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Disabilities Associated with Autism Spectrum Disorders

Luke was born prematurely, had infantile spasms, and experienced bleeding inside his brain that produced damage to his frontal cortex. He also has a high-functioning austism spectrum disorder (ASD). Everyone likes Luke. He is exceptionally verbal, funny, and enjoyable. Luke had been told that I was coming to visit him and his parents, so he was expecting me. Luke answered the door when I rang the doorbell and greeted me with, "Hi, Travis, did you come to fix our toilet?" Apparently, the family's upstairs toilet was broken, and Luke reasoned that I must have come to repair it. I told him that I'd send one of my helpers to fix the toilet later, but that I was there to visit with him. That episode was typical of Luke. He is very socially curious and outgoing, but sometimes a bit off the mark.

Luke has very poor social judgment and limited impulse control. He occasionally blurts out profanity for no apparent reason and has periodic unprovoked behavioral outbursts. His neurologist diagnosed Luke as having frontal lobe seizures, for which he is treated with anti-epileptic medication. He is an example of a youngster with comorbid conditions: an ASD, epilepsy, and frontal lobe syndrome.

DISABILITIES COMMONLY ASSOCIATED WITH ASDs

An ASD is a concurrent condition in numerous developmental disabilities, which means that the child presents a combination of features of both disabilities. This is referred to as *syndromal autism.* Parents and teachers often wonder how that can be possible. They assume that a child either has fragile X syndrome or an ASD, not both. A variety of developmental problems can damage some of the same brain structures that are dysfunctional in autism to varying degrees. In a study of the two major types of ASDs, Miles and colleagues (2005) found that children and youth diagnosed with an ASD who

also had a known genetic syndrome (e.g., de Lange syndrome) all fell within the category of complex ASD—those with dysmorphic features and/or lower intellectual functioning, who are more likely to exhibit brain differences on MRI evaluation than children with familial autism. Children with the familial form of ASDs usually have only a single disability (the ASD).

Fragile X Syndrome

Fragile X syndrome is the most common inherited cause of intellectual disability, as well as the most common known cause of ASD. Features usually include intellectual disability, ranging from learning disabilities to severe cognitive disability; an attention-deficit/hyperactivity disorder (ADHD); anxiety and unstable moods; autistic behaviors; and a long face, large ears, flat feet, and hyperextensible joints, especially fingers. Seizures (epilepsy) affect about 25% of people with fragile X. Boys are typically more severely affected than girls. Although most affected boys have intellectual disability, only one third to one half of affected girls have significant intellectual deficit; the rest have either a normal IQ or learning disabilities. Emotional and behavioral problems are common in both sexes.

About 20% of boys with fragile X meet full criteria for ASD. Most boys and some girls have some symptoms of ASD, but many tend to be very social and interested in other people. Those who also have an ASD are exceedingly shy, anxious, and exhibit repetitive behavior typical of ASDs. They often seem over-aroused and are prone to engaging in self-injury. Medications to reduce excessive arousal (e.g., Inderal, [propranolol], Tenormin [atenolol]) sometimes help manage their anxiety. Behavioral and education treatments used with other children with ASDs are also useful in children with fragile X syndrome—especially those that begin with the recognition that the child's compulsive routines are anxiety-driven and he or she is not being willfully disobedient.

In 1991, scientists discovered the gene called fragile X mental retardation–1 (FMR1) that causes fragile X syndrome. The FMR1 gene is located on the long arm of the X chromosome. Within this gene lies a region of DNA that varies in length from one person to another. Usually, the stretch of DNA falls within a range of length that would be considered "normal." In some people, however, the stretch of DNA is somewhat longer; this gene change is called a *permutation.* Although a person who carries the permutation does not usually have symptoms of fragile X, the stretch of DNA is prone to further expansion when it is passed from a mother to her children.

When the stretch of DNA expands beyond a certain length, the gene is switched off and does not produce the protein that it is normally makes. This gene change is called a *full mutation.* A boy who inherits a full mutation exhibits fragile X syndrome because his only X chromosome contains the

mutated gene. A female may not be as severely affected because each cell of her body needs to use only one of its two X chromosomes and randomly inactivates the other. The Fragile X Research Foundation web site, http://www.fraxa.org, is an excellent resource for more information on this syndrome.

