the Mini-Mental State Exam.

Denis had been born in Ceylon, where his parents were both stationed as career diplomats with the foreign service. His father drank himself into an early grave, but not before divorcing his mother when their only child was 7 or 8. Because it concerned him, Denis vividly remembered their last major argument. His mother had pleaded to have Denis's problems evaluated, but his father had banged his fist and sworn that no kid of his was "going to see some damn shrink." Not long afterwards, his parents split up.

Denis felt he had learned a lot from his father's example—he didn't drink, had never tried drugs, didn't argue with his wife, and had readily agreed when she suggested having Randy evaluated. "You always dream that your kids will have what you never did," he said. "In our case, it's Ritalin."

Evaluation of Denis Tourney

As a child, Denis undoubtedly had several symptoms of ADHD. It was easiest for him to remember the problems relating to his activity level (the A2 criteria). Those included

the childhood symptoms of squirming (A2a), inability to remain seated (A2b) or wait his turn (A2h), always being on the go (A2e), excessive running (A2c), and excessive talking (A2f). (For children, DSM-5 requires six of these symptom—but, because they tend to be poorly remembered years later, only five for patients age 17 and above. The same numbers and rationale hold for symptoms of inattention.) Denis also thought that he had had problems with his attention span, though he was less clear about the exact symptoms.

These symptoms were present when Denis was a small child, certainly before age 12 (B); we have only anecdotal "clear evidence" that they interfered with the quality of his work, but at this remove, it would seem to be enough. His clinician should ascertain that he had had difficulties in more than one setting (such as school and at home;, C). But even three decades later, he remembered enough hyperactivity/impulsivity symptoms to justify the childhood diagnosis. As adults, many such patients recognize restlessness as their predominant symptom. It would be a good idea for the clinician to verify what Denis thought he remembered, perhaps by obtaining old school records.

In children, a number of other conditions make up the differential diagnosis. (Note that in a clinician's office, many children with ADHD are able to sit still and focus attention well; the diagnosis often hinges on the history.) Those with **intellectual disability** learn slowly and may be overly active and impulsive, but patients with ADHD, once their attention is captured, are able to learn normally. Unlike children with **autism spectrum disorder**, patients with ADHD communicate normally. **Depressed** patients may be agitated or have a poor attention span, but the duration is not usually lifelong. Many patients with **Tourette's disorder** are also hyperactive, but those who only have ADHD will not show motor and vocal tics.

Children reared in a **chaotic social environment** may also have difficulty with hyperactivity and inattention; although ADHD can be diagnosed in a child who lives in an unstable social environment, the process requires extra care and thought. Other **behavior disorders** (**oppositional defiant disorder**, **conduct disorder**) may involve behavior that runs afoul of adults or peers, but the behaviors appear purposeful and are not accompanied by the feelings of remorse typical of ADHD behavior. However, many children with ADHD have comorbid **conduct, oppositional defiant**, or **Tourette's disorder**.

The differential diagnosis in adults includes **antisocial personality disorder** and **mood disorders** (patients with mood disorders can have problems with concentration and agitation). The diagnosis should not be made if the symptoms are better explained by **schizophrenia**, an **anxiety disorder**, or a **personality disorder**.

As a child, Denis might have fulfilled criteria for ADHD, combined type; with the information currently available, however, this would be a tough sell to any hard-nosed coder. Although as an adult he continued to have severe problems concentrating, he overcame them by dint of raw intelligence. Until he compared his usual concentration to the kind of work he could do with medication, he never realized just how disabled he had been.

Although we have some specifics that would constitute a current DSM-5 diagnosis

(he was distractible—A1b), even with more information we might not be able to dredge up enough detail to make a full adult diagnosis by contemporary standards. As a clinician, I feel more comfortable with the qualifier "in partial remission." A fuller examination, perhaps with added information from his wife (or boss), might justify a different final diagnosis. Oh, and I'd give him a GAF score of 70.

F90.2 [314.01] Attention-deficit/hyperactivity disorder, combined presentation (in partial remission)

ADHD is probably underdiagnosed in adults. Although some writers have expressed skepticism about its validity, the evidence of its legitimacy in this age range is increasing. However, the fussiness of their language makes the specifier criteria seem ripe for neglect.

