01 - Neurodevelopmental Disorders

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Neurodevelopmental Disorders The neurodevelopmental disorders are a group of conditions with onset in the developmental period. The disorders typically manifest early in development, often before the child enters school, and are characterized by developmental deficits or differences in brain processes that produce impairments of personal, social, academic, or occupational functioning. The range of developmental deficits or differences varies from very specific limitations of learning or control of executive functions to global impairments of social skills or intellectual ability. Once thought to be categorically defined, more recent dimensional approaches to measurement of the symptoms demonstrate a range of severity, often without a very clear boundary with typical development. Diagnosis of a disorder thus requires the presence of both symptoms and impaired function. The neurodevelopmental disorders frequently co-occur with one another; for example, individuals with autism spectrum disorder often have intellectual developmental disorder (intellectual disability), and many children with attention-deficit/hyperactivity disorder (ADHD) also have a specific learning disorder. The neurodevelopmental disorders also frequently cooccur with other mental and behavioral disorders with onset in childhood (e.g., communication disorders and autism spectrum disorder may be associated with anxiety disorders; ADHD with oppositional defiant disorder; tics with obsessive-compulsive disorder). For some neurodevelopmental disorders, the clinical presentation includes behaviors that are more frequent or intense when compared with those of normal children of the same developmental age and gender, as well as deficits and delays in achieving expected milestones. For example, autism spectrum disorder is diagnosed only when the characteristic deficits of social communication are accompanied by excessively repetitive behaviors, restricted interests, and insistence on sameness. Intellectual developmental disorder is characterized by deficits in general mental abilities, such as reasoning, problem solving, planning, abstract thinking, judgment, academic learning, and learning from experience. The deficits result in impairments of adaptive functioning, such that the individual fails to meet standards of personal independence and social responsibility in one or more aspects of daily life, including communication, social

participation, academic or occupational functioning, and personal independence at home or in community settings. Global developmental delay, as its name implies, is diagnosed when an individual fails to meet expected developmental milestones in several areas of intellectual functioning. The diagnosis is used for individuals younger than 5 years who are unable to undergo systematic assessments of intellectual functioning, and thus the clinical severity level cannot be reliably assessed. Intellectual developmental disorder may result from an acquired insult during the developmental period from, for example, a severe head injury, in which case a neurocognitive disorder also may be diagnosed. The communication disorders include language disorder, speech sound disorder, social

(pragmatic) communication disorder, and childhood-onset fluency disorder (stuttering). The first three disorders are characterized by deficits in the development and use of language, speech, and social communication, respectively. Social communication disorder is characterized by deficits in both verbal and nonverbal communication skills that result in social impairment and are not better explained by low abilities in structural language, intellectual developmental disorder, or autism spectrum disorder. Childhood-onset fluency disorder is characterized by disturbances of the normal fluency and motor production of speech, including repetitive sounds or syllables, prolongation of consonants or vowel sounds, broken words, blocking, or words produced with an excess of physical tension. Like other neurodevelopmental disorders, communication disorders begin early in life and may produce lifelong functional impairments. Autism spectrum disorder is characterized by persistent deficits in social communication and social interaction across multiple contexts, including deficits in social reciprocity, nonverbal communicative behaviors used for social interaction, and skills in developing, maintaining, and understanding relationships. In addition to the social communication deficits, the diagnosis of autism spectrum disorder requires the presence of restricted, repetitive patterns of behavior, interests, or activities. Because symptoms change with development and may be masked by compensatory mechanisms, the diagnostic criteria may be met based on historical information, although the current presentation must cause significant impairment. Within the diagnosis of autism spectrum disorder, individual clinical characteristics are noted through the use of specifiers (with or without accompanying intellectual impairment; with or without accompanying structural language impairment; associated with a known genetic or other medical condition or environmental factor; associated with a neurodevelopmental, mental, or behavioral problem), as well as specifiers that describe the severity of autistic symptoms. These specifiers provide clinicians with an opportunity to individualize the diagnosis and communicate a richer clinical description of the affected individuals. For example, many individuals previously diagnosed with Asperger’s disorder would now receive a diagnosis of autism spectrum disorder without language or intellectual impairment. ADHD is a neurodevelopmental disorder defined by impairing levels of inattention, disorganization, and/or hyperactivity-impulsivity. Inattention and disorganization entail inability to stay on task, seeming not to listen, and losing materials necessary for tasks, at levels that are inconsistent with age or developmental level. Hyperactivity-impulsivity entails overactivity, fidgeting, inability to stay seated, intruding into other people’s activities, and inability to wait— symptoms that are excessive for age or developmental level. In childhood, ADHD frequently overlaps with disorders that are often considered to be “externalizing disorders,” such as oppositional defiant disorder and conduct disorder. ADHD often persists into adulthood, with resultant impairments of social, academic, and occupational functioning. Specific learning disorder, as the name implies, is diagnosed when there are specific deficits in an individual’s ability to perceive or process information for learning academic skills efficiently and

accurately. This neurodevelopmental disorder first manifests during the years of formal schooling and is characterized by persistent and impairing difficulties with learning foundational academic skills in reading, writing, and/or math. The individual’s performance of

the affected academic skills is well below average for age, or acceptable performance levels are achieved only with extraordinary effort. Specific learning disorder may occur in individuals identified as intellectually gifted and manifest only when the learning demands or assessment procedures (e.g., timed tests) pose barriers that cannot be overcome by their innate intelligence and compensatory strategies. For all individuals, specific learning disorder can produce lifelong impairments in activities dependent on the skills, including occupational performance. The neurodevelopmental motor disorders include developmental coordination disorder, stereotypic movement disorder, and tic disorders. Developmental coordination disorder is characterized by deficits in the acquisition and execution of coordinated motor skills and is manifested by clumsiness and slowness or inaccuracy of performance of motor skills that cause interference with activities of daily living. Stereotypic movement disorder is diagnosed when an individual has repetitive, seemingly driven, and apparently purposeless motor behaviors, such as hand flapping, body rocking, head banging, self-biting, or hitting. The movements interfere with social, academic, or other activities. If the behaviors cause self-injury, this should be specified as part of the diagnostic description. Tic disorders are characterized by the presence of motor or vocal tics, which are sudden, rapid, recurrent, nonrhythmic, stereotyped motor movements or vocalizations. The duration, presumed etiology, and clinical presentation define the specific tic disorder that is diagnosed: Tourette’s disorder, persistent (chronic) motor or vocal tic disorder, provisional tic disorder, other specified tic disorder, and unspecified tic disorder. Tourette’s disorder is diagnosed when the individual has multiple motor and vocal tics that have been present for at least 1 year and that have a waxingwaning symptom course. The use of specifiers for the neurodevelopmental disorder diagnoses enriches the clinical description of the individual’s clinical course and current symptomatology. These include the following: Severity specifiers are available for intellectual developmental disorder, autism spectrum disorder, ADHD, specific learning disorder, and stereotypic movement disorder. Specifiers indicative of current symptomatology are available for ADHD, specific learning disorder, and persistent motor or vocal tic disorder. Autism spectrum disorder and stereotypic movement disorder also include the specifier “associated with a known genetic or other medical condition or environmental factor.” This specifier gives clinicians an opportunity to document factors that may have played a role in the etiology of the disorder, as well as those that might affect the clinical course. Intellectual Developmental Disorders Intellectual Developmental Disorder (Intellectual Disability)

Diagnostic Criteria Intellectual developmental disorder (intellectual disability) is a disorder with onset during the developmental period that includes both intellectual and adaptive functioning deficits in conceptual, social, and practical domains. The following three criteria must be met: A. Deficits in intellectual functions, such as reasoning, problem solving, planning, abstract thinking, judgment, academic learning, and learning from experience, confirmed by both clinical assessment and individualized, standardized intelligence testing. B. Deficits in adaptive functioning that result in failure to meet developmental and sociocultural standards for personal independence and social responsibility. Without ongoing support, the adaptive deficits limit functioning in one or more activities of daily life, such as communication, social participation, and independent living, across multiple environments, such as home, school, work, and community. C. Onset of intellectual and

adaptive deficits during the developmental period. Note: The term intellectual developmental disorder is used to clarify its relationship with the WHO ICD-11 classification system, which uses the term Disorders of Intellectual Development. The equivalent term intellectual disability is placed in parentheses for continued use. The medical and research literature use both terms, while intellectual disability is the term in common use by educational and other professions, advocacy groups, and the lay public. In the United States, Public Law 111-256 (Rosa's Law) changed all references to "mental retardation" in federal laws to "intellectual disability." Specify current severity (see Table 1): F70 Mild F71 Moderate F72 Severe F73 Profound TABLE 1 Severity levels for intellectual developmental disorder (intellectual disability) Severity level Conceptual domain Social domain Practical domain Mild For preschool children, there may be Compared with typically developing The individual may function age-

no obvious conceptual differences. For school-age children and adults, there are difficulties in learning academic skills involving reading, writing, arithmetic, time, or money, with support needed in one or more areas to meet age-related expectations. In adults, abstract thinking, executive function (i.e., planning, strategizing, priority setting, and cognitive flexibility), and short-term memory, as well as functional use of academic skills (e.g., reading, money management), are impaired. There is a somewhat concrete approach to problems and solutions compared with age-mates. All through development, the individual's conceptual skills lag markedly behind those of peers. For preschoolers, language and preacademic skills develop slowly. For school-age children, progress in reading, writing, mathematics, and understanding of time and money occurs slowly across the school years and is markedly limited compared with that of peers. For adults, academic skill development is typically at an elementary level, and support is required for all use of academic skills in work and personal life. Ongoing assistance on a daily basis is needed to complete conceptual tasks of day-to-day life, and others may take over these responsibilities fully for the individual. Moderate Severe Attainment of conceptual skills is limited. The individual generally has little understanding of written language or of concepts involving numbers, quantity, time, and age-mates, the individual is immature in social interactions. For example, there may be difficulty in accurately perceiving peers' social cues. Communication, conversation, and language are more concrete or immature than expected for age. There may be difficulties regulating emotion and behavior in age-appropriate fashion; these difficulties are noticed by peers in social situations. There is limited understanding of risk in social situations; social judgment is immature for age, and the person is at risk of being manipulated by others (gullibility). appropriately in personal care. Individuals need some support with complex daily living tasks in comparison to peers. In adulthood, supports typically involve grocery shopping, transportation, home and child-care organizing, nutritious food preparation, and banking and money management. Recreational skills resemble those of age-mates, although judgment related to well-being and organization around recreation requires support. In adulthood, competitive employment is often seen in jobs that do not emphasize conceptual skills. Individuals generally need support to make health care decisions and legal decisions, and to learn to perform a skilled vocation competently. Support is typically needed to raise a family. The individual shows marked The individual can care for personal differences from peers in social and communicative behavior across development. Spoken language is typically a primary tool for social communication but is much less complex than that of peers. Capacity for relationships is evident in ties to family and friends, and the individual may have successful friendships across life and sometimes romantic relations in adulthood. However, individuals may not perceive or interpret social cues accurately. Social judgment and decisionmaking abilities are

limited, and caretakers must assist the person with life decisions. Friendships with typically developing peers are often affected by communication or social limitations. Significant social and communicative support is needed in work settings for success. needs involving eating, dressing, elimination, and hygiene as an adult, although an extended period of teaching and time is needed for the individual to become independent in these areas, and reminders may be needed. Similarly, participation in all household tasks can be achieved by adulthood, although an extended period of teaching is needed, and ongoing supports will typically occur for adult-level performance. Independent employment in jobs that require limited conceptual and communication skills can be achieved, but considerable support from coworkers, supervisors, and others is needed to manage social expectations, job complexities, and ancillary responsibilities such as scheduling, transportation, health benefits, and money management. A variety of recreational skills can be developed. These typically require additional supports and learning opportunities over an extended period of time. Maladaptive behavior is present in a significant minority and causes social problems. Spoken language is quite limited in The individual requires support for terms of vocabulary and grammar. Speech may be single words or phrases and may be supplemented through augmentative means. all activities of daily living, including meals, dressing, bathing, and elimination. The individual requires supervision at all times.

money. Caretakers provide extensive supports for problem solving throughout life. Speech and communication are focused on the here and now within everyday events. Language is used for social communication more than for explication. Individuals understand simple speech and gestural communication. Relationships with family members and familiar others are a source of pleasure and help. The individual cannot make responsible decisions regarding well-being of self or others. In adulthood, participation in tasks at home, recreation, and work requires ongoing support and assistance. Skill acquisition in all domains involves long-term teaching and ongoing support. Maladaptive behavior, including self-injury, is present in a significant minority. Profound Conceptual skills generally involve the physical world rather than symbolic processes. The individual may use objects in goal-directed fashion for self-care, work, and recreation. Certain visuospatial skills, such as matching and sorting based on physical characteristics, may be acquired. However, co-occurring motor and sensory impairments may prevent functional use of objects. The individual has very limited understanding of symbolic communication in speech or gesture. He or she may understand some simple instructions or gestures. The individual expresses his or her own desires and emotions largely through nonverbal, nonsymbolic communication. The individual enjoys relationships with wellknown family members, caretakers, and familiar others, and initiates and responds to social interactions through gestural and emotional cues. Co-occurring sensory and physical impairments may prevent many social activities. The individual is dependent on others for all aspects of daily physical care, health, and safety, although he or she may be able to participate in some of these activities as well. Individuals without severe physical impairments may assist with some daily work tasks at home, like carrying dishes to the table. Simple actions with objects may be the basis of participation in some vocational activities with high levels of ongoing support. Recreational activities may involve, for example, enjoyment in listening to music, watching movies, going out for walks, or participating in water activities, all with the support of others. Cooccurring physical and sensory impairments are frequent barriers to participation (beyond watching) in home, recreational, and vocational activities. Maladaptive behavior is present in a significant minority. Specifiers The various levels of severity are defined on the basis of adaptive functioning, and not IQ scores, because it is adaptive functioning that determines the level of supports required. Moreover,

IQ measures are less valid in the lower end of the IQ range. Diagnostic Features The essential features of intellectual developmental disorder (intellectual disability) are deficits in general mental abilities (Criterion A) and impairment in everyday adaptive functioning, in comparison to an individual's age-, gender-, and socioculturally matched peers (Criterion B). Onset is during the developmental period (Criterion C). The diagnosis of intellectual developmental disorder is based on both clinical assessment and standardized testing of intellectual functions, standardized neuropsychological tests, and standardized tests of adaptive functioning. Criterion A refers to intellectual functions that involve reasoning, problem solving, planning, abstract thinking, judgment, learning from instruction and experience, and practical understanding. Critical components include verbal comprehension, working memory, perceptual

reasoning, quantitative reasoning, abstract thought, and cognitive efficacy. Intellectual functioning is typically measured with individually administered and psychometrically valid, comprehensive, and culturally appropriate tests of intelligence. Individuals with intellectual developmental disorder have scores of approximately two standard deviations or more below the population mean, including a margin for measurement error (generally ± 5 points). On tests with a standard deviation of 15 and a mean of 100, this involves a score of 65–75 (70 ± 5). Clinical training and judgment are required to interpret test results and assess intellectual performance. Factors that may affect test scores include practice effects (i.e., learning from repeated testing) and the "Flynn effect" (i.e., overly high scores due to out-of-date test norms). Invalid scores may result from the use of brief intelligence screening tests or group tests; highly discrepant individual subtest scores may make an overall IQ score invalid. Instruments must be normed for the individual's sociocultural background and native language. Co-occurring disorders that affect communication, language, and/or motor or sensory function may affect test scores. Individual cognitive profiles based on neuropsychological testing as well as cross-battery intellectual assessment (using multiple IQ or other cognitive tests to create a profile) are more useful for understanding intellectual abilities than a single IQ score. Such testing may identify areas of relative strengths and weaknesses, an assessment important for academic and vocational planning. IQ test scores are approximations of conceptual functioning but may be insufficient to assess reasoning in real-life situations and mastery of practical tasks. For example, a person with deficits in intellectual functioning whose IQ score is somewhat above 65–75 may nevertheless have such substantial adaptive behavior problems in social judgment or other areas of adaptive functioning that the person's actual functioning is clinically comparable to that of individuals with a lower IQ score. Thus, clinical judgment is important in interpreting the results of IQ tests, and using them as the sole criteria for the diagnosis of an intellectual developmental disorder is insufficient. Deficits in adaptive functioning (Criterion B) refer to how well a person meets community standards of personal independence and social responsibility, in comparison to others of similar age and sociocultural background. Adaptive functioning involves adaptive reasoning in three domains: conceptual, social, and practical. The conceptual (academic) domain involves competence in memory, language, reading, writing, math reasoning, acquisition of practical knowledge, problem solving, and judgment in novel situations, among others. The social domain involves awareness of others' thoughts, feelings, and experiences; empathy; interpersonal communication skills; friendship abilities; and social judgment, among others. The practical domain involves learning and self-management across life settings, including personal care, job responsibilities, money management, recreation, self-management of behavior, and school and work task organization, among others. Intellectual capacity, education, motivation, socialization, personality features,

vocational opportunity, cultural experience, and coexisting other medical conditions or mental disorders influence adaptive functioning. Adaptive functioning is assessed using both clinical evaluation and individualized, culturally appropriate, psychometrically sound measures. Standardized measures are used with knowledgeable informants (e.g., parent or other family member; teacher; counselor; care provider) and the individual to the extent possible. Additional sources of information include

educational, developmental, medical, and mental health evaluations. Scores from standardized measures and interview sources must be interpreted using clinical judgment. When standardized testing is difficult or impossible, because of a variety of factors (e.g., sensory impairment, severe problem behavior), the individual may be diagnosed with unspecified intellectual developmental disorder. Adaptive functioning may be difficult to assess in a controlled setting (e.g., prisons, detention centers); if possible, corroborative information reflecting functioning outside those settings should be obtained. Criterion B is met when at least one domain of adaptive functioning—conceptual, social, or practical—is sufficiently impaired that ongoing support is needed in order for the person to perform adequately across multiple environments, such as home, school, work, and community. Criterion C, onset during the developmental period, refers to recognition that intellectual and adaptive deficits are present during childhood or adolescence. A comprehensive evaluation includes an assessment of intellectual capacity and adaptive functioning; identification of genetic and nongenetic etiologies; evaluation for associated medical conditions (e.g., cerebral palsy, seizure disorder); and evaluation for co-occurring mental, emotional, and behavioral disorders. Components of the evaluation may include basic pre- and perinatal medical history, three-generational family pedigree, physical examination, genetic evaluation (e.g., karyotype or chromosomal microarray analysis and testing for specific genetic syndromes), and metabolic screening and neuroimaging assessment. Associated Features Intellectual developmental disorder is a heterogeneous condition with multiple causes. There may be associated difficulties with social judgment; assessment of risk; self-management of behavior, emotions, or interpersonal relationships; or motivation in school or work environments. Because of a lack of awareness of risk and danger, accidental injury rates may be increased. Lack of communication skills may predispose to disruptive and aggressive behaviors. Gullibility is often a feature, involving naiveté in social situations and a tendency for being easily led by others. Gullibility and lack of awareness of risk may result in exploitation by others and possible victimization, fraud, unintentional criminal involvement, false confessions, and risk for physical and sexual abuse. These associated features can be important in criminal cases, including Atkins-type hearings involving the death penalty. Beyond deficits in adaptive functioning, individuals also can become distressed about their intellectual limitations. While such distress may not always be seen as having an impact on functioning, distress can represent an important feature of the clinical scenario. Prevalence Intellectual developmental disorder has an overall general population prevalence of approximately 10 per 1,000; however, the global prevalence varies by country and level of development, being approximately 16 per 1,000 in middle-income countries and 9 per 1,000 in high-income countries. The prevalence also varies by age, being higher in youth than in adults. In the United States, prevalence per 1,000 population does not vary significantly by ethnoracial groups.