Dyslexia

It is becoming increasingly clear that there is a link between speech and language disabilities and ASDs. Miniscalco et al. (2006) studied a community sample of children identified with a language disorder at 6 years of age and followed them for a year. Detailed test results at age 7 years were available for 21 of the children. Thirteen of the 21 children (62%) had an ASD, atypical autism, Asperger syndrome, ADHD, or combinations of these conditions.

Dyslexia is a specific learning disability that is neurological in origin. It is characterized by difficulties with accurate and/or fluent word recognition, by poor spelling, and by decoding abilities. These difficulties typically result from an impairment in the phonological component of language. Secondary consequences may include problems in reading comprehension and reduced reading experience that can impede growth of vocabulary and background knowledge (National Reading Panel, 1998). Individuals with dyslexia process language information in an area of the brain that is different from the area of the brain individuals without dyslexia process that information. Many people who are dyslexic are of average to above average intelligence. Some people have referred to ASD as the most extreme form of dyslexia, but that is inaccurate. Although nearly all children with ASDs have language and reading problems, they also have social relationship difficulties and engage in repetitive routines that are unlike the behavior of children with dyslexia. Children with dyslexia have typical social relationships and do not engage in repetitive stereotyped routines. Some children with ASDs have reading difficulties and phonological processing problems similar to those seen in children with dyslexia and respond to the same phonetic reading strategies as children with dyslexia.

A very small percentage of children with ASDs exhibit exceptional verbal skills. Silberberg and Silberberg (1968–1969) defined the term *hyperlexia* to describe children who read at levels beyond those expected for their mental age in the face of disordered oral communication. Many parents and teachers are confused by hyperlexia, assuming it means exceptional intellectual ability. It usually does not. Most children who exhibit hyperlexia can read words and sentences early and beyond their age levels, but their comprehension is usually closer to their mental age or below. Turkeltaub et al. (2004) stated that there are three consistent features of hyperlexia:

1. The presence of a developmental disorder of communication, most often an autistic spectrum disorder

2. Acquisition of reading skills prior to age 5 without explicit instruction
3. Advanced word recognition ability relative to mental age, with reading comprehension on par with verbal ability

Prader-Willi Syndrome

Prader-Willi syndrome (PWS) is a developmental disability caused by the deletion of a section of Chromosome 15 or two copies of Chromosome 15 from their mother and none from their father. Very occasionally, other chromosomal abnormalities cause milder forms of PWS. It occurs in approximately one in 12,000 to 15,000 births. Children with PWS are distinguished by a voracious appetite, short stature, low metabolic rate, and resulting obesity. Their average IQ is 65. Approximately 15% of children with PWS also meet the diagnostic criteria for ASD. Although children with PWS are usually socially interested, they are poor at understanding others' perspectives, engage in compulsive routines similar to those seen in ASD, and are intolerant of changes in daily routines. When their expected routines are disrupted, the children exhibit tantrums. Approximately 85% of children with PWS display an unusual form of self-injury (skin picking), with onset before 5 years of age for most children (Dimitropoulos et al., 2001; Symons et al., 1999; Thompson & Butler, 2004). Educational and behavioral interventions directed at their compulsive routines are similar to those for children with ASDs (Dykens, Hodapp, & Finucane, 2000). Some parents are strongly opposed to using food reinforcement in behavioral programs for children and youth with PWS although others routinely use access to pieces of nutritious low-calorie fruit or vegetables to reinforce exercise and academic activities

To date, however, there are no truly effective treatments for the severe appetite disorder and associated obesity. Some specialists who treat children with PWS have given them a growth hormone that increases their muscle mass (thereby burning more calories) and increases their vertical growth. Psychotropic medications have generally had limited success in treating behavior problems associated with PWS, though some clinicians have used Abilify or Geodon, atypical antipsychotic medications that cause little weight gain. Two studies have suggested that Topiramate, an antiepileptic drug used as a mood stabilizer, reduced aggression and skin-picking in PWS and stopped weight gain (Shapira et al., 2004; Smathers, Wilson, & Nigro, 2003).