F90.8 [314.01] Other Specified Attention-Deficit/Hyperactivity Disorder

F90.9 [314.01] Unspecified Attention-Deficit/Hyperactivity Disorder

Use either other specified ADHD or unspecified ADHD for patients with prominent symptoms that do not fulfill the criteria for ADHD proper. Examples would include people whose symptoms begin after age 12 or whose symptoms are too few. Remember that, to qualify, those symptoms that are present should be associated with impairment. If you want to specify the reason why ADHD doesn't work for the patient, choose F90.8 and tack on something to the effect of "symptoms first identified at age 13." Otherwise, choose the second. See page 11 (sidebar).

Tic Disorders

A *tic* is a sudden vocalization or movement of the body that is repeated, rapid, and unrhythmic—so quick, in fact, that it can occur literally in (and sometimes is) the blink of an eye. Complex tics, which may include several simple tics in quick succession, naturally take longer. Tics are common; they can occur by themselves or as symptoms of Tourette's disorder.

Tics range from the occasional twitch to repetitive motor and vocal outbursts that can cluster into bouts and create utter (!) chaos in the classroom. Motor tics first appear in early childhood, sometimes as early as 2 years of age. Classically, they involve the upper part of the face (grimaces and twitching of the muscles around the eyes), though affected children can present with a wide range of symptoms that include abdominal tensing and jerking of shoulders, head, or extremities. Vocal tics tend to begin some-

what later. Simple vocal tics may include barks, coughs, throat clearing, sniffs, and single syllables that may be muttered or called out.

Tics cause children to feel out of control of their own bodies and mental processes, though as they get older, some patients do develop a "tension and release" buildup of the urge to tic that is relieved by the tic itself—not unlike what's encountered in kleptomania. Although tics are involuntary, patients can sometimes suppress them for a time; they usually disappear during sleep. Though tic disorders are described as persistent, they do change in intensity with time, perhaps disappearing entirely for weeks at a time. Frequency often increases when a person is sick, tired, or stressed.

Childhood tics are common, occurring in around 10% of boys and 5% of girls. Most of these are motor tics that disappear as the child matures; usually, they don't generate enough concern to warrant an evaluation. When they persist into adulthood, the prevalence is lower, though males still predominate. Adults rarely develop tics de novo; when it does happen, it is often in response to use of cocaine or other street drugs. The tics of adult patients tend to remain the same, varying in intensity though less severe than in childhood. Several factors contribute to a worse prognosis in an adult: comorbid mental conditions or chronic physical illness, lack of support at home, and psychoactive drug use.

Because tics look pretty much the same regardless of diagnosis, I've presented an example only in the context of Tourette's disorder.

F95.2 [307.23] Tourette's Disorder

Tourette's disorder (TD) was first described in 1895 by the French neurologist Georges Gilles de la Tourette. It entails many tics that affect various parts of the body. Motor tics of the head are usually present (eye blinking is often the first symptom to appear). Some patients have complex motor tics (for example, doing deep knee bends). The location and severity of motor tics in patients with TD typically change with time.

But the vocal tics are what make this disorder so distinctive and bring patients to the attention of professionals—often mental health clinicians rather than neurologists. Vocal tics can include an astonishing variety of barks, clicks, coughs, grunts, and understandable words. A sizeable minority (10–30%) of patients also have *coprolalia*, which means that they utter obscenities or other language that can render the condition intolerable by family and acquaintances. Mental coprolalia (intrusive dirty thoughts) can also occur.

Now acknowledged to be far from rare, TD affects up to 1% of young people, with males affected at two to three times the frequency of females. For unknown reasons, it is less common in African Americans than in other racial/ethnic groups. Associated symptoms include self-injury due to head banging and skin picking. TD is strongly familial, with concordance over 50% in monozygotic twins and 10% in dizygotic. There is often a family history of tics or obsessive–compulsive disorder (OCD), so that clinicians suspect a genetic linkage between Tourette's and early-onset OCD.

Typically, TD begins by age 6; most patients reach maximum severity by ages 10–12, after which improvement occurs in perhaps 75%. Under 25% will continue to have tics

that are moderate or worse. Though there may be periods of remission, it usually lasts throughout life. Maturity, however, can bring reduced severity or even complete disappearance. Most patients have comorbid conditions, especially OCD and ADHD.

Essential Features of **Tourette's Disorder**

The first tics of patients with TD are often eye blinks that appear when the children are 6 or thereabouts. They are joined by vocal tics, which may initially be grunts or throat clearings. Eventually, patients with TD have multiple motor tics and at least one vocal tic. The best-known tic of all, coprolalia—swear words and other socially unacceptable speech—is relatively uncommon.