Development and Course Onset of intellectual developmental disorder is in the developmental period. The age and characteristic features at onset depend on the etiology and severity of brain

dysfunction. Delayed motor, language, and social milestones may be identifiable within the first 2 years of life among those with more severe intellectual developmental disorder, while mild levels may not be identifiable until school age when difficulty with academic learning becomes apparent. All criteria (including Criterion C) must be fulfilled by history or current presentation. Some children younger than 5 years whose presentation will eventually meet criteria for intellectual developmental disorder have deficits that meet criteria for global developmental delay. When intellectual developmental disorder is associated with a genetic syndrome, there may be a characteristic physical appearance (e.g., as in Down syndrome). Some syndromes have a behavioral phenotype, which refers to specific behaviors that are characteristic of particular genetic disorder (e.g., Lesch-Nyhan syndrome). In acquired forms, the onset may be abrupt following an illness such as meningitis or encephalitis or head trauma occurring during the developmental period. When intellectual developmental disorder results from a loss of previously acquired cognitive skills, as in severe traumatic brain injury, the diagnoses of intellectual developmental disorder and of a neurocognitive disorder may both be assigned. Although intellectual developmental disorder is generally nonprogressive, in certain genetic disorders (e.g., Rett syndrome) there are periods of worsening, followed by stabilization, and in others (e.g., Sanfilippo syndrome, Down syndrome) progressive worsening of intellectual function in varying degrees. In some cases, the progressive worsening of intellectual functioning may represent the overlay of neurocognitive disorder that develops in adulthood (i.e., persons with Down syndrome being at high risk for developing neurocognitive disorder due to Alzheimer’s disease in adulthood). In this situation, both diagnoses, intellectual developmental disorder and neurocognitive disorder, are given. The disorder is generally lifelong, although severity levels may change over time. The course may be influenced by underlying medical or genetic conditions and co-occurring conditions (e.g., hearing or visual impairments, epilepsy). Early and ongoing interventions may improve adaptive functioning throughout childhood and adulthood. In some cases, these result in significant improvement of intellectual functioning, such that the diagnosis of intellectual developmental disorder is no longer appropriate. Thus, it is common practice when assessing infants and young children to delay diagnosis of intellectual developmental disorder until after an appropriate course of intervention is provided. For older children and adults, the extent of support provided may allow for full participation in all activities of daily living and improved adaptive function. Diagnostic assessments must determine whether improved adaptive skills are the result of a stable, generalized new skill acquisition (in which case the diagnosis of intellectual developmental disorder may no longer be appropriate) or whether the improvement is contingent on the presence of supports and ongoing interventions (in which case the diagnosis of intellectual developmental disorder may still be appropriate). Risk and Prognostic Factors

Genetic and physiological. Prenatal etiologies include genetic syndromes (e.g., sequence variations or copy number variants involving one or more genes; chromosomal disorders), inborn errors of metabolism, brain malformations, maternal disease (including placental disease), and environmental influences (e.g., alcohol, other drugs, toxins, teratogens). Perinatal causes include a variety of labor and delivery–related events leading to neonatal encephalopathy. Postnatal causes include hypoxic ischemic injury, traumatic brain injury, infections, demyelinating disorders, seizure disorders (e.g., infantile spasms), severe and chronic social deprivation, and toxic metabolic syndromes and intoxications (e.g., lead, mercury). Culture-Related Diagnostic Issues Intellectual developmental disorder occurs across ethnoracial groups. Prevalence differences across social and cultural contexts may be due to variation in environmental risks (e.g., perinatal injury, chronic

social deprivation) for the disorder that are associated with socioeconomic status and access to quality health care. For example, in Western Australia, the population prevalence of intellectual developmental disorder among Aboriginal children is 39 per 1,000 people, as opposed to 16 per 1,000 for the more affluent non-Aboriginal youth population. Cultural sensitivity and knowledge of sociostructural conditions are needed during assessment, and the individual's socioeconomic, ethnic, cultural, and linguistic background; available experiences; and adaptive functioning within his or her community and cultural setting must be considered. Cultural explanations for intellectual developmental disorder vary and may include cultural beliefs about supernatural influences and punishment for presumed or actual wrongdoing by the mother or parents, which can be associated with shame and underreporting of the disorder. Sex- and Gender-Related Diagnostic Issues Overall, males are more likely than females to be diagnosed with both mild (average male:female ratio 1.6:1) and severe (average male:female ratio 1.2:1) forms of intellectual developmental disorder. However, sex ratios vary widely in reported studies. Sex-linked genetic factors, sex differences in other genetic factors such as specific copy number variants, and male vulnerability to brain insult may account for some of the sex differences. Association With Suicidal Thoughts or Behavior Individuals with intellectual developmental disorder can be at risk for suicide associated with comorbid mental disorder, higher intellectual and adaptive function, and immediate past stressors. Comorbid mental disorder may manifest atypically in intellectual developmental disorder; thus, recognizing comorbidity and screening for suicidal thoughts is important in the assessment process, with particular attention to change in behavior of the individual. Differential Diagnosis The diagnosis of intellectual developmental disorder should be made whenever Criteria A, B, and C are met. A diagnosis of intellectual developmental disorder should not be assumed because of a particular genetic or medical condition. A genetic syndrome linked to intellectual developmental disorder should be noted as a concurrent diagnosis with the intellectual

Major and mild neurocognitive disorders. Communication disorders and specific learning disorder. Autism spectrum disorder. developmental disorder. Intellectual developmental disorder is categorized as a neurodevelopmental disorder and is distinct from the neurocognitive disorders, which are characterized by a loss of cognitive functioning. Major neurocognitive disorder may co-occur with intellectual developmental disorder (e.g., an individual with Down syndrome who develops Alzheimer's disease, or an individual with intellectual developmental disorder who loses further cognitive capacity following a head injury). In such cases, the diagnoses of intellectual developmental disorder and neurocognitive disorder may both be given. Moreover, when there is stabilization of cognitive functioning following traumatic or nontraumatic brain injury with onset in the developmental period (childhood and adolescence), and there is no continuing cognitive decline, both neurocognitive disorder and intellectual developmental disorder diagnoses can be used if diagnostic criteria are met for intellectual developmental disorder. These neurodevelopmental disorders are specific to the communication and learning domains and do not show deficits in intellectual and adaptive behavior. They may co-occur with intellectual developmental disorder. Both diagnoses are made if full criteria are met for intellectual developmental disorder and a communication disorder or specific learning disorder. Intellectual developmental disorder is common among individuals with autism spectrum disorder. Assessment of intellectual ability may be complicated by socialcommunication and behavior deficits inherent to autism spectrum disorder, which may interfere with understanding and complying with test procedures. Appropriate assessment of intellectual functioning in autism spectrum disorder is essential, with reassessment across the developmental period, because IQ scores in autism

spectrum disorder may be unstable, particularly in early childhood. Comorbidity Co-occurring neurodevelopmental and other mental and medical conditions are frequent in intellectual developmental disorder, with rates of some conditions (e.g., mental disorders, cerebral palsy, and epilepsy) three to four times higher than in the general population. The prognosis and outcome of co-occurring diagnoses may be influenced by the presence of intellectual developmental disorder. Assessment procedures may require modifications because of associated disorders, including communication disorders, autism spectrum disorder, and motor, sensory, or other disorders. Knowledgeable informants are essential for identifying symptoms such as irritability, mood dysregulation, aggression, eating problems, and sleep problems, and for assessing adaptive functioning in various community settings. The most common co-occurring neurodevelopmental and other mental disorders are attention-deficit/hyperactivity disorder; depressive and bipolar disorders; anxiety disorders; autism spectrum disorder; stereotypic movement disorder (with or without self-injurious behavior); impulse-control disorders; and major neurocognitive disorder. Major depressive disorder may occur throughout the range of severity of intellectual developmental disorder. Selfinjurious behavior requires prompt diagnostic attention and may warrant a separate diagnosis of stereotypic movement disorder. Individuals with intellectual developmental disorder, particularly those with more severe intellectual developmental disorder, may also exhibit aggression and disruptive behaviors, including harm of others or property destruction.

46 Individuals with intellectual developmental disorder disproportionately have more health problems, including obesity, than the general population. Frequently they cannot verbalize physical symptoms they are experiencing. This may lead to health problems being undiagnosed and untreated. Relationship to Other Classifications ICD-11 uses the term disorders of intellectual development to indicate that these are disorders that involve impaired brain functioning early in life. These disorders are described in ICD-11 as a metasyndrome occurring in the developmental period analogous to dementia or major neurocognitive disorder in later life. There are four subtypes of disorders of intellectual development in ICD-11: mild, moderate, severe, and profound. The American Association on Intellectual and Developmental Disabilities (AAIDD) uses the term intellectual disability. The AAIDD’s classification is multidimensional rather than categorical and is based on the disability construct. Rather than listing severity specifiers as is done in DSM-5, the AAIDD emphasizes a profile of supports based on severity. Global Developmental Delay F88 This diagnosis is reserved for individuals under the age of 5 years when the clinical severity level cannot be reliably assessed during early childhood. This category is diagnosed when an individual fails to meet expected developmental milestones in several areas of intellectual functioning, and applies to individuals who are unable to undergo systematic assessments of intellectual functioning, including children who are too young to participate in standardized testing. This category requires reassessment after a period of time. Unspecified Intellectual Developmental Disorder (Intellectual Disability) F79 This category is reserved for individuals over the age of 5 years when assessment of the degree of intellectual developmental disorder (intellectual disability) by means of locally available procedures is rendered difficult or impossible because of associated sensory or physical impairments, as in blindness or prelingual deafness; locomotor disability; or presence of severe problem behaviors or co-occurring mental disorder. This category should only be used in exceptional circumstances and requires reassessment after a period of time.

F80.2 Communication Disorders Disorders of communication include deficits in language, speech, and communication. Speech is the expressive production of sounds and includes an individual’s

articulation, fluency, voice, and resonance quality. Language includes the form, function, and use of a conventional system of symbols (i.e., spoken words, sign language, written words, pictures) in a rule-governed manner for communication. Communication includes any verbal or nonverbal behavior (whether intentional or unintentional) that has the potential to influence the behavior, ideas, or attitudes of another individual. Assessments of speech, language, and communication abilities must take into account the individual's cultural and language context, particularly for individuals growing up in bilingual environments. The standardized measures of language development and of nonverbal intellectual capacity must be relevant for the cultural and linguistic group (i.e., tests developed and standardized for one group may not provide appropriate norms for a different group). The diagnostic category of communication disorders includes the following: language disorder, speech sound disorder, childhood-onset fluency disorder (stuttering), social (pragmatic) communication disorder, and unspecified communication disorders Sex differences in the development of early communication may give rise to higher prevalence rates of communication disorders in boys compared with girls. Given the associated features of communication disorders and the relationship of communication to other developmental domains, communication disorders have high rates of comorbidity with other neurodevelopmental disorders (e.g., autism spectrum disorder, attention-deficit/hyperactivity disorder (ADHD), specific learning disorder, intellectual developmental disorder [intellectual disability]), mental disorders (e.g., anxiety disorders), and some medical conditions (e.g., seizure disorders, specific chromosome abnormalities). Language Disorder Diagnostic Criteria A. Persistent difficulties in the acquisition and use of language across modalities (i.e., spoken, written, sign language, or other) due to deficits in comprehension or production that include the following:

1. Reduced vocabulary (word knowledge and use).
2. Limited sentence structure (ability to put words and word endings together to form sentences based on the rules of grammar and morphology).
3. Impairments in discourse (ability to use vocabulary and connect sentences to explain or describe a topic or series of events or have a conversation).

B. Language abilities are substantially and quantifiably below those expected for age, resulting in functional limitations in effective communication, social participation, academic achievement, or occupational performance, individually or in any combination. C. Onset of symptoms is in the early developmental period. D. The difficulties are not attributable to hearing or other sensory impairment, motor dysfunction, or another medical or neurological condition and are not better explained by intellectual developmental disorder (intellectual disability) or global developmental delay. Diagnostic Features The essential features of language disorder are difficulties in the acquisition and use of language due to deficits in the comprehension or production of vocabulary, grammar, sentence structure, and discourse. The language deficits are evident in spoken communication, written communication, or sign language. Language learning and use is dependent on both receptive and expressive skills. Expressive ability refers to the production of vocal, gestural, or verbal signals, while receptive ability refers to the process of receiving and comprehending language messages. Language skills need to be assessed in both expressive and receptive modalities as these may differ in severity. Language disorder usually affects vocabulary and grammar, and these effects then limit the capacity for discourse. The child’s first words and phrases are likely to be delayed in onset; vocabulary size is smaller and less varied than expected; and sentences are shorter and less complex with grammatical errors, especially in past tense.

Deficits in comprehension of language are frequently underestimated, as children may be good at using context to infer meaning. There may be word-finding problems, impoverished verbal definitions, or poor understanding of synonyms, multiple meanings, or word play appropriate for age and culture. Problems with remembering new words and sentences are manifested by difficulties following instructions of increasing length, difficulties rehearsing strings of verbal information (e.g., remembering a phone number or a shopping list), and difficulties remembering novel sound sequences, a skill that may be important for learning new words. Difficulties with discourse are shown by a reduced ability to provide adequate information about the key events and to narrate a coherent story. The language difficulty is manifest by abilities substantially and quantifiably below that expected for age and significantly interfering with academic achievement, occupational performance, effective communication, or socialization (Criterion B). A diagnosis of language disorder is made based on the synthesis of the individual's history, direct clinical observation in different contexts (i.e., home, school, or work), and scores from standardized tests of language ability that can be used to guide estimates of severity. Associated Features

Environmental. Genetic and physiological. Normal variations in language. Individuals, even children, can be adept at accommodating to their limited language. They may appear to be shy or reticent to talk. Affected individuals may prefer to communicate only with family members or other familiar individuals. Although these social indicators are not diagnostic of a language disorder, if they are notable and persistent, they warrant referral for a full language assessment. Development and Course Language acquisition is marked by changes from onset in toddlerhood to the adult level of competency that appears during adolescence. Changes appear across the dimensions of language (sounds, words, grammar, narratives/expository texts, and conversational skills) in age-graded increments and synchronies. Language disorder emerges during the early developmental period; however, there is considerable variation in early vocabulary acquisition and early word combinations. Individual differences in early childhood are not, as single indicators, highly predictive of later outcomes, although a late onset of language at age 24 months in a populationbased sample was the best predictor of outcomes at age 7 years. By age 4 years, individual differences in language ability are more stable, with better measurement accuracy, and are highly predictive of later outcomes. Language disorder diagnosed in children age 4 years and older is likely to be stable over time and typically persists into adulthood, although the particular profile of language strengths and deficits is likely to change over the course of development. Language disorders can have social consequences across the lifespan. Children with language disorders are at risk for peer victimization. For females with childhood language disorders, there could be almost three times the risk compared with unaffected children for sexual assault in adulthood. Risk and Prognostic Factors Children with receptive language impairments have a poorer prognosis than those with predominantly expressive impairments. Receptive language impairments are more resistant to treatment, and difficulties with reading comprehension are frequently seen. Bilingualism does not cause or worsen a language disorder, but children who are bilingual may demonstrate delays or differences in language development. A language disorder in bilingual children will affect both languages; therefore, assessment across both languages is important to consider. Language disorders are highly heritable, and family members are more likely to have a history of language impairment. Population-based twin studies consistently report substantial heritability for language disorder, and molecular studies suggest multiple genes interacting on causal pathways. Differential Diagnosis Language disorder needs to be distinguished from normal developmental variations, and this distinction may be difficult to make before age 4

years. Regional, social, or cultural/ethnic variations of language (e.g., dialects) must be considered

Hearing or other sensory impairment. Intellectual developmental disorder (intellectual disability). Autism spectrum disorder. Neurological disorders. Language regression. F80.0 when an individual is being assessed for language impairment. Hearing impairment needs to be excluded as the primary cause of language difficulties. Language deficits may be associated with a hearing impairment, other sensory deficit, or a speech-motor deficit. When language deficits are in excess of those usually associated with these problems, a diagnosis of language disorder may be made. Language impairment is often the presenting feature of intellectual developmental disorder. However, the definitive diagnosis of intellectual developmental disorder may not be made until the child is able to complete standardized assessments. Language disorder can occur with varying degrees of intellectual ability, and a discrepancy between verbal and nonverbal ability is not necessary for a diagnosis of language disorder. Autism spectrum disorder frequently manifests with delayed language development. However, autism spectrum disorder is often accompanied by behaviors not present in language disorder, such as lack of social interest or unusual social interactions (e.g., pulling individuals by the hand without any attempt to look at them), odd play patterns (e.g., carrying toys around but never playing with them), unusual communication patterns (e.g., knowing the alphabet but not responding to own name), and rigid adherence to routines and repetitive behaviors (e.g., flapping, spinning, echolalia). Language disorder can be acquired in association with neurological disorders, including epilepsy (e.g., acquired aphasia or Landau-Kleffner syndrome). Loss of speech and language in a child at any age warrants thorough assessment to determine if there is a specific neurological condition, such as Landau-Kleffner syndrome. Language loss may be a symptom of seizures, and a diagnostic assessment is necessary to exclude the presence of epilepsy (e.g., routine and sleep electroencephalogram). Declines in critical social and communication behaviors during the first 2 years of life are evident in most children presenting with autism spectrum disorder and should signal the need for autism spectrum disorder assessment. Comorbidity Language disorder may be associated with other neurodevelopmental disorders in terms of specific learning disorder (literacy and numeracy), intellectual developmental disorder, attentiondeficit/hyperactivity disorder, autism spectrum disorder, and developmental coordination disorder. It is also associated with social (pragmatic) communication disorder. In clinical samples, language disorder may co-occur with speech sound disorder, although data from a large population-based sample of 6-year-old children in the United States suggest comorbidity might be rare (1.3%). A positive family history of speech or language disorders is often present. Speech Sound Disorder Diagnostic Criteria

A. Persistent difficulty with speech sound production that interferes with speech intelligibility or prevents verbal communication of messages. B. The disturbance causes limitations in effective communication that interfere with social participation, academic achievement, or occupational performance, individually or in any combination. C. Onset of symptoms is in the early developmental period. D. The difficulties are not attributable to congenital or acquired conditions, such as cerebral palsy, cleft palate, deafness or hearing loss, traumatic brain injury, or other medical or neurological conditions. Diagnostic Features Speech sound production describes the clear articulation of the phonemes (i.e., individual sounds) that in combination make up spoken words. Speech sound production requires both the phonological knowledge of speech sounds and the ability to coordinate the movements of the articulators (i.e., the jaw, tongue, and lips,) with breathing and vocalizing for speech. Children with speech production difficulties may experience

difficulty with phonological knowledge of speech sounds or the ability to coordinate movements for speech in varying degrees. A speech sound disorder is diagnosed when speech sound production is not what would be expected based on the child’s age and developmental stage and when the deficits are not the result of a physical, structural, neurological, or hearing impairment. Among typically developing children at age 3 years, overall speech should be intelligible, whereas at age 2 years, only 50% may be understandable. Boys are more likely (range of 1.5–1.8 to 1.0) to have a speech sound disorder than girls. Associated Features Language disorder may be found to co-occur with speech sound disorder, although cooccurrences are rare by age 6 years. A positive family history of speech or language disorders is often present. If the ability to rapidly coordinate the articulators is a particular aspect of difficulty, there may be a history of delay or incoordination in acquiring skills that also utilize the articulators and related facial musculature; among others, these skills include chewing, maintaining mouth closure, and blowing the nose. Other areas of motor coordination may be impaired as in developmental coordination disorder. The terms childhood apraxia of speech and verbal dyspraxia are used for speech production problems with motor components. Development and Course Learning to produce speech sounds clearly and accurately and learning to produce connected speech fluently are developmental skills. Articulation of speech sounds follows a developmental pattern, which is reflected in the age norms of standardized tests. It is not unusual for typically developing children to use developmental processes for shortening words and syllables as they are learning to talk, but their progression in mastering speech sound production should result in mostly intelligible speech by age 3 years. Children with speech sound disorder continue to use

Normal variations in speech. Hearing or other sensory impairment. Structural deficits. Dysarthria. Selective mutism. immature phonological simplification processes past the age when most children can produce words clearly. Most speech sounds should be produced clearly and most words should be pronounced accurately according to age and community norms by age 5 years. The most frequently misarticulated sounds in English also tend to be learned later, leading them to be called the “late eight” (l, r, s, z, th, ch, dzh, and zh). Misarticulation of any of these sounds by itself could be considered within normal limits up to age 8 years; however, when multiple sounds are involved, it is important to target some of those sounds as part of a plan to improve intelligibility, rather than waiting until the age at which almost all children can produce them accurately. Lisping (i.e., misarticulating sibilants) is particularly common and may involve frontal or lateral patterns of airstream direction. It may be associated with a tongue-thrust swallowing pattern. Most children with speech sound disorder respond well to treatment, and speech difficulties improve over time, and thus the disorder may not be lifelong. However, when a language disorder is also present, the speech disorder has a poorer prognosis and may be associated with specific learning disorder. Differential Diagnosis Regional, social, or cultural/ethnic variations of speech should be considered before making the diagnosis. Bilingual children may demonstrate an overall lower intelligibility rating, make more overall consonant and vowel errors, and produce more uncommon error patterns than monolingual English-speaking children when assessed only in English. Those who are deaf or hard of hearing may have speech sound production errors. When speech deficits are in excess of those usually associated with these problems, a diagnosis of speech sound disorder may be made. Speech impairment may be due to structural deficits (e.g., cleft palate). Speech impairment may be attributable to a motor disorder, such as cerebral palsy. Neurological signs, as well as distinctive features of voice, differentiate dysarthria from speech sound disorder, although in young children (under 3 years) differentiation may be difficult, particularly when there is no or

minimal general body motor involvement (as in, e.g., WorsterDrought syndrome). Limited use of speech may be a sign of selective mutism, an anxiety disorder that is characterized by a lack of speech in one or more contexts or settings. Selective mutism may develop in children with a speech disorder because of embarrassment about their impairments, but many children with selective mutism exhibit normal speech in “safe” settings, such as at home or with close friends. Comorbidity Speech may be differentially impaired in certain genetic conditions (e.g., Down syndrome, 22q deletion, FoxP2 gene mutation). If present, these should also be coded.

F80.81 Childhood-Onset Fluency Disorder (Stuttering) Diagnostic Criteria A. Disturbances in the normal fluency and time patterning of speech that are inappropriate for the individual’s age and language skills, persist over time, and are characterized by frequent and marked occurrences of one (or more) of the following:

1. Sound and syllable repetitions.
2. Sound prolongations of consonants as well as vowels.
3. Broken words (e.g., pauses within a word).
4. Audible or silent blocking (filled or unfilled pauses in speech).
5. Circumlocutions (word substitutions to avoid problematic words).
6. Words produced with an excess of physical tension.
7. Monosyllabic whole-word repetitions (e.g., “I-I-I-I see him”). B. The disturbance causes anxiety about speaking or limitations in effective communication, social participation, or academic or occupational performance, individually or in any combination. C. The onset of symptoms is in the early developmental period. (Note: Later-onset cases are diagnosed as F98.5 adult-onset fluency disorder.) D. The disturbance is not attributable to a speech-motor or sensory deficit, dysfluency associated with neurological insult (e.g., stroke, tumor, trauma), or another medical condition and is not better explained by another mental disorder. Diagnostic Features The essential feature of childhood-onset fluency disorder (stuttering) is a disturbance in the normal fluency and time patterning of speech that is inappropriate for the individual’s age. This disturbance is characterized by frequent repetitions or prolongations of sounds or syllables and by other types of speech dysfluencies, including broken words (e.g., pauses within a word), audible or silent blocking (i.e., filled or unfilled pauses in speech), circumlocutions (i.e., word substitutions to avoid problematic words), words produced with an excess of physical tension, and monosyllabic whole-word repetitions (e.g., “I-I-I-I see him”). The disturbance in fluency may interfere with academic or occupational achievement and with social communication. The extent of the disturbance varies from situation to situation and often is more severe when there is special pressure to communicate (e.g., giving a report at school, interviewing for a job). Dysfluency is often absent during oral reading, singing, or talking to inanimate objects or to pets.