Angelman Syndrome

Angelman syndrome is a sister syndrome usually caused by a deletion of a section of the mother's Chromosome 15 (70%) or two copies of Chromosome 15 from the child's father (2%), with the remainder being smaller deletions or errors on other chromosomes. It has a prevalence of 1 in 25,000 births. Because

the same section of Chromosome 15 is involved as in PWS and some forms of ASD, children with Angelman syndrome may also carry an ASD diagnosis. Peters, Beaudet, Madduri, and Bacino (2004) found that 42% of one sample of individuals with Angelman syndrome also met the diagnostic criteria for ASD. Unlike individuals with PWS, children with Angelman syndrome usually have severe intellectual impairments, small head size, unusual hyperkinetic limb movements, limited language, and often laugh and giggle inappropriately. Many also have seizures requiring use of antiepileptic medications. Although children with Angelman syndrome do not typically receive psychotropic medications, some doctors prescribe stimulants for hyperactivity. No specific educational or behavioral intervention strategies have been demonstrated to be uniquely effective with children with Angelman syndrome. Most programs employ a functional curriculum focusing on augmentative communication and daily living skills.

Cornelia de Lange Syndrome

The Cornelia de Lange syndrome (CdLS) is also known as the Brachman-de Lange syndrome. CdLS has an estimated birth prevalence between one in 10,000 to 30,000. There are no definitive biochemical or chromosome markers for the diagnosis. At the present time, diagnosis is made on the basis of clinical observations. The most frequently observed facial characteristics include thin, downturned lips; low-set ears; long eyelashes; and eyebrows that meet in the middle, called *synofers*. Other characteristics often associated with this syndrome include delayed growth and small stature; language delay, even in the more mildly affected; small head size; excessive body hair; and simian hand creases. Individuals may also resist being touched or show a lack of sensitivity to pain. Although significant intellectual disability is typical (average IQ is 53), some people with this disability have slightly below normal intelligence.

Malformations of the hands and feet are common and may include small hands and feet with short digits, fusing of fingers or toes, curving in of the fifth fingers, and flexion contractures at the elbows. Occasionally, fingers, hands, and forearms may be missing. Speech is often absent or minimal even in those at the higher end of the intellectual continuum. Most people with CdLS exhibit errors in articulation. Consonants are typically distorted or missing. In addition, there have been some reported observations of severe oral-motor and verbal apraxia. The majority of individuals speak very little, although they often make eye contact and appear socially interested.

Gastrointestinal problems affect a high percentage of children with CdLS. Complaints can originate from the upper GI tract, including the esophagus, stomach, and upper small intestine, although the most common is gastroesophageal reflux disease (GERD). During a home visit, the parents of an 8-year-old girl with CdLS expressed concern because their daughter was

spending so much time lying on the floor masturbating. I asked them to describe her behavior to me. With some discomfort they described her lying on her back on the floor with her back arched and her arms moving repeatedly from her pubic area upward on her abdomen toward her chest. It turns out the little girl wasn't masturbating, she was experiencing extreme discomfort from GERD. In its most severe form, reflux is associated with arching of the back, eyes averted upward, and rigid flexing of the body and limbs so that if the person were laid on his or her back, only the back of the head and the heels would touch the supporting surface. Sometimes their arms flail back and forth as well. This is known as the *Sandifer Complex* and is indicative of severe pain associated with GERD. The girl's parents subsequently consulted her pediatrician about treatment for GERD.

Although some children with CdLS have few behavioral problems, many others have significant autistic behavior. Berney, Ireland, and Burn (1999) studied a sample of children with CdLS and found that the degree of intellectual disability ranged from borderline (10%) through mild (8%), moderate (18%), and severe (20%) to profound (43%). A wide variety of symptoms occurred, notably hyperactivity (40%), self-injury (44%), daily aggression (49%), and sleep disturbance (55%). These correlated closely with the presence of compulsive ASD features and with a degree of intellectual disability. Approximately three fourths of the sample displayed prominent autistic features.