The Fine Print

Delve into the D's: • Duration and demographics (1+ years; beginning before age 18, though typically by age 4–6) • Differential diagnosis (OCD, other tic disorders, substance use disorders, and physical disorders)

Essential Features of **Tic Disorders (compared)**

	Tourette's disorder	**Persistent (chronic) motor or vocal tic disorder**	**Provisional tic disorder**
Specific tic type	1+ vocal tics & 2+ motor tics (see The Fine Print)	Motor or vocal tics, but *not* both	Motor or vocal tics, or both, in any quantity
Duration	Longer than 1 year		Less than 1 year
Differential diagnosis	No other medical condition or substance use	No other medical condition or substance use; not TD	No other medical condition or substance use; not TD; not persistent (chronic) motor or vocal tic disorder
Demographics	Must begin by age 18		
Specify if	—	Motor tics only or vocal tics only	—
Tic definition	Abrupt, nonrhythmic, quick, repeated		

The Fine Print

In TD, motor and vocal tics need not occur in the same time frame

Gordon Whitmore

Gordon was a 20-year-old college student who came to the clinic with this chief complaint: "I stopped my medicine, and my Tourette's is back."

The product of a full-term pregnancy and uncomplicated delivery, Gordon had developed normally until he was 8½ years old. That was when his mother noticed his first tic. At the breakfast table, she was looking at him across the top of a box of Post Toasties. As he read what was written on the back, every few seconds he would blink his eyes, squeezing them shut and then opening them wide.

"She asked me what was wrong, said she wondered if I was having a convulsion," Gordon told the mental health clinician. He suddenly interrupted his story to yell, "Shit-fuck! Shit-fuck!" As he bellowed out each exclamation, he twisted his head sharply to the right and shook it so that his teeth actually rattled. "But I never lost consciousness or anything like that. It was only the beginning of my Tourette's."

Unperturbed by his sudden outburst, Gordon continued his story. Gradually throughout his childhood, he accumulated an assortment of facial twitches and other abrupt movements of his head and upper body. Each new motor tic earned renewed taunts from his classmates, but these were mild compared with the abuse he suffered once the vocal tics began.

Not long after he turned 13, Gordon noticed that a certain tension would seem to accumulate in the back of his throat. He couldn't describe it—it didn't tickle and it didn't have a taste. It wasn't something he could swallow down. Sometimes a cough would temporarily relieve it, but more often it seemed to require some form of vocalization to ease it. A bark or yelp usually worked just fine. But when it was most intense, only an obscenity would do.

"Shit-fuck! Shit-fuck!" he yelled again. Then "Cunt!" Gordon shook his head again and hooted twice.

Halfway through his junior year in high school, the vocal tics got so bad that Gordon was placed on "permanent suspension" until he could learn to sit in a classroom without creating pandemonium. The third clinician his parents took him to prescribed haloperidol. This relieved his symptoms completely, except for the tendency to blink when he was under stress.

He had remained on this drug until a month earlier, when he read an article about tardive dyskinesia and began to worry about his drug's side effects. Once he stopped taking the medication, the full spectrum of tics rapidly returned. He had recently been evaluated by his general physician, who had pronounced him healthy. He had never abused street drugs or alcohol.

Gordon was a neatly dressed, pleasant-appearing young man who sat quietly for most of the interview. He really seemed quite ordinary, aside from exaggerated blink-

ing, which occurred several times a minute. He sometimes accompanied the blinks by opening his mouth and curling his lips around his teeth. But every few minutes there occurred a small explosion of hoots, grunts, yelps, or barks, along with a variety of tics that involved his face, head, and shoulders. Irregularly, but with some frequency, his outbursts would include the expletives mentioned above—uttered with more volume than conviction. Afterwards, he would placidly resume the conversation.

The remainder of Gordon's mental status was not remarkable. When he wasn't having tics, his speech was clear, coherent, relevant, and spontaneous, and he scored a perfect 30 on the Mini-Mental State Exam. He admitted that he was worried about his symptoms, but denied feeling depressed or especially anxious. He had never had hallucinations, delusions, or suicidal ideas. He also denied having obsessions and compulsions, adding, "You mean like Uncle George. He does rituals."

