



Autism Spectrum Disorders: Treatments and Psychological Interventions

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Abstract

Autism spectrum disorder (ASD) is a complex disorder with a wide range of symptoms, and thus treatment approaches are heterogeneous in nature. There is no single symptom that defines ASD, and therefore, no single treatment. While there is no cure for ASD, several interventions have been developed to help reduce symptoms, improve cognitive ability and daily living skills, and maximize the ability of the individual to ultimately live as independently as possible within the community. This chapter describes the psychologist's role in the identification of ASD and provides a review of a variety of treatments, including early intervention and specific forms of Applied Behavioral Analysis such as Pivotal Response Training (PRT), Discrete Trial Training (DTT), and Verbal Behavioral Therapy. Other early interventions, including TEACCH, Early Start Denver Model, and Floortime, are also discussed. In addition, the importance of referring to specialists such as speech therapists, occupational therapists, and

genetics on an as-needed basis is reviewed. The framework of treatment is presented in a series of vignettes, following a young child with ASD, from the initial diagnosis phase through adulthood.

Keywords

Autism · Autism spectrum disorder ·
Treatment · Intervention · Early intervention

Introduction

Psychologists commonly assess children identified as at risk for autism spectrum disorder (ASD) or other neurodevelopmental disorders and provide treatment when indicated. Psychology is a vast specialty. Similar to the specialization of physicians, psychologists train and practice in varied capacities. When pediatricians and primary care providers screen and conduct surveillance that determine a child is “at risk” for delay, a referral is typically made to a psychologist for diagnosis (see Table 20.1). The psychologist may practice independently or act as part of a team conducting a multidisciplinary diagnostic assessment. The psychologist's role is often broad and complex. The diagnosis of ASD or some other type of developmental delay is made following direct observation of the child and in-depth inter-

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Table 20.1 Autism spectrum disorder referral process

Referrals for evaluation by a psychologist typically begin with the pediatrician/primary care physician. The following steps can be expected in the process:

1. Parent should discuss any developmental concerns with the pediatrician/primary care physician. During this appointment, the doctor will review concerns and ask parent to complete developmental and/or ASD-specific screening
2. If the results of the screening tools are negative for ASD and developmental delays, the pediatrician will provide anticipatory guidance and will continue to monitor during future well-visits
3. If the results of the screening tools are negative for ASD but place child at risk for developmental delays, the pediatrician will refer to local early intervention program (if child is not yet 3 years of age), local school system (if child is 3 years or older), or appropriate private agency
4. If the results of the screening tools place child at risk for ASD, pediatrician will write a prescription/referral to a local provider or agency. In addition, the pediatrician will refer to local early intervention program (if not yet 3 years of age), local school system (if child is 3 years or older), or appropriate private agency

views with the caregivers. In addition, psychological testing is often conducted to assess cognitive skills, adaptive functioning, language ability, and academic skills (Huerta & Lord, 2012; Volkmar et al., 2014). Following the diagnosis, psychologists may provide guidance to the primary care provider for the coordination of services and/or begin treatment.

A variety of specialized psychologists could participate in the treatment of a child with ASD or other special needs, including clinical psychologists, counseling psychologists, and/or school psychologists. American Psychological Association defines psychology as the study of both the mind and behavior, specifically focusing on how the mind affects behavior (VandenBos, 2007). While all of these psychological specialties focus on this core principle, the environments in which they practice differ. Clinical and counseling psychologists may work in a hospital, outpatient clinic, or private practice setting. They can assist with the diagnosis, treatment planning, and family support services. School psychologists can assist within the school setting, modify-

ing the classroom setting, helping children engage with peers, establish behavior modification programs or decrease challenging behaviors, help children manage transitions, or manage bullying, if present. School psychologists may also work with parents and teachers to help the child with a developmental disability develop strategies for success. With the rise in popularity of Applied Behavioral Analysis (ABA) therapy – in part due to insurance coverage – behavioral psychologists have become increasingly in demand. Behavioral Psychologists examine the purpose and function of behaviors and develop ways to shape and change behavior in a desired way. Using a system of rewards (reinforcers), the behavioral psychologists will gradually work with a child and “shape” their behavior toward the desired outcome. For example, if the ultimate goal is to have a child sit down at a desk and do work, but initially the child is running around the room, the behavioral psychologist will develop a plan in which gradual approximations of the desired behavior are rewarded, e.g., stopping in response to name; coming when name is called; walking over to desk; standing at desk; working at puzzle for 30 seconds while standing at desk; working at puzzle for one minute while standing at desk; sitting in chair at desk; sitting in chair and working on puzzle at desk. Behavioral intervention can also be used to “extinguish” or treat serious problem behaviors that may be presenting safety concerns. Thus, the role of psychologists varies by specific training and the setting in which they work.

Psychologists play a significant and varied role in the diagnosis and treatment of autism and other neurodevelopmental disorders. Whether at a clinic or a school-based program, psychologists play a key role in both the evaluation and diagnosis of children with delays. Following the assessment, a treatment plan is developed and referrals are made. Goals within the treatment plan are communicated to both the family and the referring doctor.

Sam's Journey

Sam is a 24 month old toddler and has recently been diagnosed with ASD at a developmental clinic. He does not talk or make any speech sounds. When he is frustrated, he will scream, cry and bang his head. His mother noted that while he used to "eat everything", in recent months his diet has become very restricted, limited to milk and snack foods like chips and crackers. He refuses to try any new foods. He has begun waking up in the middle of the night and his mother is often unable to get him back to sleep. This makes for a long, challenging day. His parents took him to a Clinical Psychologist, and he received the diagnosis of autism. Now that she has the diagnosis of ASD, Sam's mother is feeling overwhelmed regarding treatment options and what paths she needs to explore.