Most treatments for children with CdlS emphasize physical health and well-being, which is a chronic concern. It is recommended that treatment begin early for gastrointestinal and feeding problems, hearing and visual impairment, congenital heart disease, and urinary system abnormalities. Early psychoeducational intervention programs that emphasize augmentative communication and employ visual prompting systems such as visual schedules are especially effective. Gentle guidance and redirection during instruction can be helpful because of hearing problems and lack of language. Fine motor activities, especially related to daily living skills, should take into consideration finger and hand developmental limitations. There are no generally accepted medication treatments for behavior problems in CdLS. Many physicians prescribe selective serotonin reuptake inhibitors (SSRIs) for children with CdLS who have substantial anxiety and compulsive behavior, although others rely on Abilify or Geodon for aggression and self-injury. However, there are no well-controlled studies that have evaluated the effectiveness of these medications. The Cornelia de Lange Foundation USA has a wealth of resources for parents and practitioners available on their web site (http://www.cdlsusa.org).

Tuberous Sclerosis

Tuberous sclerosis complex (TSC) is an uncommon genetic disease that causes benign tumors to grow in the brain and on other vital organs such as the

kidneys, heart, eyes, lungs, and skin. Some people are so mildly affected they may find out they also have TSC only after their more severely affected child receives a diagnosis of TSC. Children have a 50% chance of inheriting TSC if one parent has the condition. Current estimates indicate that tuberous sclerosis occurs in one in 25,000–30,000 births. Some children with TSC, usually those who have an intellectual disability, are also diagnosed with an ASD. There appears to be a connection between TSC and ASD that is not understood, and active research is exploring this association. The prevalence of TSC in the ASD population is 1%–4%, whereas features of ASD are present in 25%–50% of individuals with tuberous sclerosis complex (Wiznitzer, 2004).

TSC commonly affects the central nervous system. In addition to the benign tumors that frequently occur in TSC, other common symptoms include seizures, intellectual disability, behavior problems, and skin abnormalities. TSC may be present at birth, but signs of the disorder can be subtle and full symptoms may take some time to develop. Three types of brain tumors are associated with TSC: cortical tubers, which generally form on the surface of the brain; nodules, which form in the walls of the ventricles (the fluid-filled cavities of the brain); and a type of tumor that can block the flow of fluids within the brain. The most common effect of brain manifestation is epilepsy or seizures. Seizures occur in 60%–90% of individuals diagnosed with TSC. The behavior of a child with TSC can often be difficult and trying for parents and family. Aggression, sudden rage, hyperactivity, attention deficit, acting out, obsessive-compulsive behavior, repetitive behaviors, being nonverbal when most children their age are speaking, and other autistic behaviors occur in children with TSC.

Medical management focuses on controlling seizures and psychotherapeutic drugs for hyperactivity, aggression, and sleep problems. In some cases, surgery is performed to stop otherwise uncontrollable seizures. Educational and behavioral intervention strategies for children with TSC are the same as they are for other children with *complex autism.* Depending on which brain areas are involved, children with TSC can have speech, hearing, or perceptual motor problems, which require the attention of speech therapists and/or occupational therapists. There is very little known about the effectiveness of various early intervention strategies for children with TSC, although it is prudent to intervene as one would with any other child with an ASD.

Tourette Syndrome

Gilles de la Tourette syndrome (Tourette syndrome or TS) is a neurological disorder that becomes evident in early childhood or adolescence between the ages of 2 and 15. It is estimated that 200,000 in the United States have the disorder. Tourette syndrome is characterized by multiple motor and vocal tics that have persisted more than 1 year. Tics are involuntary spasmodic mus-

cular movements or contractions, usually of the face or extremities, but may be vocal. Many people have only motor tics or only vocal tics. The first symptoms usually are involuntary movements (tics) of the face, arms, limbs, or trunk. These tics are frequent, repetitive, and rapid. The most common first symptom is a facial tic (eye blink, nose twitch, grimace), and is replaced or added to by other tics of the neck, trunk, and limbs. Tics may also involve the entire body (e.g., kicking, stamping). Many people report what are described as premonitory urges—the urge to perform a motor activity. Other symptoms such as touching, repetitive thoughts, movements, and compulsions can occur.

Verbal tics (vocalizations) usually occur with the movements; later they may replace one or more motor tics. These vocalizations include grunting, throat clearing, shouting, and barking sounds. The verbal tics may also be expressed as coprolalia (the involuntary use of obscene words or socially inappropriate words and phrases) or copropraxia (obscene gestures). Despite widespread publicity, coprolalia/copropraxia is uncommon with tic disorders (5%–15%). Associated conditions can include attention problems (ADHD), impulsiveness, oppositional defiant disorder, obsessional-compulsive behavior, and learning disabilities. Tics run in families.