Genetic and physiological. Associated Features Fearful anticipation of the problem may develop. The speaker may attempt to avoid dysfluencies by linguistic mechanisms (e.g., altering the rate of speech, avoiding certain words or sounds) or by avoiding certain speech situations, such as telephoning or public speaking. In addition to being features of the condition, stress and anxiety have been shown to exacerbate dysfluency. Childhood-onset fluency disorder may also be accompanied by motor movements (e.g., eye blinks, tics, tremors of the lips or face, jerking of the

head, breathing movements, fist clenching). Children with fluency disorder show a range of language abilities, and the relationship between fluency disorder and language abilities is unclear. Studies have shown both structural and functional neurological differences in children who stutter. Males are more likely to stutter than females, with estimates varying depending on the age and possible cause of stuttering. Causes of stuttering are multifactorial, including certain genetic and neurophysiological factors. Development and Course Childhood-onset fluency disorder, or developmental stuttering, occurs by age 6 for 80%–90% of affected individuals, with age at onset ranging from 2 to 7 years. The onset can be insidious or more sudden. Typically, dysfluencies start gradually, with repetition of initial consonants, first words of a phrase, or long words. The child may not be aware of dysfluencies. As the disorder progresses, the dysfluencies become more frequent and interfering, occurring on the most meaningful words or phrases in the utterance. As the child becomes aware of the speech difficulty, he or she may develop mechanisms for avoiding the dysfluencies and emotional responses, including avoidance of public speaking and use of short and simple utterances. Longitudinal research shows that 65%–85% of children recover from the dysfluency, with severity of fluency disorder at age 8 years predicting recovery or persistence into adolescence and beyond. Risk and Prognostic Factors The risk of stuttering among first-degree biological relatives of individuals with childhood-onset fluency disorder is more than three times the risk in the general population. To date, mutations of four genes that underlie some cases of stuttering have been identified. Functional Consequences of Childhood-Onset Fluency Disorder (Stuttering) In addition to being features of the condition, stress and anxiety can exacerbate dysfluency. Impairment of social functioning may result from this anxiety. Negative communication attitudes may be a functional consequence of stuttering starting in the preschool years and increasing with age. Differential Diagnosis

Sensory deficits. Normal speech dysfluencies. Specific learning disorder, with impairment in reading. Bilingualism. Medication side effects. Adult-onset dysfluencies. Tourette’s disorder. F80.82 Dysfluencies of speech may be associated with a hearing impairment or other sensory deficit or a speech-motor deficit. When the speech dysfluencies are in excess of those usually associated with these problems, a diagnosis of childhood-onset fluency disorder may be made. The disorder must be distinguished from normal dysfluencies that occur frequently in young children, which include whole-word or phrase repetitions (e.g., “I want, I want ice cream”), incomplete phrases, interjections, unfilled pauses, and parenthetical remarks. If these difficulties increase in frequency or complexity as the child grows older, a diagnosis of childhood-onset fluency disorder may be appropriate. Children who have dysfluencies when they read aloud may be diagnosed mistakenly as having a reading disorder. Oral reading fluency typically is measured by timed assessments. Slower reading rates may not accurately reflect the actual reading ability of children who stutter. It is necessary to distinguish between dysfluencies resulting from attempts to learn a new language and dysfluencies that indicate a fluency disorder, which typically appear in both languages. Stuttering may occur as a side effect of medication and may be detected by a temporal relationship with exposure to the medication. If onset of dysfluencies is during or after adolescence, it is an “adultonset dysfluency” rather than a neurodevelopmental disorder. Adult-onset dysfluencies are associated with specific neurological insults and a variety of medical conditions and mental disorders and may be specified with them, but they are not a DSM-5 diagnosis. Vocal tics and repetitive vocalizations of Tourette’s disorder should be distinguishable from the repetitive sounds of childhood-onset fluency disorder by their nature and timing. Comorbidity Childhood-onset fluency disorder can co-occur with other disorders, such as

attentiondeficit/hyperactivity disorder, autism spectrum disorder, intellectual developmental disorder (intellectual disability), language disorder or specific learning disorder, seizure disorders, social anxiety disorder, speech sound disorder, and other developmental disorders. Social (Pragmatic) Communication Disorder Diagnostic Criteria A. Persistent difficulties in the social use of verbal and nonverbal communication as manifested by all of the following:

1. Deficits in using communication for social purposes, such as greeting and sharing information, in a manner that is appropriate for the social context.
2. Impairment of the ability to change communication to match context or the needs of the listener, such as speaking differently in a classroom than on a playground, talking differently to a child than to an adult, and avoiding use of overly formal language.
3. Difficulties following rules for conversation and storytelling, such as taking turns in conversation, rephrasing when misunderstood, and knowing how to use verbal and nonverbal signals to regulate interaction.
4. Difficulties understanding what is not explicitly stated (e.g., making inferences) and nonliteral or ambiguous meanings of language (e.g., idioms, humor, metaphors, multiple meanings that depend on the context for interpretation). B. The deficits result in functional limitations in effective communication, social participation, social relationships, academic achievement, or occupational performance, individually or in combination. C. The onset of the symptoms is in the early developmental period (but deficits may not become fully manifest until social communication demands exceed limited capacities). D. The symptoms are not attributable to another medical or neurological condition or to low abilities in the domains of word structure and grammar, and are not better explained by autism spectrum disorder, intellectual developmental disorder (intellectual disability), global developmental delay, or another mental disorder. Diagnostic Features Social (pragmatic) communication disorder is characterized by a primary difficulty with pragmatics (i.e., the social use of language and communication), as manifested by deficits in understanding and following social rules of both verbal and nonverbal communication in naturalistic contexts, changing language according to the needs of the listener or situation, and following rules for conversations and storytelling. The deficits in social communication result in functional limitations in effective communication, social participation, development of social relationships, academic achievement, or occupational performance. The deficits are not better explained by low abilities in the domains of structural language or cognitive ability or by autism spectrum disorder. Associated Features The most common associated feature of social (pragmatic) communication disorder is language impairment, which is characterized by a history of delay in reaching language milestones, and historical, if not current, structural language problems (see “Language Disorder” earlier in this chapter). Individuals with social communication deficits may

Genetic and physiological. Autism spectrum disorder. Attention-deficit/hyperactivity disorder. avoid social interactions. Attention-deficit/hyperactivity disorder (ADHD), emotional and behavioral problems, and specific learning disorders are also more common among affected individuals. Development and Course Because social (pragmatic) communication depends on adequate developmental progress in speech and language, diagnosis of social (pragmatic) communication disorder is rare among children younger than 4 years. By age 4 or 5 years, most children should

possess adequate speech and language abilities to permit identification of specific deficits in social communication. Milder forms of the disorder may not become apparent until early adolescence, when language and social interactions become more complex. The outcome of social (pragmatic) communication disorder is variable, with some children improving substantially over time and others continuing to have difficulties persisting into adulthood. Even among those who have significant improvements, the early deficits in pragmatics may cause lasting impairments in social relationships and behavior and also low performance of other related skills, such as written expression, reading comprehension, and oral reading. Risk and Prognostic Factors A family history of autism spectrum disorder, communication disorders, or specific learning disorder appears to increase the risk for social (pragmatic) communication disorder; this includes siblings of children with these disorders who may present with early symptoms of social (pragmatic) communication disorder. Differential Diagnosis Autism spectrum disorder is the primary diagnostic consideration for individuals presenting with social communication deficits. The two disorders can be differentiated by the presence in autism spectrum disorder of restricted/repetitive patterns of behavior, interests, or activities and their absence in social (pragmatic) communication disorder. Individuals with autism spectrum disorder may only display the restricted/repetitive patterns of behavior, interests, and activities during the early developmental period, so a comprehensive history should be obtained. Current absence of symptoms would not preclude a diagnosis of autism spectrum disorder, if the restricted interests and repetitive behaviors were present in the past. A diagnosis of social (pragmatic) communication disorder should be considered only if the current symptoms or developmental history fails to reveal evidence of symptoms that meet the diagnostic criteria for restricted/repetitive patterns of behavior, interests, or activities of autism spectrum disorder (i.e., Criterion B) causing current impairment. The social communication symptoms may be milder in social (pragmatic) communication disorder than in autism spectrum disorder, although qualitatively similar. Primary deficits of ADHD may cause impairments in social communication and functional limitations of effective communication, social participation, or academic achievement.

Social anxiety disorder. Intellectual developmental disorder (intellectual disability) and global developmental delay. F84.0 The symptoms of social (pragmatic) communication disorder overlap with those of social anxiety disorder. The differentiating feature is the timing of the onset of symptoms. In social (pragmatic) communication disorder, the individual has never had effective social communication; in social anxiety disorder, the social communication skills developed appropriately but are not utilized because of anxiety, fear, or distress about social interactions. Social communication skills may be deficient among individuals with global developmental delay or intellectual developmental disorder, but a separate diagnosis is not given unless the social communication deficits are clearly in excess of the intellectual limitations. Unspecified Communication Disorder F80.9 This category applies to presentations in which symptoms characteristic of communication disorder that cause clinically significant distress or impairment in social, occupational, or other important areas of functioning predominate but do not meet the full criteria for communication disorder or for any of the disorders in the neurodevelopmental disorders diagnostic class. The unspecified communication disorder category is used in situations in which the clinician chooses not to specify the reason that the criteria are not met for communication disorder or for a specific neurodevelopmental disorder, and includes presentations in which there is insufficient information to make a more specific diagnosis. Autism Spectrum Disorder Autism Spectrum Disorder Diagnostic Criteria A. Persistent deficits in social communication and social interaction across multiple contexts, as manifested by all of the following, currently or by history

(examples are illustrative, not exhaustive; see text):

1. Deficits in social-emotional reciprocity, ranging, for example, from abnormal social approach and failure of normal back-and-forth conversation; to reduced sharing of interests, emotions, or affect; to failure to initiate or respond to

social interactions. 2. Deficits in nonverbal communicative behaviors used for social interaction, ranging, for example, from poorly integrated verbal and nonverbal communication; to abnormalities in eye contact and body language or deficits in understanding and use of gestures; to a total lack of facial expressions and nonverbal communication. 3. Deficits in developing, maintaining, and understanding relationships, ranging, for example, from difficulties adjusting behavior to suit various social contexts; to difficulties in sharing imaginative play or in making friends; to absence of interest in peers. B. Restricted, repetitive patterns of behavior, interests, or activities, as manifested by at least two of the following, currently or by history (examples are illustrative, not exhaustive; see text):

1. Stereotyped or repetitive motor movements, use of objects, or speech (e.g., simple motor stereotypies, lining up toys or flipping objects, echolalia, idiosyncratic phrases).
2. Insistence on sameness, inflexible adherence to routines, or ritualized patterns of verbal or nonverbal behavior (e.g., extreme distress at small changes, difficulties with transitions, rigid thinking patterns, greeting rituals, need to take same route or eat same food every day).
3. Highly restricted, fixated interests that are abnormal in intensity or focus (e.g., strong attachment to or preoccupation with unusual objects, excessively circumscribed or perseverative interests).
4. Hyper- or hyporeactivity to sensory input or unusual interest in sensory aspects of the environment (e.g., apparent indifference to pain/temperature, adverse response to specific sounds or textures, excessive smelling or touching of objects, visual fascination with lights or movement). C. Symptoms must be present in the early developmental period (but may not become fully manifest until social demands exceed limited capacities, or may be masked by learned strategies in later life). D. Symptoms cause clinically significant impairment in social, occupational, or other important areas of current functioning. E. These disturbances are not better explained by intellectual developmental disorder (intellectual disability) or global developmental delay. Intellectual developmental disorder and autism spectrum disorder frequently co-occur; to make comorbid diagnoses of autism spectrum disorder and intellectual developmental disorder, social communication should be below that expected for general developmental level. Note: Individuals with a well-established DSM-IV diagnosis of autistic disorder, Asperger’s disorder, or pervasive developmental disorder not otherwise specified

should be given the diagnosis of autism spectrum disorder. Individuals who have marked deficits in social communication, but whose symptoms do not otherwise meet criteria for autism spectrum disorder, should be evaluated for social (pragmatic) communication disorder. Specify current severity based on social communication impairments and restricted, repetitive patterns of behavior (see Table 2): Requiring very substantial support Requiring substantial support Requiring support Specify if: With or without accompanying intellectual impairment With or without accompanying

language impairment Specify if: Associated with a known genetic or other medical condition or environmental factor (Coding note: Use additional code to identify the associated genetic or other medical condition.) Associated with a neurodevelopmental, mental, or behavioral problem Specify if: With catatonia (refer to the criteria for catatonia associated with another mental disorder, p. 135, for definition) (Coding note: Use additional code F06.1 catatonia associated with autism spectrum disorder to indicate the presence of the comorbid catatonia.) TABLE 2 Severity levels for autism spectrum disorder (examples of level of support needs) Severity level Social communication Restricted, repetitive behaviors Level 3 “Requiring very substantial support” Severe deficits in verbal and nonverbal social communication skills cause severe impairments in functioning, very limited initiation of social interactions, and minimal response to social overtures from others. For example, a person with few words of intelligible speech who rarely initiates interaction and, when he or she does, makes unusual approaches to meet needs only and responds to only very direct social approaches. Inflexibility of behavior, extreme difficulty coping with change, or other restricted/repetitive behaviors markedly interfere with functioning in all spheres. Great distress/difficulty changing focus or action. Level 2 “Requiring substantial support” Marked deficits in verbal and nonverbal social communication skills; social impairments apparent even with supports in place; limited initiation of social interactions; and reduced or abnormal responses to social overtures from others. For example, a person who speaks simple sentences, whose interaction is limited to narrow special interests, and who has markedly Inflexibility of behavior, difficulty coping with change, or other restricted/repetitive behaviors appear frequently enough to be obvious to the casual observer and interfere with functioning in a variety of contexts. Distress and/or difficulty changing focus or action.

odd nonverbal communication. Level 1 “Requiring support” Without supports in place, deficits in social communication cause noticeable impairments. Difficulty initiating social interactions, and clear examples of atypical or unsuccessful responses to social overtures of others. May appear to have decreased interest in social interactions. For example, a person who is able to speak in full sentences and engages in communication but whose to-and-fro conversation with others fails, and whose attempts to make friends are odd and typically unsuccessful. Inflexibility of behavior causes significant interference with functioning in one or more contexts. Difficulty switching between activities. Problems of organization and planning hamper independence. Recording Procedures It may be helpful to note level of support needed for each of the two core psychopathological domains in Table 2 (e.g., “requiring very substantial support for deficits in social communication and requiring substantial support for restricted, repetitive behaviors”). Specification of “with accompanying intellectual impairment” or “without accompanying intellectual impairment” should be recorded next. Language impairment specification should be recorded thereafter. If there is accompanying language impairment, the current level of verbal functioning should be recorded (e.g., “with accompanying language impairment—no intelligible speech” or “with accompanying language impairment—phrase speech”). For autism spectrum disorder for which the specifiers “associated with a known genetic or other medical condition or environmental factor” or “associated with a neurodevelopmental, mental, or behavioral problem” are appropriate, record autism spectrum disorder associated with (name of condition, disorder, or factor) (e.g., autism spectrum disorder associated with tuberous sclerosis complex). These specifiers apply to presentations in which the listed condition or problem is potentially relevant to the clinical care of the individual and do not necessarily indicate that the condition or problem is causally related to the autism spectrum disorder. If the associated neurodevelopmental, mental, or behavioral

problem meets criteria for a neurodevelopmental or other mental disorder, both autism spectrum disorder and the other disorder should be diagnosed. If catatonia is present, record separately “catatonia associated with autism spectrum disorder.” For more information, see criteria for catatonia associated with another mental disorder in the chapter “Schizophrenia Spectrum and Other Psychotic Disorders.” Specifiers The severity specifiers (see Table 2) may be used to describe succinctly the current symptomatology (which might fall below level 1), with the recognition that severity may vary by context and fluctuate over time. Severity of social communication difficulties and restricted, repetitive behaviors should be separately rated. The descriptive severity categories should not be used to determine eligibility for and provision of services. Indeed, individuals with relatively better skills overall may experience different or even greater psychosocial challenges. Thus, service needs can only be developed at an individual level and through discussion of personal priorities and targets.

Regarding the specifier “with or without accompanying intellectual impairment,” understanding the (often uneven) intellectual profile of a child or adult with autism spectrum disorder is necessary for interpreting diagnostic features. Separate estimates of verbal and nonverbal skill are necessary (e.g., using untimed nonverbal tests to assess potential strengths in individuals with limited language). To use the specifier “with or without accompanying language impairment,” the current level of verbal functioning should be assessed and described. Examples of the specific descriptions for “with accompanying language impairment” might include no intelligible speech (nonverbal), single words only, or phrase speech. Language level in individuals “without accompanying language impairment” might be further described as speaks in full sentences or has fluent speech. Since receptive language may lag behind expressive language development in autism spectrum disorder, receptive and expressive language skills should be considered separately. The specifier “associated with a known genetic or other medical condition or environmental factor” can be applied when an individual has a known genetic condition (e.g., Rett syndrome, fragile X syndrome, Down syndrome), a known medical condition (e.g., epilepsy), or a history of environmental exposure in utero to a known teratogen or infection (e.g., fetal valproate syndrome, fetal alcohol syndrome, fetal rubella). This specifier should not be viewed as synonymous with causation of autism spectrum disorder. A condition may be listed as being associated with autism spectrum disorder when it is thought to be potentially clinically relevant or inform care and not because the clinician is asserting a cause. Examples include autism spectrum disorder associated with a unique genomic copy number variant that could be clinically relevant even if the specific abnormality may not have directly caused nor have previously been linked to autism spectrum disorder, or Crohn’s disease, which could exacerbate behavioral symptoms. The specifier “associated with a neurodevelopmental, mental, or behavioral problem” can be applied to indicate problems (e.g., irritability, sleep problems, self-injurious behavior, or developmental regression) that contribute to the functional formulation or are a focus of treatment. Additional neurodevelopmental, mental, or behavioral disorders should also be noted as separate diagnoses (e.g., attention-deficit/hyperactivity disorder; developmental coordination disorder; disruptive behavior, impulse-control, and conduct disorders; anxiety, depressive, or bipolar disorders; tics or Tourette’s disorder; feeding, elimination, or sleep disorders). Catatonia can occur as a comorbid condition with autism spectrum disorder. In addition to classic symptoms of posturing, negativism (opposition or no response to instructions or external stimuli), mutism, and stupor, an increase or worsening of stereotypy and self-injurious behavior may form part of the symptom complex of catatonia in the setting of autism spectrum disorder. Diagnostic Features The essential features of autism spectrum

disorder are persistent impairment in reciprocal social communication and social interaction (Criterion A), and restricted, repetitive patterns of behavior, interests, or activities (Criterion B). These symptoms are present from early childhood and limit or impair everyday functioning (Criteria C and D). The stage at which functional impairment becomes obvious will vary according to characteristics of the individual and his or

her environment. Core diagnostic features are evident in the developmental period, but intervention, compensation, and current supports may mask difficulties in at least some contexts. Manifestations of the disorder also vary greatly depending on the severity of the autistic condition, developmental level, chronological age, and possibly gender; hence, the term spectrum. Individuals without cognitive or language impairment may have more subtle manifestation of deficits (e.g., Criterion A, Criterion B) than individuals with accompanying intellectual or language impairments and may be making great efforts to mask these deficits. Criterion A deficits in social communication will be more subtle if an individual has better overall communication skills (e.g., is verbally fluent, does not have intellectual impairments). Similarly, Criterion B deficits (i.e., restricted patterns of behavior and interests) may be less obvious if the interests are closer to age-typical norms (e.g., Ancient Egypt or trains as compared to wiggling a string). Autism spectrum disorder encompasses disorders previously referred to as early infantile autism, childhood autism, Kanner's autism, high-functioning autism, atypical autism, pervasive developmental disorder not otherwise specified, childhood disintegrative disorder, and Asperger's disorder. The impairments in social communication and social interaction specified in Criterion A are pervasive and sustained. Diagnoses are most valid and reliable when based on multiple sources of information, including clinician's observations, caregiver history, and, when possible, selfreport. Verbal and nonverbal deficits in social communication have varying manifestations, depending on the individual's age, intellectual level, and language ability, as well as other factors such as treatment history and current support. Many individuals have language deficits, ranging from complete lack of speech through language delays, poor comprehension of speech, echoed speech, or stilted and overly literal language. Even when formal language skills (e.g., vocabulary, grammar) are intact, the use of language for reciprocal social communication is impaired in autism spectrum disorder. Deficits in social-emotional reciprocity (i.e., the ability to engage with others and share thoughts and feelings) may be shown, for example, in young children with little or no initiation of social interaction and no sharing of emotions, along with reduced or absent imitation of others' behavior. What language exists is often one-sided, lacking in social reciprocity, and used to request or label rather than to comment, share feelings, or converse. In older children and adults without intellectual impairments or language delays, deficits in social-emotional reciprocity may be most apparent in difficulties processing and responding to complex social cues (e.g., when and how to join a conversation, what not to say). Individuals who have developed compensation strategies for some social challenges still struggle in novel or unsupported situations and suffer from the effort and anxiety of consciously calculating what is socially intuitive for most individuals. This behavior may contribute to lower ascertainment of autism spectrum disorder in these individuals, perhaps especially in adult women. Thus, longer assessments, observation in naturalistic settings, and inquiring about any tolls of social interaction may be needed. If asked about the costs of social interaction, for example, these individuals might respond that social interactions are exhausting for them, that they are unable to concentrate because of the mental effort in monitoring social conventions, that their self-esteem is adversely affected by being unable to be themselves, and so forth.