Treatment Planning

Receiving the diagnosis of ASD is only the beginning of a long journey for parents and caregivers of children with ASD. Treatment is an important part of ASD, and while there is no cure for ASD, many aspects of the condition benefit from therapy and intervention. Similarly, when parents receive a diagnosis of a neurodevelopmental disorder, they may initially feel some relief, in that the diagnosis confirms their suspicion that something "was not quite right" with their child, they are often at a loss as to how to proceed after the diagnosis. Early intervention has been shown to be effective in improving the outcomes for children with ASD and other neurodevelopmental disorders (Roane et al., 2016). For this reason, intervention should begin as early as possible.

It is important to remember that therapy must be customized to a child's unique individual needs. Screening for and identifying delays in young children and then developing interventions based on identified delays are the goal of early intervention programs. Since IQ and language skills are still emerging at young ages, children are evaluated based on the development, typically in the following areas: physical skills, cognitive skills, communication skills, social skills, and adaptive/self-help skills. The role of the psychologist is to evaluate the child globally, based

on their developmental profile, and refer to appropriate specialist, e.g., occupational therapy, speech therapy, for additional detailed treatment plan. As a child grows and develops, one form of therapy, which had been previously beneficial in the past, may no longer be effective. As a child's needs change, therapy/treatment must change to address the continuously evolving needs of the child.

Early Intervention Programs

After researching her options, Sam's mother decided to use a combined of early intervention home based therapy, which was provided by the state, and ABA therapy, which was covered by her insurance. She appreciated being involved in the home-based therapy, and included in the goal making process. She also feels encouraged by the strong research which supports ABA therapy and is optimistic that Sam will make progress. Targeted goals are listed on Sam's IFSP (Individualized Family Service Plan) and will be monitored on a regular basis.

The Early Intervention Programs for Infants and Toddlers with Disabilities provide for services and supports to children from birth through three years of age at risk for developmental delays or disabilities. These services can include speech-language therapy, occupational therapy, physical therapy, assistive technology, behavioral interventions, and more. The program offers free assessments as part of a federally funded program administered by each state under Part C of the Individuals with Disabilities Education Act (IDEA). Parents can request an evaluation if they are concerned about their child's development or a community Child Find provider, such as an early educator or pediatrician may suggest an evaluation. If the evaluation finds that a child qualifies for services, an Individualized Family Service Plan (IFSP) will be created detailing recommended services and goals. Treatment costs vary by state; there may be a no charge or a sliding scale for services. IDEA mandates that no child can be denied services because their family is unable to pay (Guralnick & Bruder, 2019).

Many therapies have overlapping features, but it is important to note that not every therapy is appropriate for every child. Variables such as intellectual ability and language ability, which vary greatly among individuals with ASD and developmental delays, will often determine which therapy is the best therapy for them at any given time. While numerous treatments exist for this population, it is important to note that no one intervention has been shown to be superior to others. The most important aspect to remember when it comes to treatment is that intervention can help, and the earlier the better (Dulcan, 2015).

There are currently many different types of early intensive behavioral intervention therapies for ASD in addition to supplemental therapies such as occupational therapy, speech–language therapy, mediation treatment, and social skills training. Regardless of intervention selected, research has shown that parents acting as interventionists for their young children with ASD and other developmental delays can be beneficial (National Autism Center, 2015a, b).

While the symptoms of both autism spectrum disorder and neurodevelopmental disorder can change with age, development, and in direct response to treatment, the condition itself is considered chronic and will impact a child’s development throughout their lifespan, including their transition into adulthood. For this reason, treatment plans must be shared and modified based on the child’s progress and in response to their developmental needs. For example, as a child begins to transition from the school system and into the workforce, compensatory skills that will allow them to participate in an employment setting to the best of their ability should be encouraged. Typically an Individualized Education Plan (IEP) dictates the goals for the child, which can include work-related goals as the child begins the process of transitioning of exiting the school system and entering the workforce. Reevaluation should occur periodically but no less than once every three years when a child has been formally enrolled in school. Reevaluations should occur on a more frequent basis when the child is young, as they can change greatly in their presentation

and, in some cases, may no longer meet the criteria for the initial diagnosis. A small prospective longitudinal study found that 9% of children who initially met the criteria for the diagnosis of autism at age 2 no longer met the same criteria by age 19 (Anderson et al., 2014). Assessments monitor the child’s progress, comparing their functioning level to same aged peers, and help determine to what degree the child is impacted by their disability. Therefore, this should be an ongoing process, as the degree to which the child is impacted at age 2 is not the same as the degree to which they are impacted at age 15 by their ASD diagnosis.

Speech–Language Pathology

Sam’s parents first voiced concerns about his developmental delay to his pediatrician regarding his lack of speech. Typically, parent’s first concern related to developmental delays in their child is communication (Kozlowski et al., 2011). While the most overt sign of Sam’s “speech” delay was that he was not using any words, there is much more to “communication” than just speech. Sam’s parents were referred to a speech–language pathologist (SLP) for further evaluation and treatment.