Kadesjo and Gillberg (2000) studied school-age children in the general population as well as in a countywide tic disorder clinic, screening them for tic disorder, and found that from 0.15% to 1.1% of all children had Tourette syndrome. Boys outnumbered girls by 4:1 to 6:1. Attention deficit and ASD spectrum problems (including Asperger syndrome) were common, each type of comorbidity affecting approximately two thirds of individuals with Tourette syndrome. Overall behavior problem scores were high, and affected children exhibited a marked degree of functional impairment.

Although children with TS often function intellectually like their peers, they have frequent skill deficits. Children with TS are often slow to develop printing skills and have even more difficulty with cursive writing. Children with TS often prefer to print when writing cursively, but they have difficulty forming letters and stringing them together. In addition, children with TS press so hard on the paper when handwriting that they may inadvertently break the pencil tip. During early intervention, therapy activities that help coordinate muscles in the shoulder, arm, and hand and encourage eye-hand coordination and kinesthesia later improve printing and writing. As children grow older, appropriate use of tape recorders, typewriters, or computers to assist with reading and writing can be beneficial.

Habit reversal is among the techniques that have helped reduce Tourette tics in higher-functioning verbal children. One begins by making the child aware of when he or she is exhibiting the tic. Ask the child to look into a mirror while performing the tic on purpose. Discuss with the child how his or her body moves and what muscles are being used when performing the tic. Next,

ask the child to identify when a tic is starting by raising his or her hand (in school) or by saying, "That was one" (at home) when the tic occurs. If the teacher or parent sees the child engaging in the tic and the child doesn't notice, the teacher or parent should signal the child with a gesture or expression that all have agreed on.

The child is asked to record each occurrence of the tic on a 3×5 index card. Keeping track of how often it occurs makes the child more aware of engaging in the tic and provides a measure of how he or she is doing. Next, the child practices a competing response—an action replacing the tic—each time a tic is about to occur. (Ask the child to write down the competing response at the top of the 3×5 card.) The muscles used for the new action make it impossible to perform the tic. For example, instead of repeated eye blinking, the child is encouraged to very gently close his or her eyelids and hold them closed for 10 seconds. To make it more likely the child will actually engage in the competing response, ask him or her to practice the competing response while looking in the mirror. This helps the child become comfortable with the response and assures him or her that the competing response is not noticeable socially. Encourage the child to use the competing response when feeling the urge to start a tic.

Habit reversal requires persistence. Although many children will notice a decrease in their tic within a couple of days, the greatest change occurs during the second and third month. Parents and teachers need to be vigilant and should not prematurely discontinue the habit reversal procedure after only a couple of days or weeks, or it is likely that the tic will return (Christopherson, 2004; Woods, Miltenberger, & Lumley, 1996; Woods et al., 2000).

Antidopaminergic medications are the most effective drugs in treating Tourette tics. Although Haldol and Orap are the only drugs currently approved by the FDA for the treatment of Tourette syndrome, other dopamine receptor-blocking drugs and tetrabenazine, a dopamine-depleting drug, have been used to treat tics. SSRIs are recommended for the treatment of obsessive-compulsive behavior, a common comorbidity of TS, as well as ASDs (Silay & Janovic, 2005).

Attention-Deficit/Hyperactivity Disorder

Difficulties with attention are nearly universal in ASDs. As a result, the *DSM-IV* definition of attention-deficit/hyperactivity disorder (ADHD) specifies that one should not use an ADHD diagnosis if the symptoms occur exclusively during the course of a pervasive developmental disorder (PDD). However, there is growing evidence that the two conditions often overlap within the same child and may coexist as separately treatable conditions. It appears the three types of ADHD outlined in Chapter 2 may occur in a child with an ASD: inattentive, hyperactive, or a combination of inattentive and hyperac-

tive. Although some researchers have argued that high-functioning ASD is indistinguishable from ADHD, the majority of clinical researchers disagree. Children with ADHD usually display empathy and social understanding, they enjoy interacting with others, and their language development is often similar to that of their typical peers. If they display repetitive movements, the movements are qualitatively different from the movements of children with ASDs. Repetitive routines of children with ASDs may include hand flapping, twirling, head weaving, repetitive rocking, and lining up nonfunctional objects, actions which are rarely seen among children with ADHD.