Deficits in nonverbal communicative behaviors used for social interaction are manifested by absent, reduced, or atypical use of eye contact (relative to cultural norms), gestures, facial expressions, body orientation, or speech intonation. An early feature of autism spectrum disorder is impaired joint attention as manifested by a lack of pointing, showing, or bringing objects to share interest with others, or failure to follow someone's pointing or eye gaze. Individuals may learn a few functional gestures, but their repertoire is smaller than that of others, and they often fail to use expressive gestures spontaneously in communication. Among young people and adults with fluent language, the difficulty in coordinating nonverbal communication with speech may give the impression of odd, wooden, or exaggerated "body language" during interactions. Impairment may be relatively subtle within individual modes (e.g., someone may have relatively good eye contact when speaking) but noticeable in poor integration of eye contact, gesture, body posture, prosody, and facial expression for social communication, or in difficulty maintaining these for sustained periods or when under stress. Deficits in developing, maintaining, and understanding relationships should be judged against norms for age, gender, and culture. There may be absent, reduced, or atypical social interest, manifested by rejection of others, passivity, or inappropriate approaches that seem aggressive or disruptive. These difficulties are particularly evident in young children, in whom there is often a lack of shared social play and imagination (e.g., age-appropriate flexible pretend play) and, later, insistence on playing by very fixed rules. Older individuals may struggle to understand what behavior is considered appropriate in one situation but not another (e.g., casual behavior during a job interview), or the different ways that language may be used to communicate (e.g., irony, white lies). There may be an apparent preference for solitary activities or for interacting with much younger or older people. Frequently, there is a desire to establish friendships without a complete or realistic idea of what friendship entails (e.g., one-sided friendships or friendships based solely on shared special interests). Relationships with siblings, coworkers, and caregivers are also important to consider (in terms of reciprocity). Autism spectrum disorder is also defined by restricted, repetitive patterns of behavior, interests, or activities (as specified in Criterion B), which show a range of manifestations according to age and ability, intervention, and current supports. Stereotyped or repetitive behaviors include simple motor stereotypies (e.g., hand flapping, finger flicking), repetitive use of objects (e.g., spinning coins, lining up toys), and repetitive speech (e.g., echolalia, the delayed or immediate parroting of heard words; use of "you" when referring to self; stereotyped use of words, phrases, or prosodic patterns). Excessive adherence to routines and restricted patterns of behavior may be manifest in resistance to change (e.g., distress at apparently small changes, such as taking an alternative route to school or work; insistence on adherence to rules; rigidity of thinking) or ritualized patterns of verbal or nonverbal behavior (e.g., repetitive questioning, pacing a perimeter). Highly restricted, fixated interests in autism spectrum disorder tend to be abnormal in intensity or focus (e.g., a toddler strongly attached to a pan or piece of string; a child preoccupied with vacuum cleaners; an adult spending hours writing out timetables). Some fascinations and routines may relate to apparent hyper- or hyporeactivity to sensory input, manifested through extreme responses to specific sounds or textures, excessive smelling or touching of objects, fascination

with lights or spinning objects, and sometimes apparent indifference to pain, heat, or cold. Extreme reaction to or rituals involving taste, smell, texture, or appearance of food or excessive food restrictions are common and may be a presenting feature of autism spectrum disorder. Many individuals with autism spectrum disorder without intellectual or language impairments learn to suppress repetitive behavior in public. In these individuals, repetitive behaviors like rocking or

finger flicking may serve an anxiolytic or self-soothing function. Special interests may be a source of pleasure and motivation and provide avenues for education and employment later in life. Diagnostic criteria may be met when restricted, repetitive patterns of behavior, interests, or activities were clearly present during childhood or at some time in the past, even if symptoms are no longer present. Criterion D requires that the features must cause clinically significant impairment in social, occupational, or other important areas of current functioning. Criterion E specifies that the social communication deficits, although sometimes accompanied by intellectual developmental disorder (intellectual disability), are not in line with the individual's developmental level; impairments exceed difficulties expected on the basis of developmental level. Standardized behavioral diagnostic instruments with good psychometric properties, including caregiver interviews, questionnaires and clinician observation measures, are available and can improve reliability of diagnosis over time and across clinicians. However, the symptoms of autism spectrum disorder occur as dimensions without universally accepted cutoff scores for what would constitute a disorder. Thus, the diagnosis remains a clinical one, taking all available information into account, and is not solely dictated by the score on a particular questionnaire or observation measure. Associated Features Many individuals with autism spectrum disorder also have intellectual and/or language impairment (e.g., slow to talk, language comprehension behind production). Even those with average or high intelligence usually have an uneven profile of abilities. The gap between intellectual and adaptive functional skills is often large. It is common for individuals with autism to have theory-of-mind deficits (i.e., to have difficulty seeing the world from another person's perspective), but these are not necessarily present in all cases. Executive function deficits are also common but not specific, as are difficulties with central coherence (i.e., being able to understand context or to "see the big picture," and thus tending to overfocus on detail). Motor deficits are often present, including odd gait, clumsiness, and other abnormal motor signs (e.g., walking on tiptoes). Self-injury (e.g., head banging, biting the wrist) may occur, and disruptive/challenging behaviors are more common in children and adolescents with autism spectrum disorder than other disorders, including intellectual developmental disorder. Some individuals develop catatonic-like motor behavior (slowing and "freezing" mid-action), but these are typically not of the magnitude of a catatonic episode. However, it is possible for individuals with autism spectrum disorder to experience a marked deterioration in motor symptoms and display a full catatonic episode with symptoms such as mutism, posturing, grimacing, and waxy flexibility. The risk period for comorbid catatonia appears to be greatest in the adolescent years. Prevalence Frequencies for autism spectrum disorder across the United States have been reported to be

between 1% and 2% of the population, with similar estimates in child and adult samples. However, prevalence appears to be lower among U.S. African American (1.1%) and Latinx children (0.8%) compared with White children (1.3%), even after the effect of socioeconomic resources is taken into account. The reported prevalence of autism spectrum disorder may be affected by misdiagnosis, delayed diagnosis, or underdiagnosis of individuals from some ethnoracial backgrounds. Prevalence across non-U.S. countries has approached 1% of the population (0.62% median global prevalence), without substantial variation based on geographic region or ethnicity and across child and adult samples. Globally, the male:female ratio in well-ascertained epidemiological samples appears to be 3:1, with concerns about underrecognition of autism spectrum disorder in women and girls. Development and Course The age and pattern of onset also should be noted for autism spectrum disorder. The behavioral features of autism spectrum disorder first become evident in early childhood, with some cases presenting a lack of interest in social

interaction in the first year of life. Symptoms are typically recognized during the second year of life (age 12–24 months) but may be seen earlier than 12 months if developmental delays are severe, or noted later than 24 months if symptoms are more subtle. The pattern of onset description might include information about early developmental delays or any losses of social or language skills. In cases where skills have been lost, parents or caregivers may give a history of a gradual or relatively rapid deterioration in social behaviors or language skills. Typically, this would occur between ages 12 and 24 months. Prospective studies demonstrate that in most cases the onset of autism spectrum disorder is associated with declines in critical social and communication behaviors in the first 2 years of life. Such declines in functioning are rare in other neurodevelopmental disorders and may be an especially useful indicator of the presence of autism spectrum disorder. In rare cases, there is developmental regression occurring after at least 2 years of normal development (previously described as childhood disintegrative disorder), which is much more unusual and warrants more extensive medical investigation (i.e., continuous spike and waves during slow-wave sleep syndrome and Landau-Kleffner syndrome). Often included in these encephalopathic conditions are losses of skills beyond social communication (e.g., loss of self-care, toileting, motor skills) (see also Rett syndrome in the section “Differential Diagnosis” for this disorder). First symptoms of autism spectrum disorder frequently involve delayed language development, often accompanied by lack of social interest or unusual social interactions (e.g., pulling individuals by the hand without any attempt to look at them), odd play patterns (e.g., carrying toys around but never playing with them), and unusual communication patterns (e.g., knowing the alphabet but not responding to own name). Deafness may be suspected but is typically ruled out. During the second year, odd and repetitive behaviors and the absence of typical play become more apparent. Since many typically developing young children have strong preferences and enjoy repetition (e.g., eating the same foods, watching the same video multiple times), distinguishing restricted and repetitive behaviors that are diagnostic of autism spectrum disorder can be difficult in preschoolers. The clinical distinction is based on the type, frequency, and intensity of the behavior (e.g., a child who daily lines up objects for hours and is very

distressed if any item is moved). Autism spectrum disorder is not a degenerative disorder, and it is typical for learning and compensation to continue throughout life. Symptoms are often most marked in early childhood and early school years, with developmental gains typical in later childhood in at least some areas (e.g., increased interest in social interaction). A small proportion of individuals deteriorate behaviorally during adolescence, whereas most others improve. While it was once the case that only a minority of individuals with autism spectrum disorder lived and worked independently in adulthood, as diagnosis of autism spectrum disorder is made more frequently in those who have superior language and intellectual abilities, more individuals are able to find a niche that matches their special interests and skills and thus are productively employed. Access to vocational rehabilitation services significantly improves competitive employment outcomes for transition-age youth with autism spectrum disorder. In general, individuals with lower levels of impairment may be better able to function independently. However, even these individuals may remain socially naive and vulnerable, have difficulties organizing practical demands without aid, and are prone to anxiety and depression. Many adults report using compensation strategies and coping mechanisms to mask their difficulties in public but suffer from the stress and effort of maintaining a socially acceptable facade. Relatively little is known about old age in autism spectrum disorder, but higher rates of co-occurring medical conditions have been documented in the literature. Some individuals come for first diagnosis in adulthood, perhaps

prompted by the diagnosis of autism in a child in the family or a breakdown of relations at work or home. Obtaining detailed developmental history in such cases may be difficult, and it is important to consider self-reported difficulties. Where clinical observation suggests criteria are currently met, autism spectrum disorder may be diagnosed, particularly if supported by a history of poor social and communication skills in childhood. A compelling report (by parents or another relative) that the individual had ordinary and sustained reciprocal friendships and good nonverbal communication skills throughout childhood would significantly lessen the likelihood of a diagnosis of autism spectrum disorder; however, ambiguous or absent developmental information in itself is not sufficient to rule out a diagnosis of autism spectrum disorder. Manifestations of the social and communication impairments and restricted/repetitive behaviors that define autism spectrum disorder are clear in the developmental period. In later life, intervention or compensation, as well as current supports, may mask these difficulties in at least some contexts. Overall, symptoms remain sufficient to cause current impairment in social, occupational, or other important areas of functioning. Risk and Prognostic Factors The best established prognostic factors for individual outcome within autism spectrum disorder are presence or absence of associated intellectual developmental disorder and language impairment (e.g., functional language by age 5 years is a good prognostic sign) and additional mental health problems. Epilepsy, as a comorbid diagnosis, is associated with greater intellectual disability and lower verbal ability.

Environmental. Genetic and physiological. A variety of risk factors for neurodevelopmental disorders, such as advanced parental age, extreme prematurity, or in utero exposures to certain drugs or teratogens like valproic acid, may broadly contribute to risk of autism spectrum disorder. Heritability estimates for autism spectrum disorder have ranged from 37% to higher than 90%, based on twin concordance rates, and a more recent five-country cohort estimated heritability at 80%. Currently, as many as 15% of cases of autism spectrum disorder appear to be associated with a known genetic mutation, with different de novo copy number variants or de novo mutations in specific genes associated with the disorder in different families. However, even when a known genetic mutation is associated with autism spectrum disorder, it does not appear to be fully penetrant (i.e., not all individuals with that same genetic abnormality will develop autism spectrum disorder). Risk for the majority of cases appears to be polygenic, with perhaps hundreds of genetic loci making relatively small contributions. Whether these findings apply to all racial/ethnic populations equally is unclear, given the limited inclusion of communities of color in genetic research. Culture-Related Diagnostic Issues Cultural differences exist in norms for social interaction, nonverbal communication, and relationships, but individuals with autism spectrum disorder are markedly impaired against the norms for their cultural context. Culture influences the perception of autistic behaviors, the perceived salience of some behaviors over others, and the expectations for child behavior and parenting practices. Considerable discrepancies are found in age at diagnosis of autism spectrum disorder in children from diverse ethnoracial backgrounds; most studies find delayed diagnosis among socially oppressed ethnic and racialized children. In addition to being diagnosed later, African American children are more often misdiagnosed with adjustment or conduct disorder than are White children. Sex- and Gender-Related Diagnostic Issues Autism spectrum disorder is diagnosed three to four times more often in males than in females, and on average, age at diagnosis is later in females. In clinic samples, females tend to be more likely to show accompanying intellectual developmental disorder as well as epilepsy, suggesting that girls without intellectual impairments or language delays may go unrecognized, perhaps because of subtler manifestation of social and communication difficulties. In comparison with males

with autism spectrum disorder, females may have better reciprocal conversation, and be more likely to share interests, to integrate verbal and nonverbal behavior, and to modify their behavior by situation, despite having similar social understanding difficulties as males. Attempting to hide or mask autistic behavior (e.g., by copying the dress, voice, and manner of socially successful women) may also make diagnosis harder in some females. Repetitive behaviors may be somewhat less evident in females than in males, on average, and special interests may have a more social (e.g., a singer, an actor) or “normative” focus (e.g., horses), while remaining unusual in their intensity. Relative to the general population, rates of gender variance have been reported to be increased in autism spectrum disorder, with higher variance in females compared with males.

Attention-deficit/hyperactivity disorder. Intellectual developmental disorder (intellectual disability) without autism spectrum disorder. Association With Suicidal Thoughts or Behavior Individuals with autism spectrum disorder are at greater risk for suicide death compared with those without autism spectrum disorder. Children with autism spectrum disorder who had impaired social communication had a higher risk of self-harm with suicidal intent, suicidal thoughts, and suicide plans by age 16 years as compared with those without impaired social communication. Adolescents and young adults with autism spectrum disorder have an increased risk of suicide attempts compared with age- and sex-matched control subjects, even after adjustments for demographic factors and psychiatric comorbidities. Functional Consequences of Autism Spectrum Disorder In young children with autism spectrum disorder, lack of social and communication abilities may hamper learning, especially learning through social interaction or in settings with peers. In the home, insistence on routines and aversion to change, as well as sensory sensitivities, may interfere with eating and sleeping and make routine care (e.g., haircuts, dental work) extremely difficult. Adaptive skills are typically below measured IQ. Extreme difficulties in planning, organization, and coping with change negatively impact academic achievement, even for students with above-average intelligence. During adulthood, these individuals may have difficulties establishing independence because of continued rigidity and difficulty with novelty. Many individuals with autism spectrum disorder, even without intellectual developmental disorder, have poor adult psychosocial functioning as indexed by measures such as independent living and gainful employment. Functional consequences in old age are unknown, but social isolation and communication problems (e.g., reduced help-seeking) are likely to have consequences for health in older adulthood. Co-occurring intellectual developmental disorder, epilepsy, mental disorders, and chronic medical conditions may be associated with a higher risk of premature mortality for individuals with autism spectrum disorder. Deaths from injury and poisoning are higher than for the general population, as are deaths from suicide. Drowning is the leading cause of accidental death in children with autism spectrum disorder. Differential Diagnosis Abnormalities of attention (overly focused or easily distracted) are common in individuals with autism spectrum disorder, as is hyperactivity. Moreover, some individuals with ADHD may exhibit social communication deficits such as interrupting others, speaking too loudly, and not respecting personal space. Although potentially difficult to discriminate ADHD from autism spectrum disorder, the developmental course and absence of restricted, repetitive behaviors and unusual interests in ADHD help in differentiating the two conditions. A concurrent diagnosis of ADHD should be considered when attentional difficulties or hyperactivity exceeds that typically seen in individuals of comparable mental age, and ADHD is one of the most common comorbidities in autism spectrum disorder. Intellectual developmental disorder without autism spectrum disorder may be difficult to differentiate from

Language disorders and social (pragmatic) communication disorder. Selective mutism. Stereotypic movement disorder. Rett syndrome. Symptoms associated with anxiety disorders. autism spectrum disorder in very young children. Individuals with intellectual developmental disorder who have not developed language or symbolic skills also present a challenge for differential diagnosis, since repetitive behavior often occurs in such individuals as well. A diagnosis of autism spectrum disorder in an individual with intellectual developmental disorder is appropriate when social communication and interaction are significantly impaired relative to the developmental level of the individual's nonverbal skills (e.g., fine motor skills, nonverbal problem solving). In contrast, intellectual developmental disorder is the appropriate diagnosis when there is no apparent discrepancy between the level of social communicative skills and other intellectual skills. In some forms of language disorder, there may be problems of communication and some secondary social difficulties. However, specific language disorder is not usually associated with abnormal nonverbal communication, nor with the presence of restricted, repetitive patterns of behavior, interests, or activities. When an individual shows impairment in social communication and social interactions but does not show restricted and repetitive behavior or interests, criteria for social (pragmatic) communication disorder, instead of autism spectrum disorder, may be met. The diagnosis of autism spectrum disorder supersedes that of social (pragmatic) communication disorder whenever the criteria for autism spectrum disorder are met, and care should be taken to enquire carefully regarding past or current restricted/repetitive behavior. In selective mutism, early development is not typically disturbed. The affected child usually exhibits appropriate communication skills in certain contexts and settings. Even in settings where the child is mute, social reciprocity is not impaired, nor are restricted or repetitive patterns of behavior present. Motor stereotypies are among the diagnostic characteristics of autism spectrum disorder, so an additional diagnosis of stereotypic movement disorder is not given when such repetitive behaviors are better explained by the presence of autism spectrum disorder. However, when stereotypies cause self-injury and become a focus of treatment, both diagnoses may be appropriate. Disruption of social interaction may be observed during the regressive phase of Rett syndrome (typically between ages 1 and 4 years); thus, a substantial proportion of affected young girls may have a presentation that meets diagnostic criteria for autism spectrum disorder. However, after this period, most individuals with Rett syndrome improve their social communication skills, and autistic features are no longer a major area of concern. Consequently, autism spectrum disorder should be considered only when all diagnostic criteria are met. The overlap of anxiety symptoms with the core symptoms of autism spectrum disorder can make the classification of anxiety symptoms in autism spectrum disorder challenging. For example, social withdrawal and repetitive behaviors are core features of autism spectrum disorder but may also be expressions of anxiety. The most common anxiety disorders in autism spectrum disorder are specific phobia (in up to 30% of cases), and social anxiety and agoraphobia (in as many as 17% of cases).

Obsessive-compulsive disorder. Schizophrenia. Personality disorders. Repetitive behavior is a defining feature of both obsessivecompulsive disorder and autism spectrum disorder. In both conditions, repetitive behaviors are considered to be inappropriate or odd. In obsessive-compulsive disorder, intrusive thoughts are often related to contamination, organization, or sexual or religious themes. Compulsions are performed in response to these intrusive thoughts in attempts to relieve anxiety. In autism spectrum disorder, repetitive behaviors classically include more stereotyped motor behaviors, such as hand flapping and finger shaking or more complex behaviors, such as insistence on routines or lining up objects. Contrary to obsessive-compulsive disorder, repetitive

behaviors in autism spectrum disorder may be perceived as pleasurable and reinforcing. Schizophrenia with childhood onset usually develops after a period of normal, or near normal, development. A prodromal state has been described in which social impairment and atypical interests and beliefs occur, which could be confused with the social deficits and restricted fixated interests seen in autism spectrum disorder. Hallucinations and delusions, which are defining features of schizophrenia, are not features of autism spectrum disorder. However, clinicians must take into account the potential for individuals with autism spectrum disorder to be concrete in their interpretation of questions regarding the key features of schizophrenia (e.g., “Do you hear voices when no one is there?” ”Yes [on the radio]”). Autism spectrum disorder and schizophrenia can co-occur, and both should be diagnosed when criteria are met. In adults without intellectual developmental disorder or significant language impairment, some behaviors associated with autism spectrum disorder may be perceived by others as symptoms of narcissistic, schizotypal, or schizoid personality disorder. Schizotypal personality disorder in particular may intersect with autism spectrum disorder in unusual preoccupations and perceptual experiences, odd thinking and speech, constricted affect and social anxiety, lack of close friends, and odd or eccentric behavior. The early developmental course of autism spectrum disorder (lack of imaginative play, restricted/repetitive behavior, sensory sensitivities) is most helpful in differentiating it from personality disorders. Comorbidity Autism spectrum disorder is frequently associated with intellectual developmental disorder and language disorder (i.e., an inability to comprehend and construct sentences with proper grammar). Specific learning difficulties (literacy and numeracy) are common, as is developmental coordination disorder. Psychiatric comorbidities also co-occur in autism spectrum disorder. About 70% of individuals with autism spectrum disorder may have one comorbid mental disorder, and 40% may have two or more comorbid mental disorders. Anxiety disorders, depression, and ADHD are particularly common. Avoidant/restrictive food intake disorder is a fairly frequent presenting feature of autism spectrum disorder, and extreme and narrow food preferences may persist. Among individuals who are nonverbal or have language deficits, observable signs such as changes in sleep or eating and increases in challenging behavior should trigger an evaluation for anxiety or depression, as well as for potential pain or discomfort from undiagnosed medical or dental problems. Medical conditions commonly associated with autism spectrum disorder

include epilepsy and constipation. Attention-Deficit/Hyperactivity Disorder Attention-Deficit/Hyperactivity Disorder Diagnostic Criteria A. A persistent pattern of inattention and/or hyperactivity-impulsivity that interferes with functioning or development, as characterized by (1) and/or (2):