Evaluation of Gordon Whitmore

Gordon's symptoms had begun when he was a small child (criterion C) and included vocal as well as multiple motor tics (A), which had occurred frequently enough and long enough (B) to qualify him fully for a diagnosis of TD. He was otherwise healthy, so that **another medical condition** (especially a neurological disorder such as dystonia) would not appear to be a likely cause of his symptoms. Other mental disorders associated with abnormal movements include **schizophrenia** and **amphetamine intoxication**, but Gordon presented no evidence for either of these (D). The duration and full spectrum of vocal and multiple motor tics distinguished his condition from other tic disorders (persistent motor or vocal tic disorder, provisional tic disorder).

We should also inquire about conditions that may be associated with TD. These include OCD and ADHD of childhood. (Gordon's uncle may have had OCD.) Gordon's diagnosis would therefore be as follows (I'd assign him a GAF score of 55):

F95.2 [307.23] Tourette's disorder

F95.0 [307.21] Provisional Tic Disorder

By definition, the tics in provisional tic disorder are transient. Usually, they are simple motor tics that begin at ages 3–10 and wax and wane over a period of weeks to months; vocal tics are less common than motor tics. A patient who has been diagnosed with persistent motor or vocal tic disorder can never receive the diagnosis of provisional tic disorder.

F95.1 [307.22] Persistent (Chronic) Motor or Vocal Tic Disorder

Once tics have been present for a year, they can no longer be considered provisional. Persistent motor tics also wax and wane over a range of severity. However, persistent

vocal tics are rare. Even persistent motor tics usually disappear within a few years, though they may recur in adults when individuals are tired or stressed. Although persistent tics are probably related genetically to TD, patients with TD cannot receive this diagnosis.

F95.8 [307.20] Other Specified Tic Disorder

F95.9 [307.20] Unspecified Tic Disorder

Use unspecified tic disorder to code tics that don't fulfill criteria for one of the preceding tic disorders. Or you can specify the reason by using other specified tic disorder. One example would be tics that have apparently begun after age 18.

Motor Disorders

F82 [315.4] Developmental Coordination Disorder

Developmental coordination disorder (DCD) is perhaps better known by a pejorative label—"clumsy-child syndrome." More or less synonymous with *dyspraxia* (meaning difficulty in performing skilled movements despite normal strength and sensation), DCD remains a focus of some controversy. And it's a big one, inasmuch as it affects perhaps 6% of children ages 5–10; a third of these have severe symptoms. By a ratio of about 4:1, boys are affected more often than girls.

These young people have difficulty getting their bodies to perform as they might wish. Younger children experience delayed milestones, especially crawling, walking, speaking—even getting dressed. Older children, usually chosen last for team sports because they don't catch, run, jump, or kick well, may have trouble making friends. Some children even have trouble mastering classroom skills such as coloring, printing, cursive, and cutting with scissors.

Although the symptoms often stand on their own, for over half of patients DCD exists as part of a broader problem that includes attention deficits or learning problems such as dyslexia. Autism spectrum disorder has also been linked.

After years of study, the cause is still unknown. In the individual case, a variety of physical conditions must be ruled out: muscular dystrophy, congenital myasthenia, cerebral palsy, central nervous system tumors, epilepsy, Friedreich's ataxia, and Ehlers–Danlos disease. Obviously, late onset of motor incoordination after a normal start would weigh heavily against DCD.

Motor skill deficits can persist through adolescence and into adult life, though little is known about the course of DCD in mature patients.

Essential Features of **Developmental Coordination Disorder**

Motor skills are so much poorer than you'd expect, given a child's age, that they get in the way of progress in school, sports, or other activities. The specific motor behaviors involved include general awkwardness; problems with balance; delayed developmental milestones; and slow achievement of basic skills such as jumping, throwing or catching a ball, and handwriting.

The Fine Print

The D's: • Disability (work/educational, social, or personal impairment) • Differential diagnosis (physical conditions such as cerebral palsy; intellectual disability; autism spectrum disorder; ADHD)

F98.4 [307.3] Stereotypic Movement Disorder

Stereotypies are behaviors that people seem driven to perform over and again without any apparent goal—repetitive movement for the sake of motion. Such behavior is entirely normal in babies and young children, who will rock themselves, suck their thumbs, and put into their mouths just about anything that will fit. But when stereotypies persist until later childhood and beyond, they may come to clinical attention as stereotypic movement disorder (SMD).

The behaviors include rocking, hand flapping or waving, twiddling of fingers, picking at skin, and spinning of objects. Serious injury can result from biting, head banging, or striking fingers, mouth parts, or other body parts. You'll typically encounter these behaviors in patients with intellectual disability or autism spectrum disorder, though also in perhaps 3% of otherwise normal children with ADHD, tics, or OCD.