However, ADHD signs and symptoms may be seen among some children and youth with ASDs. Goldstein and Schwebach (2004) conducted a retrospective chart review of children (N = 57) diagnosed with an ASD, a PDD-NOS, or an ADHD. Questionnaire and neuropsychological test data were used to determine the severity of ADHD-like symptoms presenting among children with PDDs. Twenty-six percent of children with PDD met *DSM-IV* criteria for the combined type of ADHD. Thirty-three percent met diagnostic criteria for the Inattentive Type of ADHD and 41% did not demonstrate a number of ADHD symptoms significant enough to warrant a comorbid diagnosis of ADHD. These findings are consistent with the common clinical observation indicating that some children with PDD also experience an independent comorbid ADHD, suggesting that a comorbid diagnosis of ADHD with PDD be considered in such cases.

Within groups of children receiving structured early intervention services, it is likely that some meet the criteria of ADHD, although outcomes have not been analyzed separately for them. Clinical experience suggests that children with ASDs and more severe attention problems do best when verbal prompts are minimized and visual schedules are used combined with task completion activities (e.g., completing five problems or sorting ten red and blue socks into matching colored containers). Although some programs for children with ADHD incorporate response cost components (a mild form of punishment), this is generally not a good idea when working with children with ASDs because they tend to perseverate about losing points or tokens following an outburst. Cognitive behavior therapy (CBT) may be useful for some high-functioning children with Asperger syndrome or PDD-NOS; however, the verbal skills required may exceed the limits of many children with ASDs. Video self-rehearsal and social stories may help some children with ADHD and ASDs become more aware of their actions and their effects on others.

There is some evidence that Ritalin, the most common treatment for ADHD, is also effective in treating ADHD-like symptoms among children with ASDs. Di Martino et al. (2004) studied the effects of Ritalin on the behavior of boys with a mean age of 7.9 years with PDD and moderate-to-severe hyperactivity/impulsivity. One hour after a single Ritalin dose

(0.4 mg/kg), 40% of the children exhibited hyperactivity, stereotypes, dysphoria, or other adverse symptoms, and received no further Ritalin treatment. Those who either improved or didn't change during the 1-hour test probe were given Ritalin in an open label trial. Measures of hyperactivity and impulsivity improved significantly, although ASD core symptom measures were unaffected. No significant adverse effects were observed in children who improved while receiving Ritalin.

Down Syndrome

Down syndrome is usually caused by a child's receiving three copies of Chromosome 21 instead of two copies, although there are some cases in which DNA from two chromosomes become intermixed. Rarer are individuals who have a mixture of cells in their body that have the normal number of copies of Chromosome 21 although others have trisomy 21 (called *mosaics*). Down syndrome occurs in 1 in 650–1,000 births. Children with Down syndrome are likely to have heart and gastrointestinal problems and hearing loss. They are at greater risk for developing a rare form of leukemia.

Dykens and Hodapp (1994) studied behavioral profiles and developmental trajectories of adaptive behavior among 80 children with Down syndrome ages 1 to 11.5 years using the Vineland Adaptive Behavior Scales. Profile findings indicated a significant weakness in communication relative to daily living and socialization skills. Within communication itself, expressive language was significantly weaker than receptive skills, especially when children's overall communicative levels were above 24 months. Fidler (2005) found relative strengths in some aspects of visual processing, receptive language, and nonverbal social functioning and relative weaknesses in gross motor skills and expressive language skills.

Children with DS are often described as easygoing, cheerful, and having few behavior problems. However, as with any other developmental disability, there are exceptions, especially among individuals with more severe intellectual disability. Starr and colleagues (2005) studied 13 individuals who had DS with IQ scores between 24 and 48, using ASD diagnostic tests to determine whether they met criteria for ASDs. Five of the 13 met formal diagnostic criteria for ASD, and most of the remaining eight exhibited some ASD features. Capone and colleagues (2005) studied individuals with DS who met *DSM-IV* criteria for ASD, a comparison group of DS who displayed stereotypy movement disorder (SMD), and typical DS controls without behavior problems (N = 44). They found the lethargy and stereotypy scales of the Aberrant Behavior Checklist reliably distinguished among the groups. Kielinen and colleagues (2004) conducted a population survey of ASDs in Finland, identifying 187 children with ASDs. Of those, 12.3% also had a known genetic syndrome, among the more common being Down syndrome.