1. Inattention: Six (or more) of the following symptoms have persisted for at least 6 months to a degree that is inconsistent with developmental level and that negatively impacts directly on social and academic/occupational activities: Note: The symptoms are not solely a manifestation of oppositional behavior, defiance, hostility, or failure to understand tasks or instructions. For older adolescents and adults (age 17 and older), at least five symptoms are required. a. Often fails to give close attention to details or makes careless mistakes in schoolwork, at work, or during other activities (e.g., overlooks or misses details, work is inaccurate). b. Often has difficulty sustaining attention in tasks or play activities (e.g., has difficulty remaining focused during lectures, conversations, or lengthy reading). c. Often does not seem to listen when spoken to directly (e.g., mind seems

elsewhere, even in the absence of any obvious distraction). d. Often does not follow through on instructions and fails to finish schoolwork, chores, or duties in the workplace (e.g., starts tasks but quickly loses focus and is easily sidetracked). e. Often has difficulty organizing tasks and activities (e.g., difficulty managing sequential tasks; difficulty keeping materials and belongings in order; messy, disorganized work; has poor time management; fails to meet deadlines). f. Often avoids, dislikes, or is reluctant to engage in tasks that require sustained mental effort (e.g., schoolwork or homework; for older adolescents and adults, preparing reports, completing forms, reviewing lengthy papers). g. Often loses things necessary for tasks or activities (e.g., school materials, pencils, books, tools, wallets, keys, paperwork, eyeglasses, mobile

telephones). h. Is often easily distracted by extraneous stimuli (for older adolescents and adults, may include unrelated thoughts). i. Is often forgetful in daily activities (e.g., doing chores, running errands; for older adolescents and adults, returning calls, paying bills, keeping appointments). 2. Hyperactivity and impulsivity: Six (or more) of the following symptoms have persisted for at least 6 months to a degree that is inconsistent with developmental level and that negatively impacts directly on social and academic/occupational activities: Note: The symptoms are not solely a manifestation of oppositional behavior, defiance, hostility, or a failure to understand tasks or instructions. For older adolescents and adults (age 17 and older), at least five symptoms are required. a. Often fidgets with or taps hands or feet or squirms in seat. b. Often leaves seat in situations when remaining seated is expected (e.g., leaves his or her place in the classroom, in the office or other workplace, or in other situations that require remaining in place). c. Often runs about or climbs in situations where it is inappropriate. (Note: In adolescents or adults, may be limited to feeling restless.) d. Often unable to play or engage in leisure activities quietly. e. Is often “on the go,” acting as if “driven by a motor” (e.g., is unable to be or uncomfortable being still for extended time, as in restaurants, meetings; may be experienced by others as being restless or difficult to keep up with). f. Often talks excessively. g. Often blurts out an answer before a question has been completed (e.g., completes people’s sentences; cannot wait for turn in conversation). h. Often has difficulty waiting his or her turn (e.g., while waiting in line). i. Often interrupts or intrudes on others (e.g., butts into conversations, games, or activities; may start using other people’s things without asking or receiving permission; for adolescents and adults, may intrude into or take over what others are doing). B. Several inattentive or hyperactive-impulsive symptoms were present prior to age 12 years. C. Several inattentive or hyperactive-impulsive symptoms are present in two or more settings (e.g., at home, school, or work; with friends or relatives; in other activities). D. There is clear evidence that the symptoms interfere with, or reduce the quality of,

social, academic, or occupational functioning. E. The symptoms do not occur exclusively during the course of schizophrenia or another psychotic disorder and are not better explained by another mental disorder (e.g., mood disorder, anxiety disorder, dissociative disorder, personality disorder, substance intoxication or withdrawal). Specify whether: F90.2 Combined presentation: If both Criterion A1 (inattention) and Criterion A2 (hyperactivity-impulsivity) are met for the past 6 months. F90.0 Predominantly inattentive presentation: If Criterion A1 (inattention) is met but Criterion A2 (hyperactivity-impulsivity) is not met for the past 6 months. F90.1 Predominantly hyperactive/impulsive presentation: If Criterion A2 (hyperactivity-impulsivity) is met and Criterion A1 (inattention) is not met for the past 6 months. Specify if: In partial remission: When full criteria were previously met, fewer than the full criteria have been met for the past 6 months, and the

symptoms still result in impairment in social, academic, or occupational functioning. Specify current severity: Mild: Few, if any, symptoms in excess of those required to make the diagnosis are present, and symptoms result in no more than minor impairments in social or occupational functioning. Moderate: Symptoms or functional impairment between “mild” and “severe” are present. Severe: Many symptoms in excess of those required to make the diagnosis, or several symptoms that are particularly severe, are present, or the symptoms result in marked impairment in social or occupational functioning. Diagnostic Features The essential feature of attention-deficit/hyperactivity disorder (ADHD) is a persistent pattern of inattention and/or hyperactivity-impulsivity that interferes with functioning or development. Inattention manifests behaviorally in ADHD as wandering off task, failing to follow through on instructions or finishing work or chores, having difficulty sustaining focus, and being disorganized and is not attributable to defiance or lack of comprehension. Hyperactivity refers to excessive motor activity (such as a child running about) when it is not appropriate, or excessive fidgeting, tapping, or talkativeness. In adults, hyperactivity may manifest as extreme restlessness or wearing others out with their activity. Impulsivity refers to hasty actions that occur in the moment without forethought, which may have potential for harm to the individual (e.g., darting into the street without looking). Impulsivity may reflect a desire for immediate rewards or an inability to delay gratification. Impulsive behaviors may manifest as social intrusiveness (e.g.,

interrupting others excessively) and/or as making important decisions without consideration of long-term consequences (e.g., taking a job without adequate information). ADHD begins in childhood. The requirement that several symptoms be present before age 12 years conveys the importance of a substantial clinical presentation during childhood. At the same time, an earlier age at onset is not specified because of difficulties in establishing precise childhood onset retrospectively. Adult recall of childhood symptoms tends to be unreliable, and it is beneficial to obtain ancillary information. ADHD cannot be diagnosed in the absence of any symptoms prior to age 12. When symptoms of what appears to be ADHD first occur after age 13, they are more likely to be explained by another mental disorder or to represent the cognitive effects of substance use. Manifestations of the disorder must be present in more than one setting (e.g., home and school, or home and work). Confirmation of substantial symptoms across settings typically cannot be done accurately without consulting informants who have seen the individual in those settings. Typically, symptoms vary depending on context within a given setting. Signs of the disorder may be minimal or absent when the individual is receiving frequent rewards for appropriate behavior, is under close supervision, is in a novel setting, is engaged in especially interesting activities, has consistent external stimulation (e.g., via electronic screens), or is interacting in one-on-one situations (e.g., the clinician's office). Associated Features Delays in language, motor, or social development are not specific to ADHD but often co-occur. Emotional dysregulation or emotional impulsivity commonly occurs in children and adults with ADHD. Individuals with ADHD self-report and are described by others as being quick to anger, easily frustrated, and overreactive emotionally. Even in the absence of a specific learning disorder, academic or work performance is often impaired. Individuals with ADHD may exhibit neurocognitive deficits in a variety of areas, including working memory, set shifting, reaction time variability, response inhibition, vigilance, and planning/organization, although these tests are not sufficiently sensitive or specific to serve as diagnostic indices. Although ADHD is not associated with specific physical features, rates of minor physical anomalies (e.g., hypertelorism, highly arched palate, low-set ears) may be elevated. Subtle motor delays and other neurological soft signs may occur. (Note that marked co-occurring

clumsiness and motor delays should be coded separately [e.g., developmental coordination disorder].) Children with neurodevelopmental disorders with a known cause (e.g., fragile X syndrome, 22q11 deletion syndrome) may often also have symptoms of inattention and impulsivity/hyperactivity; they should receive an ADHD diagnosis if their symptoms meet the full criteria for the disorder. Prevalence Population surveys suggest that ADHD occurs worldwide in about 7.2% of children; however, cross-national prevalence ranges widely, from 0.1% to 10.2% of children and adolescents. Prevalence is higher in special populations such as foster children or correctional settings. In a

Temperamental. Environmental. Genetic and physiological. Course modifiers. cross-national meta-analysis, ADHD occurred in 2.5% of adults. Development and Course Many parents first observe excessive motor activity when the child is a toddler, but symptoms are difficult to distinguish from highly variable normative behaviors before age 4 years. ADHD is most often identified during elementary school years when inattention becomes more prominent and impairing. The disorder is relatively stable through early adolescence, but some individuals have a worsened course with development of antisocial behaviors. In most individuals with ADHD, symptoms of motoric hyperactivity become less obvious in adolescence and adulthood, but difficulties with restlessness, inattention, poor planning, and impulsivity persist. A substantial proportion of children with ADHD remain relatively impaired into adulthood. In preschool, the main manifestation is hyperactivity. Inattention becomes more prominent during elementary school. During adolescence, signs of hyperactivity (e.g., running and climbing) are less common and may be confined to fidgetiness or an inner feeling of jitteriness, restlessness, or impatience. In adulthood, along with inattention and restlessness, impulsivity may remain problematic even when hyperactivity has diminished. Risk and Prognostic Factors ADHD is associated with reduced behavioral inhibition, effortful control, or constraint; negative emotionality; and/or elevated novelty seeking. These traits may predispose some children to ADHD but are not specific to the disorder. Very low birth weight and degree of prematurity convey a greater risk for ADHD; the more extreme the low weight, the greater the risk. Prenatal exposure to smoking is associated with ADHD even after controlling for parental psychiatric history and socioeconomic status. A minority of cases may be related to reactions to aspects of diet. Neurotoxin exposure (e.g., lead), infections (e.g., encephalitis), and alcohol exposure in utero have been correlated with subsequent ADHD, but it is not known whether these associations are causal. The heritability of ADHD is approximately 74%. Large-scale genomewide association studies (GWAS) have identified a number of loci enriched in evolutionarily constrained genomic regions and loss-of-function genes as well as around brain-expressed regulatory regions. There is no single gene for ADHD. Visual and hearing impairments, metabolic abnormalities, and nutritional deficiencies should be considered as possible influences on ADHD symptoms. ADHD is elevated in individuals with idiopathic epilepsy. Family interaction patterns in early childhood are unlikely to cause ADHD but may influence its course or contribute to secondary development of conduct problems. Culture-Related Diagnostic Issues Differences in ADHD prevalence across regions appear attributable mainly to different diagnostic procedures and methodological practices, including using different diagnostic

interviews and differences in whether functional impairment was required and, if so, how it was defined. Prevalence is also affected by cultural variation in attitudes toward behavioral norms and expectations of children and youth in different social contexts, as well as cultural differences in interpretations of children’s behaviors by parents and teachers, including differences by gender.

Clinical identification rates in the United States for African American and Latinx populations tend to be lower than for non-Latinx White populations. Underdetection may result from mislabeling of ADHD symptoms as oppositional or disruptive in socially oppressed ethnic or racialized groups because of explicit or implicit clinician bias, leading to overdiagnosis of disruptive disorders. Higher prevalence in non-Latinx White youth may also be influenced by greater parental demand for diagnosis of behaviors seen as ADHD-related. Informant symptom ratings may be influenced by the cultural background of the child and the informant, suggesting that culturally competent diagnostic practices are relevant in assessing ADHD. Sex- and Gender-Related Diagnostic Issues ADHD is more frequent in males than in females in the general population, with a ratio of approximately 2:1 in children and 1.6:1 in adults. Females are more likely than males to present primarily with inattentive features. Sex differences in ADHD symptom severity may be due to differing genetic and cognitive liabilities between sexes. Diagnostic Markers No biological marker is diagnostic for ADHD. Although ADHD has been associated with elevated power of slow waves (4–7 Hz “theta”) as well as decreased power of fast waves (14–30 Hz “beta”), a later review found no differences in theta or beta power in either children or adults with ADHD relative to control subjects. Although some neuroimaging studies have shown differences in children with ADHD compared with control subjects, meta-analysis of all neuroimaging studies do not show differences between individuals with ADHD and control subjects. This likely is due to differences in diagnostic criteria, sample size, task used, and technical aspects of the neuroimaging technique. Until these issues are resolved, no form of neuroimaging can be used for diagnosis of ADHD. Association With Suicidal Thoughts or Behavior ADHD is a risk factor for suicidal ideation and behavior in children. Similarly, in adulthood, ADHD is associated with an increased risk of suicide attempt, when comorbid with mood, conduct, or substance use disorders, even after controlling for comorbidity. Suicidal thoughts are also more common in ADHD populations than in non-ADHD control subjects. ADHD predicted persistence of suicidal thoughts in U.S. Army soldiers. Functional Consequences of Attention-Deficit/Hyperactivity Disorder ADHD is associated with reduced school performance and academic attainment. Academic deficits, school-related problems, and peer neglect tend to be most associated with elevated symptoms of inattention, whereas peer rejection and, to a lesser extent, accidental injury are most

Oppositional defiant disorder. Intermittent explosive disorder. Other neurodevelopmental disorders. salient with marked symptoms of hyperactivity or impulsivity. Inadequate or variable selfapplication to tasks that require sustained effort is often interpreted by others as laziness, irresponsibility, or failure to cooperate. Young adults with ADHD have poor job stability. Adults with ADHD show poorer occupational performance, attainment, attendance, and higher probability of unemployment, as well as elevated interpersonal conflict. On average, individuals with ADHD obtain less schooling, have poorer vocational achievement, and have reduced intellectual scores than their peers, although there is great variability. In its severe form, the disorder is markedly impairing, affecting social, familial, and scholastic/occupational adjustment. Family relationships may be characterized by discord and negative interactions. Individuals with ADHD have lower self-esteem relative to peers without ADHD. Peer relationships are often disrupted by peer rejection, neglect, or teasing of the individual with ADHD. Children with ADHD are significantly more likely than their peers without ADHD to develop conduct disorder in adolescence and antisocial personality disorder in adulthood, consequently increasing the likelihood for substance use disorders and incarceration. The risk of subsequent substance use disorders is elevated, especially when conduct disorder or antisocial personality disorder develops. Individuals with ADHD are more likely than peers to be injured. Children and adults with ADHD are at higher risk for suffering

trauma and developing subsequent posttraumatic stress syndrome. Traffic accidents and violations are more frequent in drivers with ADHD. Individuals with ADHD have a higher overall mortality rate, largely because of accidents and injuries. There may also be an elevated likelihood of obesity and hypertension among individuals with ADHD. Differential Diagnosis Individuals with oppositional defiant disorder may resist work or school tasks that require self-application because they resist conforming to others' demands. Their behavior is characterized by negativity, hostility, and defiance. These symptoms must be differentiated from aversion to school or mentally demanding tasks because of difficulty in sustaining mental effort, forgetting instructions, and impulsivity in individuals with ADHD. Complicating the differential diagnosis is the fact that some individuals with ADHD may develop secondary oppositional attitudes toward such tasks and devalue their importance. ADHD and intermittent explosive disorder share high levels of impulsive behavior. However, individuals with intermittent explosive disorder show serious aggression toward others, which is not characteristic of ADHD, and they do not experience problems with sustaining attention as seen in ADHD. In addition, intermittent explosive disorder is rare in childhood. Intermittent explosive disorder may be diagnosed in the presence of ADHD. The increased motoric activity that may occur in ADHD must be distinguished from the repetitive motor behavior that characterizes stereotypic movement disorder and some cases of autism spectrum disorder. In stereotypic movement disorder, the motoric behavior is generally fixed and repetitive (e.g., body rocking, self-biting), whereas the fidgetiness and restlessness in ADHD are typically generalized and not characterized by repetitive stereotypic movements. In Tourette’s disorder, frequent multiple tics can be mistaken for the generalized fidgetiness of ADHD. Prolonged observation may be needed to differentiate fidgetiness from bouts of multiple tics.

Specific learning disorder. Intellectual developmental disorder (intellectual disability). Autism spectrum disorder. Reactive attachment disorder. Anxiety disorders. Posttraumatic stress disorder. Depressive disorders. Bipolar disorder. Children with specific learning disorder alone may appear inattentive because of frustration, lack of interest, or limited ability in neurocognitive processes, including working memory and processing speed, whereas their inattention is much reduced when performing a skill that does not require the impaired cognitive process. Symptoms of ADHD are common in children with intellectual developmental disorder placed in academic settings that are inappropriate to their intellectual ability. In such cases, the symptoms are not evident during nonacademic tasks. A diagnosis of ADHD in intellectual developmental disorder requires that inattention or hyperactivity be excessive for mental age. Individuals with ADHD and those with autism spectrum disorder exhibit inattention, social dysfunction, and difficult-to-manage behavior. The social dysfunction and peer rejection seen in individuals with ADHD must be distinguished from the social disengagement, isolation, and indifference to facial and tonal communication cues seen in individuals with autism spectrum disorder. Children with autism spectrum disorder may display tantrums because of an inability to tolerate a change from their expected course of events. In contrast, children with ADHD may misbehave or have a tantrum during a major transition because of impulsivity or poor self-control. Children with reactive attachment disorder may show social disinhibition, but not the full ADHD symptom cluster, and display other features such as a lack of enduring relationships that are not characteristic of ADHD. ADHD shares symptoms of inattention with anxiety disorders. Individuals with ADHD are inattentive because of their preferential engagement with novel and stimulating activities or preoccupation with enjoyable activities. This is distinguished from the inattention attributable to worry and rumination seen in anxiety disorders. Restlessness might be seen in anxiety disorders. However, in ADHD, the symptom is not associated

with worry and rumination. Concentration difficulties associated with posttraumatic stress disorder (PTSD) may be misdiagnosed in children as ADHD. Children younger than 6 years often manifest PTSD in nonspecific symptoms such as restlessness, irritability, inattention, and poor concentration, which can mimic ADHD. Parents may also minimize their children's trauma-related symptoms, and teachers and other caregivers are often unaware of the child's exposure to traumatic events. A comprehensive assessment of past exposure to traumatic events can rule out PTSD. Individuals with depressive disorders may present with inability to concentrate. However, poor concentration in mood disorders becomes prominent only during a depressive episode. Individuals with bipolar disorder may have increased activity, poor concentration, and increased impulsivity, but these features are episodic, unlike ADHD, in which the symptoms are persistent. Moreover, in bipolar disorder, increased impulsivity or inattention is accompanied by elevated mood, grandiosity, and other specific bipolar features. Children with

Disruptive mood dysregulation disorder. Substance use disorders. Personality disorders. Psychotic disorders. Medication-induced symptoms of ADHD. Neurocognitive disorders. ADHD may show significant changes in mood within the same day; such lability is distinct from a manic or hypomanic episode, which must last 4 or more days to be a clinical indicator of bipolar disorder, even in children. Bipolar disorder is rare in preadolescents, even when severe irritability and anger are prominent, whereas ADHD is common among children and adolescents who display excessive anger and irritability. Disruptive mood dysregulation disorder is characterized by pervasive irritability, and intolerance of frustration, but impulsiveness and disorganized attention are not essential features. However, most children and adolescents with the disorder also have symptoms that meet criteria for ADHD, which is diagnosed separately. Differentiating ADHD from substance use disorders may be problematic if the first presentation of ADHD symptoms follows the onset of abuse or frequent use. Clear evidence of ADHD before substance misuse from informants or previous records may be essential for differential diagnosis. In adolescents and adults, it may be difficult to distinguish ADHD from borderline, narcissistic, and other personality disorders. Some personality disorders tend to share the features of disorganization, social intrusiveness, emotional dysregulation, and cognitive dysregulation. However, ADHD is not characterized by fear of abandonment, self-injury, extreme ambivalence, or other features of personality disorder. It may take extended clinical observation, informant interview, or detailed history to distinguish impulsive, socially intrusive, or inappropriate behavior from narcissistic, aggressive, or domineering behavior to make this differential diagnosis. ADHD is not diagnosed if the symptoms of inattention and hyperactivity occur exclusively during the course of a psychotic disorder. Symptoms of inattention, hyperactivity, or impulsivity attributable to the use of medication (e.g., bronchodilators, isoniazid, neuroleptics [resulting in akathisia], thyroid replacement medication) are diagnosed as other specified or unspecified other (or unknown) substance–related disorders. While impairment in complex attention may be one of the affected cognitive domains in a neurocognitive disorder, it must represent a decline from a previous level of performance in order to justify a diagnosis of major or mild neurocognitive disorder. Moreover, major or mild neurocognitive disorder typically has its onset in adulthood. In contrast, the inattention in ADHD must have been present prior to age 12 and does not represent a decline from previous functioning. Comorbidity Although ADHD is more common in males, females with ADHD have higher rates of a number of comorbid disorders, particularly oppositional defiant disorder, autism spectrum disorder, and personality and substance use disorders. Oppositional defiant disorder co-occurs with ADHD in approximately half of children with the combined presentation and about a quarter with the predominantly inattentive

presentation. Conduct disorder co-occurs in about a quarter of children

or adolescents with the combined presentation, depending on age and setting. Most children and adolescents with disruptive mood dysregulation disorder have symptoms that also meet criteria for ADHD; a lesser percentage of children with ADHD have symptoms that meet criteria for disruptive mood dysregulation disorder. Anxiety disorders, major depressive disorder, obsessivecompulsive disorder, and intermittent explosive disorder occur in a minority of individuals with ADHD but more often than in the general population. Although substance use disorders are relatively more frequent among adults with ADHD in the general population, the disorders are present in only a minority of adults with ADHD. In adults, antisocial and other personality disorders may co-occur with ADHD. ADHD may co-occur in variable symptom profiles with other neurodevelopmental disorders, including specific learning disorder, autism spectrum disorder, intellectual developmental disorder, language disorders, developmental coordination disorder, and tic disorders. Comorbid sleep disorders in ADHD are associated with daytime impairments in cognition (e.g., inattention). Many individuals with ADHD report daytime sleepiness that may meet criteria for hypersomnolence disorder. One quarter to one-half of individuals with ADHD report sleep difficulties; studies have shown an association of ADHD with insomnia, circadian rhythm sleepwake disorder, sleep-disordered breathing, and restless legs syndrome. Individuals with ADHD have been found to have elevated rates of a number of medical conditions, particularly allergy and autoimmune disorders, as well as epilepsy. Other Specified Attention-Deficit/Hyperactivity Disorder F90.8 This category applies to presentations in which symptoms characteristic of attentiondeficit/hyperactivity disorder that cause clinically significant distress or impairment in social, occupational, or other important areas of functioning predominate but do not meet the full criteria for attention-deficit/hyperactivity disorder or any of the disorders in the neurodevelopmental disorders diagnostic class. The other specified attentiondeficit/hyperactivity disorder category is used in situations in which the clinician chooses to communicate the specific reason that the presentation does not meet the criteria for attention-deficit/hyperactivity disorder or any specific neurodevelopmental disorder. This is done by recording “other specified attention-deficit/hyperactivity disorder” followed by the specific reason (e.g., “with insufficient inattention symptoms”). Unspecified Attention-Deficit/Hyperactivity Disorder F90.9

This category applies to presentations in which symptoms characteristic of attentiondeficit/hyperactivity disorder that cause clinically significant distress or impairment in social, occupational, or other important areas of functioning predominate but do not meet the full criteria for attention-deficit/hyperactivity disorder or any of the disorders in the neurodevelopmental disorders diagnostic class. The unspecified attentiondeficit/hyperactivity disorder category is used in situations in which the clinician chooses not to specify the reason that the criteria are not met for attentiondeficit/hyperactivity disorder or for a specific neurodevelopmental disorder, and includes presentations in which there is insufficient information to make a more specific diagnosis. Specific Learning Disorder Specific Learning Disorder Diagnostic Criteria A. Difficulties learning and using academic skills, as indicated by the presence of at least one of the following symptoms that have persisted for at least 6 months, despite the provision of interventions that target those difficulties:

1. Inaccurate or slow and effortful word reading (e.g., reads single words aloud incorrectly or slowly and hesitantly, frequently guesses words, has difficulty sounding out words).