While psychologists evaluate speech in terms of developmental milestones, e.g., is it grossly within normal limits for the child’s age, an in-depth analysis of speech development is required – the specialized skill of a speech–language pathologist. Often the terms “speech” and “language” are used interchangeably, but *speech* refers to how humans sound, or say sounds and words. It includes articulation, voice, and fluency, all of which can have an effect on the sound of speech. *Language*, however, refers to communication (including words, signs, gestures, augmentative and alternative communication) and how we use this code to express thoughts and ideas for a variety of purposes (expressive language) as well as an understanding of this code (receptive language) so that humans can decipher and understand others’ communication (ASHA, n.d.). Speech–language pathologists are often included as core team members on the diagnostic team which evaluate young children suspected of

having developmental delays. If a psychologist were to be operating in private practice, they would refer a child with communication delays to a speech–language pathologist for additional testing for concerns that were outside the scope of the psychologist. Psychologists, pediatricians, or other interventionists often refer to an SLP whenever there is concern about a child’s language, either the understanding of language or the expressive use of language.

Occupational Therapy

Based on the psychologist’s explanation of Sam’s needs, his mother elected to receive home based services through her state’s early intervention program. Sam qualified to receive both occupational therapy and speech therapy. Sam’s mother worked with the Occupational Therapist to develop goals for Sam’s Individual Family Service Plan (IFSP) which included learning to sit at the table during meal times with physical supports, learning to expand his diet to include a wider range of textures, and improving his fine motor skills. Additional goals may be related to toilet training.

Psychologists refer to occupational therapists (OTs) to provide services to a child who is having delays in a variety of areas, including sensory issues, feeding issues, and fine motor delays. Psychologists often identify delays in these areas during their assessment of the child, either through parent report or identifying delays during developmental testing. In-depth assessment and treatment would require a referral to an occupational therapist. Even without a formal diagnosis, developmental delays can lead to a referral to early intervention, which provides services including occupational therapy for infants and toddlers who are delayed in developing the baseline skills babies typically master in the first 3 years of life. When a child shows delays in mastering typical milestones or activities, or displays unusual or disruptive behavioral responses, the OT is in many instances the first professional to work with him/her (AOTA, 2019).

Occupational Therapy for Children from Birth to 3 Years: Early Intervention

Early intervention services aim to treat delays and developmental problems from the earliest time possible. The first 3 years of life are the most crucial in terms of the developing brain and body. Evidence-based research studies prove that the best window of opportunity for progress is from birth through age three (Roane et al., 2016). OT treatment with infants includes educating the parents/caregivers on activities they can do at home to encourage their infant to meet all of these developmental challenges. It is best done in the infant’s home or other natural environments (i.e., daycare, grandparent’s house, etc.). OT early intervention services are provided for children with suspected delays and identified delays such as autism spectrum disorders, fetal alcohol syndrome, intellectual disabilities, and other neurodevelopmental disorders. (Boyer & Thompson, 2014).

As a child grows and develops, repeat psychological assessments may prompt referrals to occupational therapy to address difficulties with their play skills, feeding skills, sensory processing problems, pre-writing and academic readiness skills, and/or self-help skills.

Sensory Processing Disorder

Among the many challenging behaviors that children with ASD can present with, a hypersensitivity to their environment is commonly seen. Sensory processing disorder or SPD (originally called sensory integration dysfunction) is a neurological disorder in which the sensory information that the individual perceives results in abnormal responses. A neurophysiologic condition in which sensory input either from the environment or from one’s body is poorly detected, modulated, or interpreted and/or to which atypical responses are observed. Sensory processing refers to the way the nervous system receives messages from the senses and turns them into responses. For those with sensory processing dis-

order, sensory information goes into the brain but does not get organized into appropriate responses. Those with SPD perceive and/or respond to sensory information differently than most other people. Unlike people who have impaired sight or hearing, those with sensory processing disorder do detect the sensory information; however, the sensory information gets “disorganized” in their brain and therefore the responses are inappropriate in the context in which they find themselves. (Miller, 2014).

Parents often report challenging behavior in their children, and through careful questioning, the psychologist may determine that sensory triggers may be a factor in the child’s challenging behavior. While a precise definition of sensory dysfunction has yet to be agreed upon, many children, not just those with ASD, experience an abnormal perception of sensory stimuli whether it is auditory, visual, or tactile and consequent behavioral responses (Noor et al., 2018).

Psychologists receive referrals for behavioral difficulties that appear to be, at least in part, reactionary to sensory input. For example, the child with ASD who has behavioral tantrums only during PE class or the lunchroom may be reacting to the loud noise in these environments. Psychologists may refer to an occupational therapist if they feel sensory oversensitivity or undersensitivity is contributing to a child’s behavioral difficulties. Unfortunately, there have been conspicuously few research studies of sensory processing disorders and few theoretical models. Nevertheless, some of the most illuminating descriptions of this phenomenon are provided by individuals describing how they perceive the world (Kranowitz, 2016). It is often challenging to identify which specific environmental stimuli will trigger distress behavior in the individual with ASD or a developmental delay.

While a psychologist may be able to identify the pattern of triggers and responses, e.g., an extremely loud, sudden noise results in aggressive behavior, a referral to an occupational therapist for treatment would be typically done if it is believed sensory issues are contributing to behavioral challenges. Learning how to address the challenges imposed by sensory sensitivities

can have a positive impact on a child’s development. Working with an occupational therapist, one can develop approaches to address a child’s specific concerns. The psychologist would encourage parents to keep a log of antecedents or triggers that appear to come before the behavior that may be contributing to the behavior, e.g., mother runs the vacuum cleaner or blender and the child throws a tantrum and becomes aggressive in response to noise. While some sensory experiences can be avoided, others may be reduced by introducing a barrier, e.g., earplugs or headphones. The psychologist often refers to an occupational therapist for assistance with possible environmental triggers, strategies to avoid/reduce such triggers, and coping methods to either block external sensory experiences or build up tolerance to these experiences. To reduce a reaction of fear or panic, the psychologist or occupational therapist could develop a program of desensitization to the fear-inducing object or situation (Fjeldsted & Xue, 2019).