Individuals with Down syndrome who have ASDs tend to be among those with lower cognitive abilities (see Miles et al., 2005). They typically receive augmentative communication and functional adaptive skills training rather than intensive early behavior therapy (IEBT). They are also more likely to receive psychotropic medications for their behavior challenges than higher-functioning peers.

Nonverbal Learning Disorder

Myklebust (1975) coined the term *nonverbal learning disorder* (NVLD) to refer to children who have a large discrepancy between their verbal skills, which often appear normal, and their visuo-spatial skills, which are much lower than their verbal skills. Much of the subsequent work on this condition has been published by Rourke (1989), although Denckla (1983) described what appears to be the same condition using the descriptor *right hemisphere non-verbal learning and emotional disorder.* Children with NVLD may begin talking about a topic that interests them, although it is obvious that no one else is interested, and will persist in talking about that topic well beyond the time that is reasonable. The children usually have poor peer relations, engage in immature, inappropriate behavior, and have difficulty understanding social situations. They don't understand emotional signals from others. They have poor handwriting and poor overall comprehension in reading. They tend to focus on parts of objects rather than wholes. They have problems reading maps or other tasks requiring an understanding of spatial relationships such as graphs or charts. They tend to have poor perceptual motor coordination and may appear "clumsy." They are distractible and have trouble sticking to a single task. Rourke and others believe that NVLD is a right hemisphere disorder. Others in the field believe that NVLD is actually the same as Asperger syndrome. Cederlund and Gillberg (2004) studied 100 males ages 5½ to 24½ years, with an average age of 11 years 4 months, who had a clinical diagnosis of Asperger syndrome. They conducted an in-depth review of their medical records and neuropsychological test data and found a high rate (51%) of nonverbal learning disabilities (defined as Verbal IQ more than 15 points higher than Performance IQ), but otherwise there was little or no support for the notion of right-hemisphere brain dysfunction being at the core of the syndrome. They found a high incidence of ASDs among the relatives of these subjects.

The suggested strategies for working with individuals with NVLD are the same as those one would use with a child with Aspergers syndrome. Simplify the learning environment, removing extraneous materials. Structure therapy or instruction with lists and picture schedules for younger children. Have the child check off each activity as it is completed. Be concrete, avoid abstractions, and make the consequence for completing a learning task clear to the child. Caregivers are encouraged to keep verbal instructions to a mini-

mum. The child is likely to have difficulty sorting out what is relevant from ancillary information. Social skills instruction/therapy should begin by teaching the child how to show he is listening when people speak to him. A good second step is learning to take turns, which leads to sequential reciprocal interactions. Some children have difficulty knowing how loudly to speak, depending on the listener's distance, so practicing appropriate voice volume modulation at different distances can be helpful. Social stories and VSM can be used to teach the child which situations lead to specific emotions, and how a person appears when they are experiencing a given emotion (e.g., facial expression, gestures, posture). Medications for anxiety disorder are sometimes helpful for individuals with NVLD (e.g., beta blockers, SSRI antidepressants).

SUMMARY

ASD symptoms are common in some other disabilities, and in a significant percentage of some, those symptoms lead to a co-diagnosis of an ASD. Such individuals require appropriate health care and psychoeducational services for both conditions. In some cases, it may be difficult to arrive at a definitive diagnosis because some children and youth who have very limited skills and low intellectual functioning cannot be assessed using accepted diagnostic instruments (e.g., ADOS). In those cases, the lack of appropriate social and communicative skills may reflect low cognitive functioning rather than a comorbid ASD. However, among individuals with a mild to moderate intellectual disability who are reasonably cooperative, it is usually possible to distinguish whether the child actually exhibits ASD features.

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Orders for Canada are consolidated for shipping twice each month. For minimum shipping time, please place your orders by the 9th or 24th of each month.

**calculate percentage on subtotal*