Just what percentage of adults may be affected is actually unknown, though, other than in individuals with intellectual disability, it's probably uncommon. Of 20 adults with SMD in one study, 14 were women; a lifetime history of mood and anxiety disorders was the rule in these patients.

Patients who abuse amphetamines may become fascinated with handling mechanical devices such as watches or radios, or picking at their own skin. Some will sort or rearrange small objects such as jewelry or even pebbles—*punding* (from a word popularized by amphetamine abusers), which may be related to excessive dopamine stimulation.

SMD behaviors are associated with blindness (especially when it's congenital), deafness, Lesch–Nyhan syndrome, temporal lobe epilepsy, and postencephalitic syndrome, as well as severe instances of schizophrenia and OCD. It has also been reported in individual patients with Wilson's disease and brainstem stroke, several with the genetic syndrome *cri du chat* ("cry of the cat," so called because of the characteristic sound the patients make as infants). You may also find SMD behavior in demented

elderly patients. Perhaps 10% of people with intellectual disability who live in a facility have the self-injury type of SMD.

In 1995, *The New Yorker* reported that Bill Gates, then the CEO of Microsoft, rocks when he works. "[H]is upper body rocks down to an almost forty-five-degree angle, rocks back up, rocks down again. His elbows are often folded together, resting in his crotch. He rocks at different levels of intensity according to his mood. Sometimes people who are in the meetings begin to rock with him." Claiming it a holdover from "an extremely young age," Gates told the reporter, "I think it's just excess energy."

Essential Features of **Stereotypic Movement Disorder**

You can't find another physical or mental cause for the patient's pointless, repeated movements, such as head banging, swaying, biting (of self), or hand flapping.

The Fine Print

The D's: • Demographics (begins in early childhood) • Distress or disability (social, occupational, or personal impairment; self-injury can occur) • Differential diagnosis (OCD, autism spectrum disorder, trichotillomania, tic disorders, excoriation disorder, intellectual disability, substance use disorders, and physical disorders)

Coding Notes

Specify:

{With}{Without} self-injurious behavior

Specify current severity:

Mild. Symptoms are readily managed behaviorally.
Moderate. Symptoms require behavior modification and specific protective measures.
Severe. Symptoms require continuous watching to avert possible injury.

Specify if:

Associated with a known medical or genetic condition, neurodevelopmental disorder, or environmental factor (such as intellectual disability or fetal alcohol syndrome)

Communication Disorders

Communication disorders are among the most frequent reasons why children are referred for special evaluation. For some children, problems with communication are symptomatic of broader developmental problems, such as autism spectrum disorder and intellectual disability. Many other children, however, have stand-alone disorders of speech and language.

Disorders of speech include lack of speech fluidity (for example, stuttering); inaccurately produced or appropriately used speech sounds (as in speech sound disorder); and developmental verbal dyspraxias, which result from impaired motor control and coordination of speech organs. Disorders of language comprise problems with formation of words (morphology) or sentences (syntax), language meaning (semantics), and the use of context (pragmatics). The old (DSM-IV) disorders of expressive and receptive language, as well as problems with reading and writing, have been subsumed within the latter category.

These disorders still are not well understood or (often) well recognized. While they are differentiable, they are also highly comorbid with one another.

F80.2 [315.32] Language Disorder

Language disorder (LD) is a new category intended to cover language-related problems including spoken and written language (and even sign language) that are manifested in receptive and expressive language ability—though these may be present to different degrees. Both vocabulary and grammar are usually affected. Patients with LD speak later and less than normal children, ultimately impairing academic progress. Later in life, occupational success may be impaired.

The diagnosis should be based on history, direct observation, and standardized testing, though no actual testing results are specified in the criteria. The condition tends to persist, so that affected teens and adults will likely continue to have difficulty expressing themselves. This disorder has strong genetic underpinnings.

Language impairments can also coexist with other developmental disorders, including intellectual disability, ADHD, and autism spectrum disorder.

Essential Features of **Language Disorder**

Beginning early in childhood, a patient's use of spoken and written language persistently lags behind age expectations. Compared to age-mates, patients will have small vocabularies, impaired use of words to form sentences, and reduced ability to employ sentences to express ideas.