The exact cause of sensory processing disorder has not yet been identified. Preliminary studies and research suggest that SPD is often inherited. Prenatal and birth complications have also been implicated as causal in SPD, as well as certain environmental factors. Sensory processing disorder can affect anyone. Current studies indicate that 5–16% of children exhibit symptoms of SPD (Case-Smith et al., 2015). Sensory processing disorder is not recognized as a formal medical dx at this time. Sensory differences are, however, included in Diagnostic and Statistical Manual of Mental Disorders (DSM-5) criteria for ASD.

Feeding Issues and Neurodevelopmental Disorders

Sam’s feeding issues were present from early on in life. He would not transition from the bottle to rice cereal, depriving him of calories and needed nutrients for growth. His mother had been aware of potential delays, and decided to discuss the scope of her concerns with the pediatrician. Due to the parent reported concerns, the pediatrician referred them to early intervention, which provides services

for infants and toddlers who are delayed in developing the basic skills babies typically develop in the first three years. After the initial evaluation from the early intervention team, while there was no formal diagnosis, everyone agreed that Sam had feeding issues due to oral sensitivity, in addition to other developmental delays. While Sam made some progress with tolerance for textures his feeding continues to be restricted in comparison to other children his age. A referral to an Occupational Therapist who specialized in feeding issues was included in his IFSP.

A large percentage of children with ASD demonstrate feeding difficulties from an early age and have a significantly less varied diet in comparison to non-ASD peers. It is estimated that 50% of children with ASD demonstrate limited food acceptance (Seiverling et al., 2018) in comparison to rate of 25% for neurotypical developing children (Hubbard et al., 2014). Despite such feeding difficulties, their overall caloric intake and growth does not appear to be significantly impacted (Emond, et al., 2010). This phenomenon, while not core to the diagnosis of ASD, is a very common experience for families who have children with ASD. Other types of feeding problems, such as Pica, are more common in individuals with both ASD and intellectual disabilities (ID). The consumption of non-nutrition food substances can be dangerous and, in some cases, life-threatening (Matson et al., 2013). Many families take it upon themselves to try diet manipulation with the hopes that it will reduce ASD symptomatology. One of the most popular diets within the fields of autism has been the gluten-free, casein-free diet (GFCF), with over half of families within the ASD community reporting having tried an elimination diet (Smith & Antolovich, 2000). While there are ample anecdotal stories and the lay press supporting the use of the GFCF diet, empirical research support for the diet is lacking. A 2013 review by Hurwitz of the literature found only five studies that could meet the inclusive criteria for “well-controlled” studies. Of these, three had no positive effects and the two remaining studies had quality concerns. The author concluded that parents would be best served by putting their time, energy, and resources into therapies that have proven outcomes rather

than therapies which lack sufficient scientific support like GFCF diets.

Sam’s mother believes feeding therapy has helped her son. Three years after voicing her initial concerns and choosing to pursue therapy for her son, he has not only transitioned from the bottle, he has expanded his diet to include crackers, fruits, some vegetables, and pasta. While he still does not like to combine textures he is willing to try new foods and slowly is incorporating them into his diet. His mother reports that like many children with an autistic spectrum disorder, her son continues to have a restricted diet but slowly, methodically he is accepting a wider variety of types and textures of foods. She has learned that having a mealtime routine and eating together is important. It is important to eat on a schedule. She has learned to space meals throughout the day and to eliminate snacks.

Feeding problems typically are multifactorial; many issues can contribute to the difficulty such as food aversion, sensory issues, behavioral problems, premature birth history, and feeding tube. For these reasons, often numerous professionals, including behavioral psychologists, occupational therapists, and other feeding specialists, work with the child and family. Children with feeding issues often have developed negative behaviors when the food is introduced. Behavioral psychologists can work with the child and the family to help change negative behaviors, such as throwing food, and make mealtime a more pleasant, positive experience. One of the first areas psychologists work on is helping teach parents to train the child’s internal hunger signals to specific mealtimes. By reducing snacking, this helps the child’s body expect and accept food at designated times. Oftentimes the role of either the psychologist or the occupational therapist with feeding therapy experience is to change the parents’ expectation regarding mealtime as much as it is to change a child’s feeding behaviors. The role of the parent is to provide healthy, nutritious food on a schedule, and the role of the child is to determine how much they will eat. Decreasing power struggles and expectations are an important part of feeding therapy. Reducing parent anxiety surrounding mealtime can in turn reduce the child’s anxiety.

Many children with ASD have anxiety at mealtimes due to sensory aversions and fear of

unfamiliar foods. Children with ASD are prone to anxiety, and caregivers can inadvertently make anxiety worse during mealtime by trying to force children to eat, thereby causing an association between mealtime and stress (Twachtman-Reilly et al., 2008). Fear and anxiety can supersede hunger by putting the child's body in a state of "fight or flight." Since many children with ASD experience this phenomenon of "fight or flight," a psychologist can assist parents in how to give positive reinforcement and how to help their child relax, such as before mealtime. Ways to do this include spending training the parents on modeling deep breathing or alternatively, blowing pinwheels, bubbles, or even a kazoo. Positive reinforcement during mealtime can include smiling, praise, singing, and other positive behaviors.