2. Difficulty understanding the meaning of what is read (e.g., may read text accurately but not understand the sequence, relationships, inferences, or deeper meanings of what is read).
3. Difficulties with spelling (e.g., may add, omit, or substitute vowels or consonants).
4. Difficulties with written expression (e.g., makes multiple grammatical or punctuation errors within sentences; employs poor paragraph organization; written expression of ideas lacks clarity).
5. Difficulties mastering number sense, number facts, or calculation (e.g., has poor understanding of numbers, their magnitude, and relationships; counts on fingers to add single-digit numbers instead of recalling the math fact as peers do; gets lost in the midst of arithmetic computation and may switch procedures).
6. Difficulties with mathematical reasoning (e.g., has severe difficulty applying mathematical concepts, facts, or procedures to solve quantitative problems). B. The affected academic skills are substantially and quantifiably below those expected for the individual's chronological age, and cause significant interference with academic or occupational performance, or with activities of daily living, as confirmed by individually administered standardized achievement measures and comprehensive clinical assessment. For individuals age 17 years and older, a documented history of impairing learning difficulties may be substituted for the standardized assessment. C. The learning difficulties begin during school-age years but may not become fully manifest until the demands for those affected academic skills exceed the individual's limited capacities (e.g., as in timed tests, reading or writing lengthy complex reports for a tight deadline, excessively heavy academic loads). D. The learning difficulties are not better accounted for by intellectual disabilities, uncorrected visual or auditory acuity, other mental or neurological disorders, psychosocial adversity, lack of proficiency in the language of academic instruction, or inadequate educational instruction. Note: The four diagnostic criteria are to be met based on a clinical synthesis of the individual's history (developmental, medical, family, educational), school reports, and psychoeducational assessment. Coding note: Specify all academic domains and subskills that are impaired. When more than one domain is impaired, each one should be coded individually according to the following specifiers. Specify if: F81.0 With impairment in reading: Word reading accuracy Reading rate or fluency Reading comprehension Note: Dyslexia is an alternative term used to refer to a pattern of learning difficulties characterized by problems with accurate or fluent word recognition, poor decoding, and poor spelling abilities. If dyslexia is used to specify this particular pattern of difficulties, it is important also to specify any additional difficulties that are present, such as difficulties with reading comprehension or math reasoning. F81.81 With impairment in written expression: Spelling accuracy Grammar and punctuation accuracy Clarity or organization of written expression

F81.2 With impairment in mathematics: Number sense Memorization of arithmetic facts Accurate or fluent calculation Accurate math reasoning Note: Dyscalculia is an alternative term used to refer to a pattern of difficulties characterized by problems processing numerical information, learning arithmetic facts, and performing accurate or fluent calculations. If dyscalculia is used to specify this particular pattern of mathematic difficulties, it is important also to specify any additional difficulties that are present, such as difficulties with math reasoning or word reasoning accuracy. Specify current severity: Mild: Some difficulties learning skills in one or two academic domains, but of mild

enough severity that the individual may be able to compensate or function well when provided with appropriate accommodations or support services, especially during the school years. Moderate: Marked difficulties learning skills in one or more academic domains, so that the individual is unlikely to become proficient without some intervals of intensive and specialized teaching during the school years. Some accommodations or supportive services at least part of the day at school, in the workplace, or at home may be needed to complete activities accurately and efficiently. Severe: Severe difficulties learning skills, affecting several academic domains, so that the individual is unlikely to learn those skills without ongoing intensive individualized and specialized teaching for most of the school years. Even with an array of appropriate accommodations or services at home, at school, or in the workplace, the individual may not be able to complete all activities efficiently. Recording Procedures Each impaired academic domain and subskill of specific learning disorder should be recorded. Because of ICD coding requirements, impairments in reading, impairments in written expression, and impairments in mathematics, with their corresponding impairments in subskills, must be coded and recorded separately. For example, impairments in reading and mathematics and impairments in the subskills of reading rate or fluency, reading comprehension, accurate or fluent calculation, and accurate math reasoning would be coded and recorded as F81.0 specific learning disorder with impairment in reading, with impairment in reading rate or fluency, and impairment in reading comprehension; F81.2 specific learning disorder with impairment in mathematics, with impairment in accurate or fluent calculation and impairment in accurate math reasoning. Diagnostic Features

Specific learning disorder is a neurodevelopmental disorder with a biological origin that is the basis for abnormalities at a cognitive level that are associated with the behavioral signs of the disorder. The biological origin includes an interaction of genetic, epigenetic, and environmental factors, which affect the brain’s ability to perceive or process verbal or nonverbal information efficiently and accurately. One essential feature of specific learning disorder is persistent difficulties learning keystone academic skills (Criterion A), with onset during the years of formal schooling (i.e., the developmental period). Key academic skills include reading of single words accurately and fluently, reading comprehension, written expression and spelling, arithmetic calculation, and mathematical reasoning (solving mathematical problems). In contrast to talking or walking, which are acquired developmental milestones that emerge with brain maturation, academic skills (e.g., reading, spelling, writing, mathematics) have to be taught and learned explicitly. Specific learning disorder disrupts the normal pattern of learning academic skills; it is not simply a consequence of lack of opportunity of learning or inadequate instruction. Difficulties mastering these key academic skills may also impede learning in other academic subjects (e.g., history, science, social studies), but those problems are attributable to difficulties learning the underlying academic skills. Difficulties learning to map letters with the sounds of one’s language—to read printed words (often called dyslexia [specific learning disorder with impairment in reading])—is one of the most common manifestations of specific learning disorder. The learning difficulties manifest as a range of observable, descriptive behaviors or symptoms (as listed in Criteria A1–A6). These clinical symptoms may be observed, probed by means of the clinical interview, or ascertained from school reports, rating scales, or descriptions in previous educational or psychological assessments. The learning difficulties are persistent, not transitory. In children and adolescents, persistence is defined as restricted progress in learning (i.e., no evidence that the individual is catching up with classmates) for at least 6 months despite the provision of extra help at home or school. For example, difficulties learning to read single words that do not fully or rapidly remit with the

provision of instruction in phonological skills or word identification strategies may indicate a specific learning disorder. Evidence of persistent learning difficulties may be derived from cumulative school reports, portfolios of the child's evaluated work, curriculum-based measures, or clinical interview. In adults, persistent difficulty refers to ongoing difficulties in literacy or numeracy skills that manifest during childhood or adolescence, as indicated by cumulative evidence from school reports, evaluated portfolios of work, or previous assessments. A second key feature is that the individual's performance of the affected academic skills is well below expected for age (Criterion B). One robust clinical indicator of difficulties learning academic skills is low academic achievement for age or average achievement that is sustainable only by extraordinarily high levels of effort or support. In children, the low academic skills cause significant interference in school performance (as indicated by school reports and teacher's grades or ratings). Another clinical indicator, particularly in adults, is avoidance of activities that require the academic skills. Also in adulthood, low academic skills interfere with occupational performance or everyday activities requiring those skills (as indicated by self-report or report by others). However, this criterion also requires psychometric evidence from an individually

administered, psychometrically sound and culturally appropriate test of academic achievement that is norm-referenced or criterion-referenced. Academic skills are distributed along a continuum, so there is no natural cutpoint that can be used to differentiate individuals with and without specific learning disorder. Thus, any threshold used to specify what constitutes significantly low academic achievement (e.g., academic skills well below age expectation) is to a large extent arbitrary. Low achievement scores on one or more standardized tests or subtests within an academic domain (i.e., at least 1.5 standard deviations [SD] below the population mean for age, which translates to a standard score of 78 or less, which is below the 7th percentile) are needed for the greatest diagnostic certainty. However, precise scores will vary according to the particular standardized tests that are used. On the basis of clinical judgment, a more lenient threshold may be used (e.g., 1.0 SD below the population mean for age), when learning difficulties are supported by converging evidence from clinical assessment, academic history, school reports, or test scores. Moreover, since standardized tests are not available in all languages, the diagnosis may then be based in part on clinical judgment of scores on available test measures. A third core feature is that the learning difficulties are readily apparent in the early school years in most individuals (Criterion C). However, in others, the learning difficulties may not manifest fully until later school years, by which time learning demands have increased and exceed the individual's limited capacities. Another key diagnostic feature is that the learning difficulties are considered "specific" for four reasons. First, they are not better explained by intellectual developmental disorders (intellectual developmental disorder [intellectual disability]; global developmental delay); hearing or vision disorders; or neurological or motor disorders (Criterion D). Specific learning disorder affects learning in individuals who otherwise demonstrate normal levels of intellectual functioning (generally estimated by an IQ score of greater than about 70 [± 5 points allowing for measurement error]). The phrase "unexpected academic underachievement" is often cited as the defining characteristic of specific learning disorder in that the specific learning disabilities are not part of a more general learning difficulty as manifested in intellectual developmental disorder or global developmental delay. Second, the learning difficulty cannot be attributed to more general external factors, such as economic or environmental disadvantage, chronic absenteeism, or lack of education as typically provided in the individual's community context. Third, the learning difficulty cannot be attributed to neurological (e.g., pediatric stroke) or motor disorders or to vision or

hearing disorders, which are often associated with problems learning academic skills but are distinguishable by presence of neurological signs. Finally, the learning difficulty may be restricted to one academic skill or domain (e.g., reading single words, retrieving or calculating number facts). Specific learning disorder may also occur in individuals identified as intellectually “gifted.” These individuals may be able to sustain apparently adequate academic functioning by using compensatory strategies, extraordinarily high effort, or support, until the learning demands or assessment procedures (e.g., timed tests) pose barriers to their demonstrating their learning or accomplishing required tasks. In these cases, the individual’s achievement scores will be low

relative to ability level or achievement in other domains, rather than to the population mean for achievement. Comprehensive assessment is required. Specific learning disorder can only be diagnosed after formal education starts but can be diagnosed at any point afterward in children, adolescents, or adults, providing there is evidence of onset during the years of formal schooling (i.e., the developmental period). No single data source is sufficient for a diagnosis of specific learning disorder. Rather, specific learning disorder is a clinical diagnosis based on a synthesis of the individual’s medical, developmental, educational, and family history; the history of the learning difficulty, including its previous and current manifestation; the impact of the difficulty on academic, occupational, or social functioning; previous or current school reports; portfolios of work requiring academic skills; curriculum-based assessments; and previous or current scores from individual standardized tests of academic achievement. If an intellectual, sensory, neurological, or motor disorder is suspected, then the clinical assessment for specific learning disorder should also include methods appropriate for these disorders. Thus, comprehensive assessment will involve professionals with expertise in specific learning disorder and psychological/cognitive assessment. Since specific learning disorder typically persists into adulthood, reassessment is rarely necessary, unless indicated by marked changes in the learning difficulties (amelioration or worsening) or requested for specific purposes. Associated Features The symptoms of specific learning disorder (difficulty with aspects of reading, writing, or mathematics) frequently co-occur. An uneven profile of abilities is common, such as a combination of above-average abilities in drawing, design, and other visuospatial abilities, and slow, effortful, and inaccurate reading and poor reading comprehension and written expression. Specific learning disorder is frequently but not invariably preceded, in preschool years, by delays in attention, language, or motor skills that may persist and co-occur with specific learning disorder. Individuals with specific learning disorder typically (but not invariably) exhibit poor performance on psychological tests of cognitive processing. However, it remains unclear whether these cognitive abnormalities are the cause, correlate, or consequence of the learning difficulties. Cognitive deficits associated with difficulties learning to read words are well documented, and there is a burgeoning understanding of the cognitive deficits associated with difficulty acquiring mathematics skills, but cognitive deficits associated with other manifestations of specific learning disorder (e.g., reading comprehension, written expression) are underspecified. Although individual cognitive deficits particularly contribute to each specific learning disorder symptom, some cognitive deficits are shared across different specific learning disorder subtypes (e.g., processing speed) and may contribute to co-occurring symptoms of specific learning disorder. The co-occurring nature of the symptoms of specific learning disorder and the shared cognitive deficits across the specific learning disorder subtypes suggest shared underlying biological mechanisms. Thus, individuals with similar behavioral symptoms or test scores are found to have a variety

of cognitive deficits, and many of these processing deficits are also found in other neurodevelopmental disorders (e.g., attention-deficit/hyperactivity disorder [ADHD], autistic spectrum disorder, communication disorders, developmental coordination disorder). As a group, individuals with the disorder show circumscribed alterations in cognitive processing and brain structure and function. Genetic differences are also evident at the group level. However, cognitive testing, neuroimaging, or genetic testing are not useful for diagnosis at this time, and assessment of cognitive processing deficits is not required for diagnostic assessment. Prevalence The prevalence of specific learning disorder across the academic domains of reading, writing, and mathematics is 5%–15% among school-age children in Brazil, Northern Ireland, and the United States. Prevalence in adults is unknown. Development and Course Onset, recognition, and diagnosis of specific learning disorder usually occur during the elementary school years when children are required to learn to read, spell, write, and learn mathematics. However, precursors such as language delays or deficits, difficulties in rhyming or counting, or difficulties with fine motor skills required for writing commonly occur in early childhood before the start of formal schooling. Manifestations may be behavioral (e.g., a reluctance to engage in learning; oppositional behavior). Specific learning disorder is lifelong, but the course and clinical expression are variable, in part depending on the interactions among the task demands of the environment, the range and severity of the individual's learning difficulties, the individual's learning abilities, comorbidity, and the available support systems and intervention. Nonetheless, problems with reading fluency and comprehension, spelling, written expression, and numeracy skills in everyday life typically persist into adulthood. Changes in manifestation of symptoms occur with age, so that an individual may have a persistent or shifting array of learning difficulties across the lifespan. Adults with specific learning disorder appear to experience limitations and restrictions in activity and participation in domains of communication, interpersonal interactions and community, and social and civic life. Examples of symptoms that may be observed among preschool-age children include a lack of interest in playing games with language sounds (e.g., repetition, rhyming), and they may have trouble learning nursery rhymes. Preschool children with specific learning disorder may frequently use baby talk, mispronounce words, and have trouble remembering names of letters, numbers, or days of the week. They may fail to recognize letters in their own names and have trouble learning to count. Kindergarten-age children with specific learning disorder may be unable to recognize and write letters, may be unable to write their own names, or may have persistent use of invented spelling beyond developmentally typical time frames. They may have trouble breaking down spoken words into syllables (e.g., "cowboy" into "cow" and "boy") and trouble recognizing words that rhyme (e.g., cat, bat, hat). Kindergartenage children also may have trouble connecting letters with their sounds (e.g., letter b makes the sound /b/) and may be unable to recognize phonemes (e.g., do not know which in a set of words [e.g., dog, man, car] starts with the same sound as "cat").

Specific learning disorder in elementary school–age children typically manifests as marked difficulty learning letter-sound correspondence (particularly in English-speaking children), fluent word decoding, spelling, or math facts; reading aloud is slow, inaccurate, and effortful, and some children struggle to understand the magnitude that a spoken or written number represents. Children in primary grades (grades 1–3) may continue to have problems recognizing and manipulating phonemes, be unable to read common one-syllable words (such as mat or top), and be unable recognize common irregularly spelled words (e.g., said, two). They may commit reading errors that indicate problems in connecting sounds and letters (e.g., "big" for "got") and have

difficulty sequencing numbers and letters. Children in grades 1–3 also may have difficulty remembering number facts or arithmetic procedures for adding, subtracting, and so forth, and may complain that reading or arithmetic is hard and avoid doing it. Children with specific learning disorder in the middle grades (grades 4–6) may mispronounce or skip parts of long, multisyllable words (e.g., say “conible” for “convertible,” “aminal” for “animal”) and confuse words that sound alike (e.g., “tornado” for “volcano”). They may have trouble remembering dates, names, and telephone numbers and may have trouble completing homework or tests on time. Children in the middle grades also may have poor comprehension with or without slow, effortful, and inaccurate reading, and they may have trouble reading small function words (e.g., that, the, an, in). They may have very poor spelling and poor written work. They may get the first part of a word correctly, then guess wildly (e.g., read “clover” as “clock”), and may express fear of reading aloud or refuse to read aloud. By contrast, adolescents may have mastered word decoding, but reading remains slow and effortful, and they are likely to show marked problems in reading comprehension and written expression (including poor spelling) and poor mastery of math facts or mathematical problem solving. During adolescence and into adulthood, individuals with specific learning disorder may continue to make numerous spelling mistakes and read single words and connected text slowly and with much effort, with trouble pronouncing multisyllable words. They may frequently need to reread material to understand or get the main point and have trouble making inferences from written text. Adolescents and adults may avoid activities that demand reading or arithmetic (reading for pleasure, reading instructions). Adults with specific learning disorder have ongoing spelling problems, slow and effortful reading, or problems making important inferences from numerical information in work-related written documents. They may avoid both leisure and work-related activities that demand reading or writing or use alternative approaches to access print (e.g., text-to-speech/speech-to-text software, audiobooks, audiovisual media). An alternative clinical expression is that of circumscribed learning difficulties that persist across the lifespan, such as an inability to master the basic sense of number (e.g., to know which of a pair of numbers or dots represents the larger magnitude), or lack of proficiency in word identification or spelling. Avoidance of or reluctance to engage in activities requiring academic skills is common in children, adolescents, and adults. Individuals with poor reading and math skills are more likely to report socioemotional distress (e.g., sadness, loneliness) as they advance across elementary grade levels. Episodes of severe anxiety or anxiety disorders, including somatic complaints or panic attacks, are common across the lifespan and accompany both the circumscribed and the broader

Environmental. Genetic and physiological. Course modifiers. expression of learning difficulties. Risk and Prognostic Factors Environmental factors, including socioeconomic conditions (e.g., low socioeconomic status) and exposure to neurotoxicants, increase the risk for specific learning disorder or difficulties in reading and mathematics. Risks for specific learning disorder or difficulties in reading and mathematics include prenatal or early-life exposure to any of the following: air pollution, nicotine, polybrominated diphenyl ethers or polychlorinated biphenyls (flame retardants), lead, or manganese. Specific learning disorder appears to aggregate in families, particularly when affecting reading, mathematics, and spelling. The relative risk of specific learning disorder in reading or mathematics is substantially higher (e.g., 4–8 times and 5–10 times higher, respectively) in first-degree relatives of individuals with these learning difficulties compared with those without them. Notably, rates vary depending on method of ascertainment (objective testing or self-report) of parent diagnostic status. Family history of reading difficulties (dyslexia) and parental literacy skills predict literacy problems or specific learning disorder in offspring, indicating the combined

role of genetic and environmental factors. There is high heritability for both reading ability and reading disability in alphabetic and nonalphabetic languages, including high heritability for most manifestations of learning abilities and disabilities (e.g., heritability estimate values greater than 0.6). Covariation between various manifestations of learning difficulties is high, suggesting that genes related to one presentation are highly correlated with genes related to another manifestation. Preterm delivery or very low birthweight is a risk for specific learning disorder. In individuals with neurofibromatosis type 1, risk of specific learning disorder is high, with up to 75% of individuals demonstrating a learning disorder. Marked problems with inattentive, internalizing, and externalizing behaviors in preschool years are predictive of later difficulties in reading and mathematics (but not necessarily specific learning disorder) and nonresponse to effective academic interventions. Language impairment in preschool years is strongly associated with later impairment in reading (e.g., word reading, reading comprehension). For example, delay or disorders in speech or language, or impaired cognitive processing (e.g., phonological awareness, working memory, rapid serial naming), may predict later specific learning disorder in reading and in written expression. Additionally, a diagnosis of ADHD in childhood is associated with underachievement in reading and math in adulthood. Comorbidity with ADHD is predictive of worse mental health outcome than that associated with specific learning disorder without ADHD. Systematic, intensive, individualized instruction, using evidence-based interventions, may improve or ameliorate the learning difficulties in some individuals or promote the use of compensatory strategies in others, thereby mitigating the otherwise poor outcomes. Culture-Related Diagnostic Issues Specific learning disorder occurs across linguistic and ethnoracial backgrounds and across

cultural and socioeconomic contexts but may vary in its manifestation according to the nature of the spoken and written symbol systems and cultural and educational practices. For example, the cognitive processing requirements of reading and of working with numbers vary greatly across orthographies. In the English language, the observable hallmark clinical symptom of difficulties learning to read is inaccurate and slow reading of single words; in other alphabetic languages that have more direct mapping between sounds and letters (e.g., Spanish, German) and in nonalphabetic languages (e.g., Chinese, Japanese), the hallmark feature is slow but accurate reading. In English-language learners, assessment should include consideration of whether the source of reading difficulties is a limited proficiency with English or a specific learning disorder. Risk factors for specific learning disorder in English-language learners include a family history of specific learning disorder or language delay in the native language, as well as learning difficulties and deficits in phonological memory in English and failure to catch up with peers. If there is suspicion of cultural or language differences (e.g., that an English-language learner is influenced by limited English proficiency), the assessment needs to take into account the individual’s language proficiency in his or her first or native language as well as in the second language (in this example, English). Importantly, children who speak a language at home that differs phonologically from the language of academic instruction are not more likely to have phonological deficits than their peers who speak the same language at home and at school. Comorbid reading difficulties may vary with different languages; for example, reading difficulties are less frequent among Chinese-reading children with developmental coordination disorder in Taiwan compared with children in English-speaking countries, possibly because of the characteristics of the two written languages (logographic vs. alphabetic). Considerations in assessment may include the linguistic and cultural context in which the individual is living, as well as his or her educational and learning history in the original linguistic and cultural context. Risk factors for learning problems among refugee and

migrant children include teacher stereotyping and low expectations, bullying, ethnic and racialized discrimination, parental misunderstandings about educational styles and expectations, trauma, and postmigration stressors. Sex- and Gender-Related Diagnostic Issues Specific learning disorder is more common in males than in females (ratios range from about 2:1 to 3:1) and cannot be attributed to factors such as ascertainment bias, definitional or measurement variation, language, ethnoracial background, or socioeconomic status. Sex differences in dyslexia (specific learning disorder with impairment in reading) may be partially mediated by processing speed. Association With Suicidal Thoughts or Behavior In U.S. adolescents age 15 years in public school, poor reading ability was associated with suicidal thoughts and behavior compared with adolescents with typical reading scores, even when controlling for sociodemographic and psychiatric variables. In a population-based study of adults in Canada, prevalence of lifetime suicide attempts among those with specific learning disorder was higher than that among those without a specific learning disorder, even after