The Fine Print

The D's: • Duration and demographics (begins in early childhood; tends to chronicity) • Disability (work/educational, social, or personal impairment) • Differential diagnosis (sensory impairment, autism spectrum disorder, intellectual disability, learning disorder—though each of these may coexist with LD)

F80.0 [315.39) Speech Sound Disorder

Substituting one sound for another or omitting certain sounds completely is the sort of error made by patients with speech sound disorder (SSD), formerly called phonological disorder. The difficulty can arise from inadequate knowledge of speech sounds or from motor problems that interfere with speech production. Consonants are affected most often, as in lisping. Other examples include errors in the order of sounds ("gaspetti" for *spaghetti*). The errors of speech found in those who learn English as a second language are *not* considered examples of SSD. When SSD is mild, the effects may appear quaint or even cute, but the disorder renders more severely affected individuals hard to understand, sometimes unintelligible.

Although SSD affects 2–3% of preschool children (it's more prevalent in boys), spontaneous improvement is the rule, reducing the prevalence to about 1 in 200 by late teens. The condition is familial and can occur with other language disorders, anxiety disorders (including selective mutism), and ADHD.

Essential Features of **Speech Sound Disorder**

The patient has problems producing the sounds of speech, compromising communication.

The Fine Print

The D's: • Duration (beginning in early childhood) • Disability (work/educational or social) • Differential diagnosis (physical disorders such as cleft palate or neurological disorders; sensory impairment such as hearing impairment; selective mutism)

F80.81 [315.35] Childhood-Onset Fluency Disorder

Although the loss of fluency and rhythm comprised by what used to be called simply *stuttering* (the title was changed to comply with ICD-10) is familiar to every layperson, the stutterer's agonized sense of dyscontrol is not. The momentary panic that ensues

may cause these people to take extreme measures to avoid difficult sounds or situations—even such ordinary experiences as using a telephone. Typically, they report anxiety or frustration, even physical tension. You'll notice children clenching their fists or blinking their eyes in the effort to regain control, especially when there is extra pressure to succeed (as when speaking to a group).

Stuttering occurs especially with consonants; the initial sounds of words, the first word of a sentence; and words that are accented, long, or seldom used. It may be provoked by joke telling, saying one's own name, talking to strangers, or speaking to an authority figure. Stutterers often find that they are fluent when singing, swearing, or speaking to the rhythm of a metronome.

On average, stuttering starts at age 5, but it can begin as young as 2. Because young children often have dysfluencies of speech, early stuttering is often ignored. Sudden onset may correlate with greater severity. As many as 3% of young children stutter; the percentage is higher for children with brain injuries or intellectual disability. Boys outnumber girls at least 3:1. Although reports vary, the prevalence in adults is about 1 in 1,000, of whom 80% are male.

Stuttering runs in families, and there is some evidence of heritability. There are genetic (and some symptomatic) links to Tourette's disorder, which is a dopamine-related disorder; dopamine antagonists have been used to ameliorate the effects of stuttering.

Essential Features of
Childhood-Onset Fluency Disorder (Stuttering)

These patients have problems speaking smoothly, most notably with sounds that are drawn out or repeated; there may be pauses in the middle of words. They experience marked tension while speaking, and will repeat entire words or substitute easier words for those that are difficult to produce. The result: anxiety about the act of speaking.

The Fine Print

The D's: • Duration (beginning in early childhood) • Distress or disability (social, academic, or occupational) • Differential diagnosis (speech motor deficits; neurological conditions such as stroke; other mental disorders)

Coding Note

Stuttering that begins later in life should be recorded as adult-onset fluency disorder and coded F98.5 [307.0].

F80.89 [315.39] Social (Pragmatic) Communication Disorder

Social (pragmatic) communication disorder (SCD) describes patients who, despite adequate vocabulary and ability to form sentences, still have problems with the practical use of language. The world of communications calls this *pragmatics*, and it involves several principal skills:

- Using language to pursue different tasks, such as welcoming someone, communicating facts, making a demand, issuing a promise, or making a request.
- Adapting language in accord with the needs of a particular situation or individual, such as speaking differently to children than to adults or in class versus at home.
- Adhering to the conventions of conversation, such as taking turns, staying on topic, using nonverbal (eye contact, facial expressions) as well as verbal signals, allowing adequate space between speaker and listener, or restating something that's been misinterpreted.
- Understanding implied communications, such as metaphors, idioms, and humor.