Intensive Interventions

Therapy can be delivered in either a school setting, a private setting, or a combination of the two. More and more, therapists are under increased pressure to show positive outcome results, particular if third party payers (insurance companies) are involved. However, as with all children, much of a child's educational experience is difficult to measure in objective data points. Similar to a teacher "teaching to the test" in order to obtain arbitrary benchmarks, if you focus on minor gains, you may lose the holistic educational experience. It is very challenging to measure teacher-child rapport, personal and emotional growth, as well as the child's ability to gain new experiences. Value can be still obtained in education even if it cannot be demonstrated in a dataset. For that reason, there is no one specific treatment for a child with autism or a developmental disability that is recommended over another. Parents are encouraged to review the programs available to them, the specific needs of their child, and determine the best "goodness of fit" approach. Many children often receive various forms of intervention throughout their lifetime. For example, some children will receive home-based early intervention through a state-sponsored program. Upon turning 3 years of age,

they will transfer to the public school system and will receive special education services that may include supplemental supports such as speech therapy and occupational therapy. Along the way, their parents may have sought out private Applied Behavioral Analysis services. Later, when their child is older and no longer needs ABA therapy, they may enroll their child in social skills training. During adolescence, if their child develops mood symptoms, they may seek out the support of counselor for therapy and a psychiatrist for medication management. Thus, goals and plans change in response to the child's developmental needs to maintain the goodness of fit as the child matures.

Applied Behavioral Analysis (ABA)

Treatment planning often includes ABA with the goal of improving socially desirable behaviors, e.g., on-task behavior and communication, by using techniques that are based upon learning theory principles. In addition to the promotion of desirable behaviors, self-control and reducing negative behaviors which interfere with learning, e.g., stereotyped behaviors, self-injurious behaviors, are also targeted for intervention.

ABA has a long history of documented effectiveness as a treatment for children with ASD and other neurodevelopmental disorders (Makrygianni et al., 2018). Numerous studies have documented its effectiveness in increasing desired behaviors and teaching new skills (National Autism Center, 2015a, b; Wong et al., 2015). ABA has also been shown to be effective in decreasing, or in some cases eliminating, negative behavior that interferes with the process of learning (National Autism Center, 2015a, b). When ABA therapy is introduced at an early age (prior to age 4) and to an intensive degree (greater than 20 hours per week), preliminary studies suggest that significant gains are possible, which can reduce the need for therapy later in life (Reichow, 2012; Roane et al., 2016). Despite the need for additional research, in 1999, the United States Surgeon General took the strong position of concluding:

Thirty years of research demonstrated the efficacy of applied behavioral methods in reducing inappropriate behavior and in increasing communication, learning and appropriate social behavior. (p. 178).

Applied Behavior Analysis is provided by a Board Certified Behavior Analyst (BCBA), who often has support staff working under their supervision. The goal of intensive ABA treatment is to address the core symptoms of ASD and the co-occurring behavior through a comprehensive curriculum. General goals for children in ABA with or without the diagnosis of ASD typically include improving daily living skills, e.g., feeding and mealtime skills, toileting; expressive and receptive language skills, e.g., following directions, responding to greetings; social skills, e.g., turn taking and reducing elopement risk, e.g., staying with therapist during outdoor excursions. The BCBA develops a customized program for each individual child. The support staff, often referred to as “line technicians,” work directly with the child, monitoring the child’s progress and collecting data. ABA can be offered through private centers, and some school systems. Children who show deficits in multiple areas and/or behavioral problems are often candidates for immersive ABA treatments that may involve 25 hours a week of therapy or more. Children who have a milder expression of ASD may receive time limited ABA therapy or therapy to a less frequent degree, e.g., 10 hours per week (Association for Professional Behavior Analysts, 2016).

Left to their own devices, children with ASD will often engage in non-productive, non-social, repetitive forms of play. They fail to learn vicariously through watching and observing others. The goal of specific, structured techniques such as Discrete Trial Training (DTT), which is a procedure used within ABA, is to help simplify and individualize instruction. As Lerman et al. (2016) explain, each discrete trial is broken down into five components:

1. *Cue*: the teacher cues the child, e.g., “what is this?” or “do this.”
2. *Prompt*: either simultaneously or immediately following the cue, the teacher gives the child a

prompt, e.g., models saying the word or moves the child’s hand to imitate the desired behavior.

3. *Response*: The child responds either correctly or incorrectly to the teacher’s cues. No response is an incorrect response.
4. *Consequence*: A correct response will immediately be reinforced with positive praise, hugs, small bites of food, or access to a toy. If an incorrect response is given, the teacher says “no,” looks away, removes the material, or in some other way indicates the response was incorrect.
5. *Intertrial interval*: Following the consequence, the teacher pauses 1–5 seconds, then cues the next trial.

DTT was one of the very first interventions developed for children with ASD, and this technique has extensive research documenting its effectiveness (Eldevik et al., 2009). Less structured techniques used in ABA include Pivotal Response Training (PRT). PRT takes advantage of the child’s natural interests and uses these for motivation. For example, if a child with autism shows an interest in cars, toy cars will be used as reinforcers, not random unrelated objects. The goal is to target “pivotal” areas of development rather than one specific skill. Pivotal areas include motivation, response to multiple cues, self-management, and initiation of social interactions (Lei & Ventola, 2017). By allowing the child to choose which activities to focus on, motivation is intrinsically increased. PRT reinforces not only correct responses but also any valid attempts made by the child in acquiring a skill, and this is also felt to increase motivation (Koegel et al., 1988). PRT has been shown to be effective as a behavioral intervention in the improvement of social-communication skills in children with ASD (Smith, 2013; Koegel et al., 2016). Finally, many ABA programs also use Verbal Behavioral Therapy (VBT). Conceptualized by B.F. Skinner in 1957, VBT attempts to teach communication and language use. Language is classified types, known as “operants” based on their function. For example, a “mand” is a request, such as when you ask a child to say “cookie” in order to receive a

cookie. A “tact” is a comment used for social-communication purposes. For example, if a child points and says “dog” when they see a dog, they are not requesting the dog, they are drawing both their attention and other’s attention to the dog. An “interverbal” is a word or response to a question. For example, if someone says “what is your name?” and the child correctly responds with Marcus, this is considered to be an interverbal. Finally, an “echoic” is a repeated word that a child may use as they are learning language. Communication is shaped initially by requesting mand or if the child cannot speak, any type of communication that indicates a request, such as pointing (DeSouza et al., 2017). VBT has been shown to be effective with young children who are just beginning to learn language and other children with delayed or disordered language (Akers et al., 2017).