Normal variations in academic attainment. Intellectual developmental disorder (intellectual disability). Learning difficulties due to neurological or sensory disorders. Neurocognitive disorders. Attention-deficit/hyperactivity disorder. adjustment for childhood adversities, history of mental illness and substance use, and sociodemographic factors. Among those with specific learning disorder, a history of witnessing chronic parental domestic violence and ever having had a major depressive disorder were associated with increased risk for suicidal behavior. Functional Consequences of Specific Learning Disorder Specific learning disorder can have negative functional consequences across the lifespan, including lower academic attainment, higher rates of high school dropout, lower rates of postsecondary education, high levels of psychological distress and poorer overall mental health, higher rates of unemployment and underemployment, and lower incomes. School dropout and co-occurring depressive symptoms increase the risk for poor mental health outcomes, including suicidal thoughts or behavior, whereas high levels of social or emotional support predict better mental health outcomes. Differential Diagnosis Specific learning disorder is distinguished from normal variations in academic attainment attributable to external factors (e.g., lack of educational opportunity, consistently poor instruction, learning in a second language), because the learning difficulties persist in the presence of adequate educational opportunity and exposure to the same instruction as the peer group, and competency in the language of instruction, even when it is different from one’s primary spoken language. Specific learning disorder differs from general learning difficulties associated with intellectual developmental disorder, because the learning difficulties occur in the presence of normal levels of intellectual functioning (i.e., IQ score of at least 70 ± 5). If intellectual developmental disorder is present, specific learning disorder can be diagnosed only when the learning difficulties are in excess of those usually associated with the intellectual developmental disorder. Specific learning disorder is distinguished from learning difficulties due to neurological or sensory disorders (e.g., pediatric stroke, traumatic brain injury, hearing impairment, vision impairment), because in these cases there are abnormal findings on neurological examination. Specific learning disorder is distinguished from learning problems associated with neurodegenerative cognitive disorders. In specific learning disorder, the clinical expression of specific learning difficulties occurs during the developmental period, which sometimes only becomes evident when learning demands have increased and exceed the individual’s limited capacities (as may occur in adulthood), and the difficulties do not manifest as a marked decline from a former state. Specific learning disorder is distinguished from the poor academic performance associated with ADHD, because in the latter condition the

problems may not necessarily reflect specific difficulties in learning academic skills but rather may reflect difficulties in performing those skills. However, the co-occurrence of specific learning disorder

Psychotic disorders. F82 and ADHD is more frequent than expected by chance. If criteria for both disorders are met, both diagnoses can be given. Specific learning disorder is distinguished from the cognitive-processing difficulties associated with schizophrenia or other psychotic disorders, because with these disorders there is a decline (often rapid) in these functional domains. However, deficits in reading ability are more severe in specific learning disorder than what would be predicted by the general cognitive impairments associated with schizophrenia. If criteria for both disorders are met, both diagnoses can be given. Comorbidity The different types of specific learning disorder commonly co-occur with one another (e.g., specific learning disorder with impairment in mathematics and with impairment in reading) and with other neurodevelopmental disorders (e.g., ADHD, communication disorders, developmental coordination disorder, autism spectrum disorder) or other mental disorders (e.g., anxiety and depressive disorders) or behavioral problems. Notably, estimates of the comorbidity of math and reading difficulties vary depending on the tests used to define the math difficulty, likely because the same symptom (e.g., arithmetic problems) can be associated with different cognitive deficits (e.g., a deficit in language skills or a deficit in number processing). These comorbidities do not necessarily exclude the diagnosis of specific learning disorder but may make testing and differential diagnosis more difficult, because each of the co-occurring disorders independently interferes with the execution of activities of daily living, including learning. Thus, clinical judgment is required to attribute such impairment to learning difficulties. If there is an indication that another diagnosis could account for the difficulties learning keystone academic skills described in Criterion A, specific learning disorder should not be diagnosed. Motor Disorders Developmental Coordination Disorder Diagnostic Criteria A. The acquisition and execution of coordinated motor skills is substantially below that expected given the individual’s chronological age and opportunity for skill learning and use. Difficulties are manifested as clumsiness (e.g., dropping or bumping into objects) as well as slowness and inaccuracy of performance of motor skills (e.g., catching an object, using scissors or cutlery, handwriting, riding a bike, or participating in sports).

B. The motor skills deficit in Criterion A significantly and persistently interferes with activities of daily living appropriate to chronological age (e.g., self-care and selfmaintenance) and impacts academic/school productivity, prevocational and vocational activities, leisure, and play. C. Onset of symptoms is in the early developmental period. D. The motor skills deficits are not better explained by intellectual developmental disorder (intellectual disability) or visual impairment and are not attributable to a neurological condition affecting movement (e.g., cerebral palsy, muscular dystrophy, degenerative disorder). Diagnostic Features The diagnosis of developmental coordination disorder is made by a clinical synthesis of the history (developmental and medical), physical examination, school or workplace report, and individual assessment using psychometrically sound and culturally appropriate standardized tests. The manifestation of impaired skills requiring motor coordination (Criterion A) varies with age. Young children may be delayed in achieving motor milestones (i.e., sitting, crawling, walking), although many achieve typical motor milestones. They also may be delayed in developing skills such as negotiating stairs, pedaling, buttoning shirts, completing puzzles, and using zippers. Even when the skill is achieved, movement execution may appear awkward, slow, or less precise than that of peers. Older children

and adults may display slow speed or inaccuracy with motor aspects of activities such as assembling puzzles, building models, playing ball games (especially in teams), handwriting, typing, driving, or carrying out self-care skills. Developmental coordination disorder is diagnosed only if the impairment in motor skills significantly interferes with the performance of, or participation in, daily activities in family, social, school, or community life (Criterion B). Examples of such activities include getting dressed, eating meals with age-appropriate utensils and without mess, engaging in physical games with others, using specific tools in class such as rulers and scissors, and participating in team exercise activities at school. Not only is ability to perform these actions impaired, but also marked slowness in execution is common. Handwriting competence is frequently affected, consequently affecting legibility and/or speed of written output and affecting academic achievement (the impact is distinguished from specific learning difficulty by the emphasis on the motoric component of written output skills). In adults, everyday skills in education and work, especially those in which speed and accuracy are required, are affected by coordination problems. Criterion C states that the onset of symptoms of developmental coordination disorder must be in the early developmental period. However, developmental coordination disorder is typically not diagnosed before age 5 years because there is considerable variation in the age at acquisition of many motor skills or a lack of stability of measurement in early childhood (e.g., some children catch up) or because other causes of motor delay may not have fully manifested. Criterion D specifies that the diagnosis of developmental coordination disorder is made if the coordination difficulties are not better explained by visual impairment or attributable to a neurological condition. Thus, visual function examination and neurological examination must be included in the diagnostic evaluation. If intellectual developmental disorder (intellectual

Environmental. Genetic and physiological. disability) is present, the motor difficulties are in excess of those expected for the mental age; however, no IQ cutoff or discrepancy criterion is specified. Developmental coordination disorder does not have discrete subtypes; however, individuals may be impaired predominantly in gross motor skills or in fine motor skills, including handwriting skills. Other terms used to describe developmental coordination disorder include childhood dyspraxia, specific developmental disorder of motor function, and clumsy child syndrome. Associated Features Some children with developmental coordination disorder show additional (usually suppressed) motor activity, such as choreiform movements of unsupported limbs or mirror movements. These “overflow” movements are referred to as neurodevelopmental immaturities or neurological soft signs rather than neurological abnormalities. In both current literature and clinical practice, their role in diagnosis is still unclear, requiring further evaluation. Prevalence The prevalence of developmental coordination disorder in children ages 5–11 years ranges from 5% to 8% cross-nationally (in the United Kingdom, 1.8% of children age 7 years are diagnosed with severe developmental coordination disorder and 3% with probable developmental coordination disorder); and 7%–8% in Canada, Sweden, and Taiwan. Males are more often affected than females, with a male:female ratio between 2:1 and 7:1. Development and Course The course of developmental coordination disorder is variable but stable at least to 1-year and 2year follow-up. Although there may be improvement in the longer term, problems with coordinated movements continue through adolescence in an estimated 50%–70% of children. Onset is in early childhood. Delayed motor milestones may be the first signs, or the disorder is first recognized when the child attempts tasks such as holding a knife and fork, buttoning clothes, or playing ball games. In middle childhood, there are difficulties with motor aspects of assembling puzzles, building models, playing ball, and handwriting, as well as with organizing belongings, when motor sequencing and coordination are

required. In early adulthood, there is continuing difficulty in learning new tasks involving complex/automatic motor skills, including driving and using tools. Inability to take notes and handwrite quickly may affect performance in the workplace. Co-occurrence with other disorders (see the section “Comorbidity” for this disorder) has an additional impact on presentation, course, and outcome. Risk and Prognostic Factors Developmental coordination disorder is associated with prematurity and low birth weight and with prenatal exposure to alcohol. Impairments in underlying neurodevelopmental processes have been found in visual-motor skills, including both visual-motor perception and spatial mentalizing. Cerebellar dysfunction, which affects the ability to make rapid motoric adjustments as the

Course modifiers. Motor impairments due to another medical condition. Intellectual developmental disorder (intellectual disability). complexity of the required movements increases, may also be involved. However, the precise neural basis of developmental coordination disorder remains unclear. Because of the cooccurrence of developmental coordination disorder with other neurodevelopmental disorders, including attention-deficit/hyperactivity disorder (ADHD), specific learning disabilities, and autism spectrum disorder, shared genetic effect has been proposed. However, consistent cooccurrence in twins appears only in severe cases. Individuals with ADHD and with developmental coordination disorder demonstrate more impairment than individuals with ADHD without developmental coordination disorder. Culture-Related Diagnostic Issues Developmental coordination disorder occurs across cultural, ethnoracial, and socioeconomic contexts. At the same time, cultural variations in motor development (both accelerated and delayed relative to U.S. norms) have been reported. These appear to be associated with caregiving practices related to expectations of independent mobility during development, inadequate opportunities for mobility among children in severe poverty, and differences in measurement methodology. By definition, “activities of daily living” implies cultural differences necessitating consideration of the context in which the individual child is living as well as whether the child has had appropriate opportunities to learn and practice such activities. Higher prevalence of developmental coordination disorder in studies of children from some low- and middle-income countries may reflect the impact of socioeconomic disadvantage on motor development. Functional Consequences of Developmental Coordination Disorder Developmental coordination disorder leads to impaired functional performance in activities of daily living (Criterion B), and the impairment is increased with co-occurring conditions. Consequences of developmental coordination disorder include reduced participation in team play and sports; poor self-esteem and sense of self-worth; emotional or behavioral problems; impaired academic achievement; poor physical fitness; reduced physical activity and obesity; and poor health-related quality of life. Differential Diagnosis Problems in coordination may be associated with visual function impairment and specific neurological disorders (e.g., cerebral palsy, progressive lesions of the cerebellum, neuromuscular disorders). In such cases, there are additional findings on neurological examination. If intellectual developmental disorder is present, motor competences may be impaired in accordance with the intellectual disability. However, if the motor difficulties are in excess of what could be accounted for by the intellectual developmental disorder, and criteria for developmental coordination disorder are met, developmental coordination disorder can be diagnosed as well.

Attention-deficit/hyperactivity disorder. Autism spectrum disorder. Joint hypermobility syndrome. F98.4 Individuals with ADHD may fall, bump into objects, or knock things over. Careful observation across different contexts is required to ascertain if lack of motor competence is attributable to

distractibility and impulsiveness rather than to developmental coordination disorder. If criteria for both ADHD and developmental coordination disorder are met, both diagnoses can be given. Individuals with autism spectrum disorder may be uninterested in participating in tasks requiring complex coordination skills, such as ball sports, which will affect test performance and function but not reflect core motor competence. Co-occurrence of developmental coordination disorder and autism spectrum disorder is common. If criteria for both disorders are met, both diagnoses can be given. Individuals with syndromes causing hyperextensible joints (found on physical examination; often with a complaint of pain) may present with symptoms similar to those of developmental coordination disorder. Comorbidity Disorders that commonly co-occur with developmental coordination disorder include communication disorders; specific learning disorder (especially reading and writing); problems of inattention, including ADHD (the most frequent coexisting condition, with about 50% cooccurrence); autism spectrum disorder; disruptive and emotional behavior problems; and joint hypermobility syndrome. Different clusters of co-occurrence may be present (e.g., a cluster with severe reading disorders, fine motor problems, and handwriting problems; another cluster with impaired movement control and motor planning). Presence of other disorders does not exclude developmental coordination disorder but may make testing more difficult and may independently interfere with the execution of activities of daily living, thus requiring examiner judgment in ascribing impairment to motor skills. Stereotypic Movement Disorder Diagnostic Criteria A. Repetitive, seemingly driven, and apparently purposeless motor behavior (e.g., hand shaking or waving, body rocking, head banging, self-biting, hitting own body). B. The repetitive motor behavior interferes with social, academic, or other activities and may result in self-injury. C. Onset is in the early developmental period. D. The repetitive motor behavior is not attributable to the physiological effects of a substance or neurological condition and is not better explained by another neurodevelopmental or mental disorder (e.g., trichotillomania [hair-pulling disorder], obsessive-compulsive disorder).

Specify if: With self-injurious behavior (or behavior that would result in an injury if preventive measures were not used) Without self-injurious behavior Specify if: Associated with a known genetic or other medical condition, neurodevelopmental disorder, or environmental factor (e.g., Lesch-Nyhan syndrome, intellectual developmental disorder [intellectual disability], intrauterine alcohol exposure) Coding note: Use additional code to identify the associated genetic or other medical condition, neurodevelopmental disorder, or environmental factor. Specify current severity: Mild: Symptoms are easily suppressed by sensory stimulus or distraction. Moderate: Symptoms require explicit protective measures and behavioral modification. Severe: Continuous monitoring and protective measures are required to prevent serious injury. Recording Procedures For stereotypic movement disorder that is associated with a known genetic or other medical condition, neurodevelopmental disorder, or environmental factor, record stereotypic movement disorder associated with (name of condition, disorder, or factor) (e.g., stereotypic movement disorder associated with Lesch-Nyhan syndrome). Specifiers The severity of non-self-injurious stereotypic movements ranges from mild presentations that are easily suppressed by a sensory stimulus or distraction to continuous movements that markedly interfere with all activities of daily living. Self-injurious behaviors range in severity along various dimensions, including the frequency, impact on adaptive functioning, and severity of bodily injury (from mild bruising or erythema from hitting hand against body, to lacerations or amputation of digits, to retinal detachment from head banging). Diagnostic Features The essential feature of stereotypic movement disorder is repetitive, seemingly driven, and apparently purposeless motor behavior (Criterion A). These behaviors are

often rhythmical movements of the head, hands, or body without obvious adaptive function. The movements may or may not respond to efforts to stop them. Among typically developing children, the repetitive movements can usually be stopped when attention is directed to them or when the child is distracted from performing them. Among children with neurodevelopmental

disorders, the behaviors are typically less responsive to such efforts. In other cases, the individual demonstrates self-restraining behaviors (e.g., sitting on hands, wrapping arms in clothing, finding a protective device). The repertoire of behaviors is variable; each individual presents with his or her own individually patterned, “signature” behavior. Examples of non-self-injurious stereotypic movements include, but are not limited to, body rocking, bilateral flapping or rotating hand movements, flicking or fluttering fingers in front of the face, arm waving or flapping, and head nodding; mouth stretching is commonly seen in association with upper limb movements. Stereotyped self-injurious behaviors include, but are not limited to, repetitive head banging, face slapping, eye poking, and biting of hands, lips, or other body parts. Eye poking is particularly concerning; it occurs more frequently among children with visual impairment. Multiple movements may be combined (e.g., cocking the head, rocking the torso, waving a small string repetitively in front of the face). Stereotypic movements may occur many times during a day, lasting a few seconds to several minutes or longer. Frequency can vary from many occurrences in a single day to several weeks elapsing between episodes. The behaviors vary in context, occurring when the individual is engrossed in other activities, when excited, stressed, fatigued, or bored. Criterion A requires that the movements be “apparently” purposeless. However, some functions may be served by the movements. For example, stereotypic movements might reduce anxiety in response to external stressors. Criterion B requires that the stereotypic movements interfere with social, academic, or other activities and, in some children, may result in self-injury (or would if protective measures were not used). The presence or absence of self-injurious behavior should be indicated using the specifiers “with self-injurious behavior” or “without self-injurious behavior.” Onset of stereotypic movements is in the early developmental period (Criterion C). Criterion D requires that the repetitive, stereotyped behavior in stereotypic movement disorder is not attributable to the physiological effects of a substance or neurological condition and is not better explained by another neurodevelopmental or mental disorder. The presence of stereotypic movements may indicate an undetected neurodevelopmental problem, especially in children ages 1–3 years. Prevalence Simple stereotypic movements (e.g., rocking) are common in young typically developing children (e.g., 5%–19% in the United Kingdom and United States). Complex stereotypic movements are much less common (occurring in approximately 3%–4%). Between 4% and 16% of individuals with intellectual developmental disorder (intellectual disability) in samples from high-income countries engage in stereotypy and self-injury. The risk is greater in individuals with severe intellectual developmental disorder. Among individuals with intellectual developmental disorder living in residential facilities, 10%–15% may have stereotypic movement disorder with self-injury. Repetitive and restricted behaviors and interests may be risk markers for the onset of self-injury, aggression, and destruction in children with severe intellectual developmental disorder. Development and Course Stereotypic movements typically begin within the first 3 years of life. Simple stereotypic

Environmental. Genetic and physiological. Normal development. movements are common in infancy and may be involved in acquisition of motor mastery. In children who develop complex motor stereotypies, approximately 80% exhibit symptoms before age 24 months, 12% between 24

and 35 months, and 8% at 36 months or older. In most typically developing children, the severity and frequency of stereotyped movements diminish over time. Onset of complex motor stereotypies may be in infancy or later in the developmental period. Among individuals with intellectual developmental disorder, the stereotyped, self-injurious behaviors may persist for years, even though the typography or pattern of self-injury may change. Risk and Prognostic Factors Social isolation is a risk factor for self-stimulation that may progress to stereotypic movements with repetitive self-injury. Environmental stress may also trigger stereotypic behavior. Fear may alter physiological state, resulting in increased frequency of stereotypic behaviors. Stereotypic movement disorder is believed to be somewhat heritable based on the high frequency of cases that have a positive family history of motor stereotypies. Significant reduction in the putamen volume in children with stereotypies suggests that distinct cortical-striatal pathways associated with habitual behaviors (i.e., premotor to posterior putamen circuits) may be the underlying anatomical site in complex motor stereotypies. Lower cognitive functioning is linked to greater risk for stereotypic behaviors and poorer response to interventions. Stereotypic movements are more frequent among individuals with moderate-tosevere/profound intellectual developmental disorder, who by virtue of a particular syndrome (e.g., Rett syndrome) or environmental factor (e.g., an environment with relatively insufficient stimulation) seem to be at higher risk for stereotypies. Repetitive self-injurious behavior may be a behavioral phenotype in neurogenetic syndromes. For example, in Lesch-Nyhan syndrome, there are both stereotypic dystonic movements and self-mutilation of fingers, lip biting, and other forms of self-injury unless the individual is restrained, and in Rett syndrome and Cornelia de Lange syndrome, self-injury may result from the hand-to-mouth stereotypies. Stereotypic behaviors may also result from a painful medical condition (e.g., middle ear infection, dental problems, gastroesophageal reflux). Culture-Related Diagnostic Issues Stereotypic repetitive behaviors, with or without self-injury, variedly manifest in many cultures. Cultural attitudes toward unusual behaviors may result in delayed diagnosis. Overall cultural tolerance and attitudes toward stereotypic movement vary and must be considered. Differential Diagnosis Simple stereotypic movements are common in infancy and early childhood. Rocking may occur in the transition from sleep to awake, a behavior that usually resolves with age. Complex stereotypies are less common in typically developing children and can usually be suppressed by distraction or sensory stimulation. The individual’s daily routine is rarely affected,