Patients with SCD, whether children or adults, have difficulty understanding and using the pragmatic aspects of social communication, to the point that their conversations can be socially inappropriate. Yet they do not have the restricted interests and repetitive behaviors that would qualify them for a diagnosis of autism spectrum disorder. SCD can occur by itself or with other diagnoses, such as other communication disorders, specific learning disorders, or intellectual disability.

Essential Features of
Social (Pragmatic) Communication Disorder

From early childhood, the patient has difficulty with each of these features: using language for social reasons, adapting communication to fit the context, following the conventions (rules) of conversation, *and* understanding implied communications.

The Fine Print

The D's: • Disability (work/educational, social, or personal impairment) • Duration (usually first identified by age 4–5) • Differential diagnosis (physical or neurological conditions, autism spectrum disorder, intellectual disability, social anxiety disorder, ADHD)

F80.9 [307.9] Unspecified Communication Disorder

The usual drill applies: Diagnose unspecified communication disorder when a problem with communication doesn't fulfill criteria for one of the previously mentioned conditions, yet causes problems for the patient.

Specific Learning Disorder

Specific learning disorder (SLD) is a particular problem in acquiring information—a problem that isn't consistent with a child's age and native intelligence, and that can't be explained by external factors such as culture or lack of educational opportunity. SLD thus comprises a set of discrepancies (in reading, mathematics, and written expression, as well as some not yet specified) between the child's theoretical ability to learn and actual academic achievement.

Before a diagnosis can be affirmed, the criteria require evidence of significant deficit obtained from of an individually administered, standardized test that is psychometrically sound and culturally appropriate. Like the vast majority of DSM-5 disorders, SLD cannot be diagnosed unless it affects school, work, or social life. Of course, the child's intellectual level will affect the manifestation, prognosis, and remedy of the SLD.

Except for the descriptive specifier "with impairment in written expression," which can appear a year or two later than the others, SLD usually declares itself by the time the child reaches second grade. Two main groups of affected children have been identified. Most affected children have problems with language skills, including spelling and reading; these stem from a basic difficulty in processing sounds and symbols of language (in other words, they have a phonological processing disability). A smaller number have difficulties solving problems—visuospatial, motor, and/or tactile-perceptual problems that manifest as dyscalculia.

In one form or another, SLD affects 5–10% of Americans over the course of their lifetimes; boys are two to four times more often affected than girls. Of course, a child's behavioral and social consequences are proportional to the severity of the impairment and to the available educational remediation and social support. Overall, however, as many as 40% of children formally diagnosed with SLD leave school before completing high school, against a national average of about 6%. These disorders are likely to persist into adult life, where the prevalence is about half that for children. Of the types of SLD, problems with math are the most likely to have an influence on adult functioning.

Children with SLD are also more likely to have behavioral or emotional problems, specifically ADHD (which worsens the mental health prognosis), autism spectrum disorder, developmental coordination disorder, and communication disorders, as well as anxiety and mood disorders.

Specific Learning Disorder with Impairment in Reading (Dyslexia)

The best-studied disorder of this group, the reading type of SLD (aka dyslexia), occurs when a child (or adult, should it persist) cannot read at the level expected for age and intelligence. It can take several forms: difficulty with *comprehension* or *speed* when the person is reading silently; with *accuracy* when the person is reading aloud; with spelling when the person is, well, trying to spell. Normally distributed throughout the population (and occurring at every intelligence level), dyslexia affects about 4% of school-age children, most of them boys.

In the quest for causation, it is interesting to note that children are less likely to have reading problems when their native language has good correspondence between graphemes and phonemes (that is, the words sound generally the way they look). In that sense, English is relatively troublesome, Italian *facile*.

Dyslexia has been attributed to a variety of environmental factors (lead poisoning, fetal alcohol syndrome, low socioeconomic status) and familial causes (inheritance may account for as many as 30% of cases). Especially at risk are socially disadvantaged children, who are less likely to receive the early stimulation that is important to childhood development. Clinicians must rule out vision and hearing problems, behavioral disorders, and ADHD (which is often comorbid).

Prognosis for dyslexia depends on several factors, especially its severity in the individual patient: Reading at two standard deviations below the population mean signifies an especially poor outlook. Other factors include parents' educational levels and the child's overall intellectual capabilities.