The Early Start Denver Model (ESDM)

As the incidence of children with ASD and other neurodevelopmental disorders has increased and families have demanded effective treatments, there has been pressure on insurance companies to support evidence-based treatment. While ABA has a long-established treatment history, it is by no means the only treatment that has been shown to be effective in children with ASD and other neurodevelopmental disorders. The Early Start Denver Model (ESDM) is a comprehensive behavioral early intervention program designed for toddlers between the ages of 12 and 48 months. Building on the theory that targeted early intervention can have the most dramatic impact, ESDM utilizes a developmental curriculum that focuses on specific skills to be taught with specific strategies to be used to teach the skills. ESDM can be delivered in clinic settings, the child’s home, and in individual or group settings. The ESDM is the early-age extension of the Denver Model. The Early Start Denver Model (ESDM) is a comprehensive, naturalistic developmental behavioral early intervention approach designed by Dr. Sally Rogers and Dr. Geraldine Dawson. The program can be used not only for

children with a confirmed diagnosis of ASD but also for children who are “at risk” for ASD, such as children who have an older sibling with ASD. There is a genetic component to ASD, and if a family has one child with autism, there is a 1-in-5 chance that subsequent children will have ASD (Ozonoff et al., 2011). ESDM could be used to target the “at risk” sibling. ESDM starts from a position of “normal” development and learning, and uses the knowledge of how ASD and other neurodevelopmental disorders can affect early development, in order to improve outcomes for children who are neurologically atypical children. ESDM aims to reduce the severity of ASD symptomatology or negative behavior in children with neurodevelopmental disorder while promoting and accelerating their development in numerous areas such as language, cognitive, social-emotional, and adaptive skills. Therapists using an ESDM approach follow a manualized curriculum and use teaching practices that are based on naturalistic developmental-applied behavior analysis. ESDM programs typically involve 20–25 hours of scheduled therapy and families are encouraged to use the techniques outside of therapy (Canoy & Boholano, 2015). Intervention models such as ESDM are seen as effective since they have the potential to reshape the young child’s developing brain to be receptive to social information by using a naturalistic approach that combines behavioral techniques and developmentally sensitive techniques (Bradshaw et al., 2015; Schreibman et al., 2015). While the ESDM has been shown to be effective with other populations, such as children with Fragile X syndrome, larger empirically supported research studies are needed to clearly establish its effectiveness among non-ASD populations (Vismara et al., 2019).

TEACCH

Developed by Dr. Eric Schopler and Dr. Robert Reichler in the 1960s at the University of North Carolina – Chapel Hill, the Treatment & Education of Autistic and Communication Related Handicapped Children (TEACCH)

approach is both a clinical and a research-based intervention program which uses a variety of techniques based on the learning characteristics of individuals with ASD, such as strengths in visual information processing, difficulties with social-communication, and weakness in attention and executive functioning (D'Elia et al., 2014). The TEACCH program attempts to address both the neuropsychological weakness and the strengths of the individual with ASD by (1) using the physical organization of the environment by putting visual barriers and minimizing distractions, (2) customized visual work schedules so the student knows what to expect, (3) work systems that promote independent work, and (4) a visual structure of materials in tasks and activities. The use of this structured learning environment and use of clients' special interest to engage them as a reward for learning are designed to promote social engagement and self-initiated communication (Mesibov & Shea, 2009). Although an accepted practice today, TEACCH was groundbreaking in its approach to involving parents in the treatment of their children with ASD (Ciurlik et al., 2015). The use of a structured TEACCH approach is to encourage the child with ASD to be independent and flexible. This teaching approach can be used with other evidence-based intervention techniques, such as ABA. In terms of standalone effectiveness, some studies have shown that the effects of TEACCH are comparable to that of Applied Behavioral Analysis (ABA; Callahan et al., 2010). The TEACCH model, which has become a state-wide program in North Carolina, has become a model for many programs around the world. The TEACCH program has been shown to be effective in teaching functional skills to adults with ASD and intellectual disabilities (Siu et al., 2019). Despite positive findings, research gaps remain. In the one meta-analysis that has analyzed the effectiveness of TEACCH (Virues-Ortega et al., 2013), TEACCH was found to be effective in improving social behavior and reducing maladaptive behaviors, but dramatic benefits in the areas of cognition, perception, and motor area were not replicated from smaller studies. This limited support was found due to the small num-

ber of studies available, lack of randomized control trials, and small samples included in the studies. In addition, methodologies with different aged children and different severity of ASD no doubt impacted findings. Thus, as with most forms of interventions, additional studies, particularly those which look at the long-term impact of TEACCH across an individual's life, e.g., social, communication, daily living, are needed to better evaluate the program.