Autism spectrum disorder. Tic disorders. Obsessive-compulsive and related disorders. Other neurological and medical conditions. and the movements generally do not cause the child distress. The diagnosis would not be appropriate in these circumstances. Stereotypic movements may be a presenting symptom of autism spectrum disorder and should be considered when repetitive movements and behaviors are being evaluated. Deficits of social communication and reciprocity manifesting in autism spectrum disorder are generally absent in stereotypic movement disorder, and thus social interaction, social communication, and rigid repetitive behaviors and interests are distinguishing features. When autism spectrum disorder is present, stereotypic movement disorder is diagnosed only when there is self-injury or when the stereotypic behaviors are sufficiently severe to become a focus of treatment. Typically, stereotypies have an earlier age at onset (before 3 years) than do tics, which have a mean age at onset of 4–6 years. They also are consistent and fixed in their pattern or topography compared with tics, which are variable in their presentation, typically changing in character over time. Stereotypies may involve arms, hands, or the entire body, while tics commonly involve eyes, face, head, and shoulders. Stereotypies are more fixed, rhythmic, and prolonged in duration than tics, which, generally, are brief, rapid, random, and

fluctuating. Stereotypies are ego-syntonic (children enjoy them) as opposed to tics, which are usually ego-dystonic. Tics wax and wane in location and time and are uniquely associated with premonitory urge (a physical feeling that precedes many tic movements). Tics and stereotypic movements are both reduced by distraction. Stereotypic movement disorder is distinguished from obsessive-compulsive disorder (OCD) by the absence of obsessions, as well as by the nature of the repetitive behaviors. In OCD the individual feels driven to perform repetitive behaviors in response to an obsession or according to rules that must be applied rigidly, whereas in stereotypic movement disorder the behaviors are seemingly driven but apparently purposeless. Trichotillomania (hair-pulling disorder) and excoriation (skin-picking) disorder are characterized by body-focused repetitive behaviors (i.e., hair pulling and skin picking) that may be seemingly driven but that are not apparently purposeless, and that may not be patterned or rhythmical. Furthermore, onset in trichotillomania and excoriation disorder is not typically in the early developmental period, but rather around puberty or later. The diagnosis of stereotypic movements requires the exclusion of habits, mannerisms, paroxysmal dyskinesias, and benign hereditary chorea. A neurological history and examination are required to assess features suggestive of other disorders, such as myoclonus, dystonia, tics, and chorea. Involuntary movements associated with a neurological condition may be distinguished by their signs and symptoms. For example, repetitive, stereotypic movements in tardive dyskinesia can be distinguished by a history of chronic neuroleptic use and characteristic oral or facial dyskinesia or irregular trunk or limb movements. These types of movements do not result in self-injury. Stereotypies are a common manifestation of a variety of neurogenetic disorders, such as Lesch-Nyhan syndrome, Rett syndrome, fragile X syndrome, Cornelia de Lange syndrome, and Smith-Magenis syndrome. For stereotypic movement disorder that is associated with a known genetic or other medical

Substance-induced repetitive behaviors. Functional (conversion) stereotypies. F95.2 F95.1 condition, neurodevelopmental disorder, or environmental factor, record stereotypic movement disorder associated with (name of condition, disorder, or factor) (e.g., stereotypic movement disorder associated with Lesch-Nyhan syndrome). A diagnosis of stereotypic movement disorder is not appropriate for repetitive skin picking or scratching associated with amphetamine intoxication or abuse. In such cases, the diagnosis substance/medication-induced obsessive-compulsive and related disorder would apply. Stereotyped movements must be distinguished from functional (conversion) movements. Sudden onset, distractibility, changing pattern with unexplained improvement or aggravation, and the coexistence of other symptoms of functional neurological symptom disorder (conversion disorder) are some of the typical features that help identify functional stereotypies. Comorbidity Common comorbidities in children with chronic motor stereotypies include attention-deficit hyperactivity disorder, motor coordination problems, tics/Tourette’s disorder, and anxiety. Tic Disorders Diagnostic Criteria Note: A tic is a sudden, rapid, recurrent, nonrhythmic motor movement or vocalization. Tourette’s Disorder A. Both multiple motor and one or more vocal tics have been present at some time during the illness, although not necessarily concurrently. B. The tics may wax and wane in frequency but have persisted for more than 1 year since first tic onset. C. Onset is before age 18 years. D. The disturbance is not attributable to the physiological effects of a substance (e.g., cocaine) or another medical condition (e.g., Huntington’s disease, postviral encephalitis). Persistent (Chronic) Motor or Vocal Tic Disorder A. Single or multiple motor or vocal tics have been present during the illness, but not both motor and vocal. B. The tics may wax and wane in frequency but have persisted for more than 1 year since first tic onset.

F95.0 C. Onset is before age 18 years. D. The disturbance is not attributable to the physiological effects of a substance (e.g., cocaine) or another medical condition (e.g., Huntington’s disease, postviral encephalitis). E. Criteria have never been met for Tourette’s disorder. Specify if: With motor tics only With vocal tics only Provisional Tic Disorder A. Single or multiple motor and/or vocal tics. B. The tics have been present for less than 1 year since first tic onset. C. Onset is before age 18 years. D. The disturbance is not attributable to the physiological effects of a substance (e.g., cocaine) or another medical condition (e.g., Huntington’s disease, postviral encephalitis). E. Criteria have never been met for Tourette’s disorder or persistent (chronic) motor or vocal tic disorder. Specifiers The “motor tics only” or “vocal tics only” specifier is only required for persistent (chronic) motor or vocal tic disorder. Diagnostic Features Tic disorders comprise five diagnostic categories: Tourette’s disorder, persistent (chronic) motor or vocal tic disorder, provisional tic disorder, and the other specified and unspecified tic disorders. Diagnosis for any of the specific tic disorders is based on the presence of motor and/or vocal tics (Criterion A), duration of tics (Criterion B), age at onset (Criterion C), and absence of any known cause such as another medical condition or substance use (Criterion D). The tic disorder diagnoses are hierarchical in order (i.e., Tourette’s disorder, followed by persistent [chronic] motor or vocal tic disorder, followed by provisional tic disorder, followed by the other specified and unspecified tic disorders). Once a tic disorder at one level of the hierarchy is diagnosed, a lower hierarchy diagnosis cannot be made (Criterion E). Tics are typically sudden, rapid, recurrent, nonrhythmic motor movements or vocalizations. Some motor tics can be slower twisting or tightening movements that occur over varying lengths of time. An individual may exhibit various tics over time, but, at any point in time, the tic repertoire may recur in a characteristic fashion. Although tics can include almost any muscle group or vocalization, certain tics, such as eye blinking or throat clearing, are common across

patient populations. There is often a localized uncomfortable sensation (premonitory sensation) prior to a tic, and most individuals report an “urge” to tic. Consequently, tics are generally experienced as involuntary, but some tics can be voluntarily suppressed for varying lengths of time. Explicit discussion of tics can serve as a trigger. Likewise, observing a gesture or sound in another person may result in an individual with a tic disorder making a similar gesture or sound, which may be incorrectly perceived by others as purposeful. This can be particularly problematic when the individual is interacting with authority figures who do not have an adequate understanding of tic disorders (e.g., teachers, supervisors, police). Tics are classically categorized as either simple or complex. Simple motor tics are characterized by the limited involvement of specific muscle groups, often are of short duration, and can include eye blinks, facial grimaces, shoulder shrugs, or extension of the extremities. Simple vocal tics include throat clearing, sniffs, chirps, barks, or grunting often caused by contraction of the diaphragm or muscles of the oropharynx. Complex motor tics are of longer duration and often include a combination of simple tics such as simultaneous head turning and shoulder shrugging. Complex tics can appear purposeful, such as head gestures or torso movements. They can also include imitations of someone else’s movements (echopraxia) or sexual or taboo gestures (copropraxia). Similarly, complex vocal tics have linguistic meaning (words or partial words) and can include repeating one’s own sounds or words (palilalia), repeating the last-heard word or phrase (echolalia), or uttering socially unacceptable words, including obscenities, or ethnic, racial, or religious slurs (coprolalia). Importantly, coprolalia is an abrupt, sharp bark or grunt utterance and lacks the prosody of similar inappropriate speech observed in human interactions. The presence of motor and/or vocal tics varies across the five tic disorders (Criterion A). For Tourette’s disorder, both

motor and vocal tics must be present (though not necessarily concurrently), whereas for persistent (chronic) motor or vocal tic disorder, only motor or only vocal tics are present. For provisional tic disorder, motor and/or vocal tics may be present. For other specified or unspecified tic disorders, the tics or tic-like symptoms are best characterized as tics but are atypical in presentation or age at onset, or have a known etiology. The 1-year minimum duration criterion (Criterion B) assures that individuals diagnosed with either Tourette's disorder or persistent (chronic) motor or vocal tic disorder have had persistent symptoms. Tics wax and wane in severity, and some individuals may have tic-free intervals of weeks to months; however, an individual who has had tics of greater than 1 year's duration since first tic onset would be considered to have persistent symptoms regardless of intermittent tic-free periods. For an individual with motor and/or vocal tics for less than 1 year since first tic onset, a provisional tic disorder diagnosis can be considered. The onset of tics must occur prior to age 18 years (Criterion C). Tic disorders typically begin in the prepubertal period, with an average age at onset between 4 and 6 years, and with the incidence of first-onset tic disorders decreasing in the later teen years. First onset of tics in adulthood is exceedingly rare and is often associated with exposures to illicit substances (e.g., excessive cocaine use), is the result of a central nervous system insult, or is related to a functional neurological disorder. Although first onset of tics is uncommon in teenagers and adults, it is not uncommon for adolescents and adults to present for an initial diagnostic assessment and, when carefully evaluated, provide a history of milder tics dating

95 back to childhood, even if earlier phases of development included tic-free periods of months or years. First-onset abnormal movements suggestive of tics that occur outside of the usual age range should result in evaluation for other movement disorders, including functional tic-like complex movements or vocalizations. Tics cannot be attributable to the physiological effects of a substance or another medical condition (Criterion D). When there is strong evidence from the history, physical examination, and/or laboratory results to suggest a plausible, proximal, and probable cause for a tic disorder, a diagnosis of other specified tic disorder should be used. Having previously met diagnostic criteria for Tourette's disorder negates a possible diagnosis of persistent (chronic) motor or vocal tic disorder (Criterion E). Similarly, a previous diagnosis of persistent (chronic) motor or vocal tic disorder negates a diagnosis of provisional tic disorder or other specified or unspecified tic disorder (Criterion E). Prevalence Tics are common in childhood but transient in most cases. A national survey in the United States estimated 3 per 1,000 for the prevalence of clinically identified cases. The frequency of identified cases was lower among African Americans and Latinx individuals, which may be related to differences in access to care. The estimated prevalence of Tourette's disorder in Canada ranges from 3 to 9 per 1,000 in school-age children. Globally, males are more commonly affected than females, with the ratio varying from 2:1 to 4:1. Epidemiological studies have shown tics to be present in children from all continents, but exact prevalence rates are influenced by methodological differences in research. Development and Course First onset of tics is typically between ages 4 and 6 years. Eye blinking is highly characteristic as an initial symptom. Peak severity occurs between ages 10 and 12 years, with a decline in severity during adolescence. Many adults with tic disorders experience diminished symptoms. However, a percentage of individuals will have persistently severe or worsening symptoms in adulthood. Tics manifest similarly in all age groups and across the lifespan. Tics wax and wane in severity (frequency and intensity) and over time change with regard to the affected muscle groups and nature of vocalizations. Many individuals, including young children, report that their tics are associated with a localized bodily sensation preceding the tic and a premonitory urge to move. It

can be difficult to find words to describe these premonitory sensations and urges. Tics associated with a premonitory urge may be experienced as not completely “involuntary” in that the urge and the tic can be resisted. An individual may also feel the need to perform a tic repeatedly or in a specific way until the individual feels that the tic has been done “just right.” Often there is a feeling of relief and tension reduction following the expression of the tic or a series of tics. The vulnerability toward developing co-occurring conditions changes as individuals pass through the age of risk for various co-occurring conditions. For example, prepubertal children with tic disorders are more likely to exhibit co-occurring attention-deficit/hyperactivity disorder (ADHD), obsessive-compulsive disorder (OCD), and separation anxiety disorder. Teenagers and adults are more vulnerable to developing mood and anxiety disorders as well as substance use

Environmental. Genetic and physiological. Course modifiers. disorders. Risk and Prognostic Factors Early in brain development, a number of environmental risk factors have been identified, including advanced paternal age as well as pre- and perinatal adverse events (e.g., impaired fetal growth, maternal intrapartum fever, maternal smoking, severe maternal psychosocial stress, preterm birth, breech presentation, and cesarean delivery). Genetic factors influence tic expression and severity. The heritability of tic disorders is estimated to be 70%–85%, and there are no differences in familial risk or heritability between males and females. Important risk alleles for Tourette’s disorder and rare genetic variants in families with tic disorders have been identified. Common genetic variants have also been identified. They are shared across tic disorders in a graded fashion that correlates with disease severity. Indeed, tic disorders likely exist along a continuous developmental spectrum, based on both their phenomenology and their genetic background. Chronic tic disorders have shared genetic variance with OCD, ADHD, and other neurodevelopmental disorders, including autism spectrum disorder. In addition, individuals with tic disorders are at increased risk to develop an autoimmune disorder (e.g., Hashimoto’s thyroiditis). It is increasingly evident that the immune system and neuroinflammation play important roles in the pathobiology of tics in at least a subset of affected individuals (e.g., those with Sydenham's chorea). However, more work is needed to understand the biobehavioral underpinnings and the potential causative role of infections for other neuropsychiatric conditions, including pediatric acute-onset neuropsychiatric syndrome and pediatric autoimmune neuropsychiatric disorder associated with streptococcal infections. Tics are increased by anxiety, excitement, and exhaustion and are better during calm, focused activities. For example, many individuals typically have fewer tics when engaged in tasks that require focused attention and motor control. Stressful/exciting events (e.g., taking a test, participating in exciting activities) often make tics worse. Culture-Related Diagnostic Issues Tic disorders do not appear to vary in clinical characteristics, course, or etiology by ethnic, racialized, and cultural background, but these backgrounds may affect how tic disorders are perceived and managed in the family and community, influencing patterns of help seeking and choices of treatment, such as age at presentation at specialty services. For example, preferred social distance from individuals with tic disorders (e.g., when working or studying together) was greater in a Korean sample than in U.S. studies. Sex- and Gender-Related Diagnostic Issues Males are more commonly affected than females, but there are no sex differences in the kinds of tics, age at onset, or course. Women with persistent tic disorders may be more likely to experience anxiety and depression. Association With Suicidal Thoughts or Behavior

Abnormal movements that may accompany other medical conditions, including other movement disorders. Paroxysmal dyskinesias. A matched case-cohort study in Sweden from 1969 to 2013

demonstrated that individuals with Tourette's disorder or persistent (chronic) motor or vocal tic disorder have a substantially increased risk of suicide attempts (odds ratio 3.86) and suicide death (odds ratio 4.39), even after adjustment for psychiatric comorbidities, compared with matched general population control subjects. Persistence of tics after young adulthood and a prior suicide attempt were the strongest predictors of suicide death. Case-control data suggest that about 1 in 10 youth with persistent (chronic) motor or vocal tic disorder has suicidal thoughts and/or behaviors, particularly in the context of anger/frustration and associated with anxiety/depression, social problems or withdrawal, aggression and internalizing problems, tic severity, and related impairment. Functional Consequences of Tic Disorders Many individuals with mild to moderate tic severity experience no distress or impairment in functioning and may even be unaware of their tics. Individuals with more severe symptoms generally have more impairment in daily living, but even individuals with moderate or even severe tic disorders may function well. The presence of a co-occurring condition, such as ADHD or OCD, can have greater impact on functioning than the tics themselves. Less commonly, tics disrupt functioning in daily activities and result in social isolation, interpersonal conflict, peer victimization, inability to work or to go to school, and lower quality of life. Often individuals with tics have difficulty focusing their attention on work-related tasks while they are actively trying to suppress their tics. The individual also may experience substantial psychological distress and even suicidal thoughts. Rare complications of Tourette's disorder include physical injury, such as eye injury (from hitting oneself in the face), and orthopedic and neurological injury (e.g., disc disease related to forceful head and neck movements). Differential Diagnosis Motor stereotypies are defined as involuntary rhythmic, repetitive, predictable movements that appear purposeful but serve no obvious adaptive function. They are often self-soothing or pleasurable and stop with distraction. Examples include repetitive hand waving/rotating, arm flapping, and finger wiggling. Motor stereotypies can usually be differentiated from tics based on the former's earlier age at onset (often younger than 3 years), prolonged duration (seconds to minutes), being repetitive and rhythmic in form and location, lacking a premonitory sensation or urge, and cessation with distraction (e.g., hearing name called or being touched). Chorea represents rapid, random, continual, abrupt, irregular, unpredictable, nonstereotyped actions that are usually bilateral and affect all parts of the body (i.e., face, trunk, and limbs). The timing, direction, and distribution of movements vary from moment to moment, and movements usually worsen during attempted voluntary action. Dystonia is the simultaneous sustained contraction of both agonist and antagonist muscles, resulting in a distorted posture or movement of parts of the body. Dystonic postures are often triggered by attempts at voluntary movements and are not seen during sleep. Paroxysmal dyskinesias are characterized by episodic involuntary

Myoclonus. Obsessive-compulsive and related disorders. Functional tic disorder. dystonic or choreoathetoid movements that are precipitated by voluntary movement or exertion and less commonly arise from normal background activity. Myoclonus is characterized by a sudden unidirectional movement that is often nonrhythmic. It may be worsened by movement and occur during sleep. Myoclonus is differentiated from tics by its rapidity, lack of suppressibility, and absence of a premonitory sensation or urge. Differentiating compulsions in OCD from complex tics may be difficult, especially because they frequently co-occur in the same individual. The compulsions of OCD are aimed at preventing or reducing anxiety or distress and are usually performed in response to an obsession (e.g., fear of contamination). In contrast, many individuals with a tic disorder feel the need to perform the action in a particular fashion, equally on both sides

of the body a certain number of times or until a “just right” feeling is achieved. Bodyfocused repetitive behavior disorders (i.e., persistent hair-pulling, skin-picking, nail-biting) are more goal-directed and complex than tics. Functional disorders should also be considered when an individual presents with “tic attacks” that can go on for extended periods of time lasting from 15 minutes to several hours. Comorbidity Many medical and psychiatric conditions have been described as co-occurring with tic disorders, and ADHD, disruptive behavior, and OCD and related disorders are particularly common. Children with ADHD may demonstrate disruptive behavior, social immaturity, and learning difficulties that may interfere with academic progress and interpersonal relationships and lead to greater impairment than that caused by a tic disorder. The obsessive-compulsive symptoms observed in tic disorders tend to have an earlier age at onset and often are characterized by a need for symmetry and exactness and/or forbidden or taboo thoughts (e.g., aggressive, sexual, or religious obsessions and related compulsions). Individuals with tic disorders can also have other movement disorders (e.g., Sydenham’s chorea, stereotypic movement disorder) and other neurodevelopmental and psychiatric conditions, such as autism spectrum disorder and specific learning disorder. As noted earlier, teenagers and adults with a tic disorder are at increased risk for developing a mood, anxiety, or substance use disorder. Other Specified Tic Disorder F95.8 This category applies to presentations in which symptoms characteristic of a tic disorder that cause clinically significant distress or impairment in social, occupational, or other important areas of functioning predominate but do not meet the full criteria for a tic disorder or any of the disorders in the neurodevelopmental

disorders diagnostic class. The other specified tic disorder category is used in situations in which the clinician chooses to communicate the specific reason that the presentation does not meet the criteria for a tic disorder or any specific neurodevelopmental disorder. This is done by recording “other specified tic disorder” followed by the specific reason (e.g., “with onset after age 18 years”). Unspecified Tic Disorder F95.9 This category applies to presentations in which symptoms characteristic of a tic disorder that cause clinically significant distress or impairment in social, occupational, or other important areas of functioning predominate but do not meet the full criteria for a tic disorder or for any of the disorders in the neurodevelopmental disorders diagnostic class. The unspecified tic disorder category is used in situations in which the clinician chooses not to specify the reason that the criteria are not met for a tic disorder or for a specific neurodevelopmental disorder and includes presentations in which there is insufficient information to make a more specific diagnosis. Other Neurodevelopmental Disorders Other Specified Neurodevelopmental Disorder F88 This category applies to presentations in which symptoms characteristic of a neurodevelopmental disorder that cause impairment in social, occupational, or other important areas of functioning predominate but do not meet the full criteria for any of the disorders in the neurodevelopmental disorders diagnostic class. The other specified neurodevelopmental disorder category is used in situations in which the clinician chooses to communicate the specific reason that the presentation does not meet the criteria for any specific neurodevelopmental disorder. This is done by recording “other specified neurodevelopmental disorder” followed by the specific reason (e.g., “neurodevelopmental disorder associated with prenatal alcohol exposure”). An example of a presentation that can be specified using the “other specified” designation is the following:

Neurodevelopmental disorder associated with prenatal alcohol exposure: Neurodevelopmental disorder associated with prenatal alcohol exposure is characterized by a range of developmental disabilities following exposure to alcohol in utero. Unspecified Neurodevelopmental Disorder F89

This category applies to presentations in which symptoms characteristic of a neurodevelopmental disorder that cause impairment in social, occupational, or other important areas of functioning predominate but do not meet the full criteria for any of the disorders in the neurodevelopmental disorders diagnostic class. The unspecified neurodevelopmental disorder category is used in situations in which the clinician chooses not to specify the reason that the criteria are not met for a specific neurodevelopmental disorder and includes presentations in which there is insufficient information to make a more specific diagnosis (e.g., in emergency room settings).

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