Early identification of dyslexia improves outcome. One study showed that 40% of children treated when age 7 could read normally at age 14. However, some news isn't so good: Perhaps 40 million adult Americans are barely literate. Although reading accuracy tends to improve with time, fluency continues to be a problem into maturity. Adults may read slowly, confuse or mispronounce proper names and unfamiliar words, avoid reading aloud (due to embarrassment), or spell imaginatively (and choose words that are easier to spell). Frequently, reading is such a tiring chore that they choose not to read for pleasure.

Specific Learning Disorder with Impairment in Mathematics (Dyscalculia)

What do we know about the mathematics type of SLD? It's a little hard to figure. These people have difficulty performing mathematical operations—counting, understanding mathematical concepts and recognizing symbols, learning multiplication tables, performing operations as simple as addition or as complex as story problems—but we don't really know the cause. Perhaps it's part of a larger nonverbal learning disability, or a problem in making a connection between number sense and the representation of numbers.

Whatever the cause, about 5% of schoolchildren are affected. Of course, you won't find it in very young children. Although it's been shown that even babies have number sense, this condition cannot rear its head until the age at which children are expected to start doing math—sometimes in kindergarten, but more usually by the beginning of second grade.

Gerstmann's syndrome is a collection of symptoms that results from a stroke or other damage to the left parietal lobe of the brain in the region of the angular gyrus. It comprises four main disabilities: problems with writing clearly (*agraphia* or *dysgraphia*), understanding the rules for calculation (*dyscalculia*), telling left from right, and distinguishing fingers on the hand (*finger agnosia*). In addition, many adults have aphasia.

The syndrome is sometimes reported in children, for whom the cause is unknown; some of these kids are otherwise quite bright. It is usually identified when a child starts school. Besides the four main symptoms, many children also have dyslexia and cannot copy simple drawings—a disability called *constructional apraxia*.

Specific Learning Disorder with Impairment in Written Expression

Patients with the written expression form of SLD have problems with grammar, punctuation, spelling, and developing their ideas in writing. Children have problems translating information from oral/auditory form to visual/written form; what they write may be too simple, too brief, or too hard to follow. Some have trouble generating new ideas. Note that though handwriting may be indecipherable, you wouldn't make this diagnosis when poor penmanship is the *only* problem.

This problem usually doesn't appear until second grade or later—well after the usual onset of SLD in reading. Writing demands subsequently increase from third to sixth grade. It can be due to troubles with working memory (there's a problem with the organization of what the child is trying to say). The diagnosis is generally not appropriate if the patient is poorly coordinated, as in developmental coordination disorder.

Essential Features of **Specific Learning Disorder**

The patient has important problems with reading, writing, or arithmetic, *to wit*:

- Reading is slow or requires inordinate effort, or the patient has marked difficulty grasping the meaning.
- The patient has trouble with writing content (not the mechanics): There are

grammatical errors, ideas are expressed in an unclear manner or are poorly organized, or spelling is unusually "creative."

The patient experiences unusual difficulty with math facts, calculation, or mathematical reasoning.

Whichever skill is affected, standardized tests reveal scores markedly less than expected for age.

The Fine Print

School records of impairment can be used instead of testing for someone 17+ years of age.

The D's: • Demographics (beginning in early school years, though full manifestation may come only when demands exceed a patient's abilities) • Disability (social, academic, occupational) • Differential diagnosis (physical disorders such as vision, hearing, or motor performance; intellectual disability; ADHD)

Coding Notes

F81.0 [315.00] With impairment in reading. Specify word-reading accuracy, reading rate or fluency, or reading comprehension.

F81.81 [315.2] With impairment of written expression. Specify spelling accuracy, grammar and punctuation accuracy, legible or fluent handwriting, or clarity and organization of written expression.

F81.2 [315.1] With impairment of mathematics. Specify number sense, memorization of arithmetic facts, accurate or fluent calculations, or accurate math reasoning.

For each affected discipline (and subset), specify severity:

Mild. There are some problems, but (often with support) the patient can compensate well enough to succeed.

Moderate. There are marked difficulties, and these will require considerable remediation for proficiency. Some accommodation may be needed.

Severe. Critical problems will be difficult to overcome without intensive remediation. Even extensive support services may not promote adequate compensation.

F88 [315.8] Other Specified Neurodevelopmental Disorder

F89 [315.9] Unspecified Neurodevelopmental Disorder

Use these categories for those patients who have a disorder that appears to begin before adulthood and is not better defined elsewhere. For those in the first group, specify a reason, such as, "Neurodevelopmental disorder associated with ingestion of lead." The latter category is used especially when you lack adequate information.

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