Floortime

Developed by Dr. Stanley Greenspan in the 1980s, Floortime is a specific therapeutic approach that utilizes the Developmental Individual Difference Relationship Model (DIR). In Floortime, the therapist or parent helps to expand the child's communication by meeting the child at their current developmental level and build on the child's strengths. Therapy is typically conducted in a play format on the floor – hence the term Floortime. Greenspan (1992) described six stages of development and the goal of Floortime is to help the child achieve these developmental milestones, which are critical to emotional and intellectual growth. The six stages are (1) birth to 3 months = self-regulation and interest in the world; (2) 2 to 7 months = Intimacy or a special love for the world of human relations; (3) 3 to 10 months = affective, reciprocal interactions which eventually lead to two-way communications; (4) 9 to 24 months = initiation of complex communication; (5) 1.5 to 4 years = development of emotional ideas; and (6) middle childhood through adolescence = progression of emotional thinking. Through the use of play, Floortime combines developmental tasks such as speech, motor, and cognitive development. By selecting a play activity that is interesting to the child, the therapist or parent attempts to engage the child initially at the level they are at and then gradually move the child toward more complex interactions (Cullinane, 2015). A review of the studies on DIR/Floortime generally supports the idea that it could be considered

evidenced-based practice but does not qualify as evidenced-treatment (Mercer, 2015).

Behavioral Assessment

The school psychologist was asked to conduct an FBA on Sam due to his tendency to run out of the classroom and attempt to leave the school building. After a couple of weeks of observations, data gathering and interviews with Sam, his teachers and his parents, the psychologist determined that Sam had become fixated on the construction site that was going on next to the school building. His attempts at leaving the school building occurred when he heard the heavy equipment and he wanted to leave to see the machinery in action. Numerous interventions were put in place such as placing large visual cues e.g., 'Stop' signs on exits to remind Sam it was not safe to leave. Sam was given a reinforcer of watching construction videos during his break time, which decreased his desire to leave the classroom.

Challenging behavior is often formally addressed using tools such as the Functional Behavioral Assessment (FBA) and the Behavior Intervention Plan (BIP), which allow a psychologist to work collaboratively with other school officials and determine the best way to intervene. The initial portion of a behavioral assessment a psychologist may conduct would be an FBA; students enrolled in regular education or special education may receive an FBA. While most often used in the school system, FBA are also created within ABA treatment programs and hospital settings. The purpose of an FBA is to identify behavior(s) that are directly interfering with the child's educational progress as well as to identify the specific target behavior, determine the purpose of the behavior, and what factors maintain the behavior (Reitzel et al., 2013). For example, if a child screams and yells when a teacher presents work to him, the identified behavior is screaming and yelling, the purpose of the behavior may be to get out of doing the work, and the behavior may be maintained because the work is too challenging for the child, and when he fusses, the teacher gives up and removes the challenging work. An FBA is part of a Behavior Intervention Plan (BIP). After the psychologist has identified the

specific behaviors to be addressed in the FBA, as well as the precursors to the behaviors, staff will formulate a Behavior Intervention Plan (BIP). Typically it is necessary to complete an FBA when a specific behavior or emotional concern is disrupting the academic progress of a child and/or the other children within the classroom. In addition, if a behavior has escalated during the school year and has become a continuous concern, an FBA may be requested. A psychologist or other qualified school assessment personnel completes the FBA. The FBA consists of several key components. First, the severity of the behavior is determined. This is often determined through direction observation, data point gathering, as well as parent and teacher ratings. Information is gathered regarding the behavior such as when it occurs, what events have immediately occurred before the behavior or after the behavior, possible reasons for the behavior, and any recent changes in the student's life. This information is used to develop a hypothesis regarding what might be causing and/or supporting the behavior. Next, the BIP is developed and evaluated for effectiveness over time. The BIP is the actual plan created to help improve behavior. It is also the method through which interventions are formally documented and progress, or lack of response, is tracked over time.

If the child is receiving special education services, the FBA can be part of the Behavior Intervention Plan (BIP). Following observations and data collection, a written plan is developed with identified goals on how to change the challenging behavior. An FBA and BIP can be used for special education students or regular education students. When an FBA/BIP is conducted regarding students classified as a Special Education student, it becomes part of their Individualized Education Plan (IEP).

Wandering and Neurodevelopmental Disorders

Wandering, also called "elopement," occurs when a child or an individual leaves a caregiver or a safe area and wanders off; this is potentially

dangerous behavior. Individuals with ASD and developmental disabilities are particularly prone to wandering. A survey of caregivers of children with ASD and/or ID found that 1 in 4 reported to have experienced an episode of wandering in the last year (Rice et al., 2016). In an online survey of families participating in the Interactive Autism Network (IAN), nearly half (49%) of respondents had attempted elopement at least once after 4 years of age. The impact of this behavior on the family was significant; 62% of parents reported their child's elopement risk prevented them from getting a good night's sleep and 56% reported it was one of the most stressful behaviors they had to deal with as caregivers of a child with ASD (Anderson et al., 2012).

The best strategy is a multitiered approach. Parents and caregivers should be given anticipatory guidance at the time of diagnosis that their child is "at risk" for wandering behaviors, and safety measures should be put in place even if the behavior is not currently a problem. Manuals such as "The Big Red Toolkit," available online by National Autism Association (nationalautismassociation.org) is designed for children with autism, although the safety strategies could apply to all children and adults with development disabilities who are at risk for wandering. Strategies include educating the child about safety and dangers using whatever means of communication works, including social stories, language and/or visual prompts such as placing stop signs on exits. Parents can make wandering prevention strategies part of a child's IEP and work with school officials to make sure that safety measures are put in place. Additional prevention methods include the use of locks, door and window alarms, and GPS tracking devices. These tracking devices can be registered with local law enforcement. Parents should specifically seek out tracking devices that are waterproof, as many children with ASD may be prone to seek out bodies of water. Parents of children or adults with developmental disabilities who have communication difficulties are encouraged to have that individual wear a medical alert ID bracelet. Keep in mind that communication skills often deteriorate in times of stress, such as during an interaction with

a police officer. A child with a developmental disability may become stressed and may not be able to convey their safety information, such as name, address, and caregiver contact information. According to the National Institute for Elopement Prevention and Resolution (2015), a history of wandering may mean that this child or adult is at risk for future elopement and that additional supervision and other precautions may be necessary. If there is a history of wandering, questions to consider include:

1. When did the wandering behavior begin and how often does it occur?
2. Is it more frequent during daytime or nighttime hours?
3. Is the wandering behavior associated with any other factors, such as pain/discomfort or noise?
4. What type of travel pattern is exhibited (random, seeking out water, heavy machinery, etc.)
5. Does the wandering appear purposeful?

In recent years there has been several high-profile cases that have brought the danger of wandering to the public's attention (McIlwain & Fournier, 2010). Numerous children with ASD have reportedly died as a result of drowning, motor vehicle accidents, or wandering away from their caregivers. As public awareness increases, greater effort is being made to train parents, school officials, and law enforcement who are in the unique role to help manage and prevent the challenge of wandering behavior among ASD and neurodevelopmental delayed individuals.

Referral for Co-occurring Development Concerns

While communication deficits are part of the core definition of an autism spectrum disorder (APA, 2013), ASD and neurodevelopmental disorders have high frequencies of co-occurring conditions (Hyman et al., 2019). Since co-occurring conditions can influence the presentation of ASD symptomatology, additional evaluations are typi-

cally warranted. Since communication and cognitive ability tend to predict a child's ultimate level of functioning, valid assessment of both of these areas is considered to be a core part of evaluation (Hyman et al., 2019). Psychologists often focus on disorder-specific assessment, e.g., diagnosing autism with instruments designed for that purpose, such as the Autism Diagnosis Interview Revised (ADI-R) and the Autism Diagnosis Observation Scale, second Edition (ADOS-2). In addition, a psychologist may provide an assessment of developmental functioning or intellectual functioning as well as adaptive functioning. Assessing adaptive functioning means reviewing how well a child handles day-to-day demands and how independently they can function compared to other children their age. Areas specifically assessed included practical skills, e.g., self-care such as bathing and grooming; social skill, e.g., the child's ability to interact with others through play and/or conversation; and conceptual skills, e.g., emerging academic skills such as letter/number recognition, interest in books or being read to. Table 20.2 provides an overview of commonly requested assessments in a comprehensive developmental evaluation.

Table 20.2 Common assessments requested in an ASD or neurodevelopmental evaluation

Assessment type	Responsible clinician
Cognitive testing	Psychologist
Language testing	Speech language pathologist
Adaptive functioning	Psychologist
Motor assessment	Occupational therapist
Hearing assessment	Audiologist
Sensory assessment	Occupational therapist
Feeding assessment	Occupational therapist/Speech language pathologist
Genetic testing	Geneticist

Treatment for Psychological Comorbidities

Around age 7, Sam's mother noticed that his academic progress appeared to "plateau" and his peers were outpacing him in terms of academic skills. Other children his age were able to read and perform basic math such as addition and subtraction, while Sam was still struggling to consistently retain his letter sounds. It felt as if he would master the material one day but would forget it overnight. He often had trouble expressing his thoughts clearly and was hard to understand at times. In addition, deficits were noted in both gross and fine motor skills. Sam could not ride a bike and he struggled with buttons and zippers when getting dressed. He also began displaying mild aggression in the form of hitting when frustrated. Sam was referred for psychological testing, and he was found to have Mild Intellectual Disability in addition to his diagnosis of autism spectrum disorder. His IEP was updated to include both the diagnosis of ASD and ID and curriculum modifications were implemented. His list of services on his IEP includes special education services, speech therapy, occupational therapy, and adaptive Physical Education. His mother continues to take him to a private facility for 10 hours of ABA therapy a week.

Although the DSM-5 provides clinically relevant criteria in which clinicians can make accurate diagnoses, there is substantial overlap in symptoms with other neurodevelopmental disorders and DSM-5 diagnoses. In fact, approximately 70% of individuals with ASD may experience symptoms of one comorbid DSM-5 condition and up to 40% of individuals with ASD will experience comorbid symptoms of two or more DSM-5 conditions (APA, 2013). Children and adults with ASD may experience clinical symptoms of major depressive disorder and a number of anxiety-related disorders (e.g., generalized anxiety disorder, obsessive-compulsive disorder). With regard to neurodevelopmental disorders, symptoms of intellectual disability, attention-deficit/hyperactivity disorder, communication disorders, and learning disabilities commonly occur in children with ASD. The presence of co-occurring disorders is associated with lower quality of life, higher reliance on intervention services, and poorer overall prognosis (Vannucchi et al., 2014; Matson & Cervantes, 2014).

Therefore, a brief summary of the often co-occurring conditions and treatment recommendations in individuals with ASD is pertinent.

Among the comorbid conditions with ASD, depression and anxiety symptoms appear to be some of the most prevalent (Hofvander et al., 2009). Mood or depressive disorders are defined as the presence of sad or irritable mood accompanied by somatic (e.g., weight loss or gain, loss of energy) and cognitive (e.g., decreased ability to think, recurrent thoughts of hopelessness) changes that affect multiple areas of a person's functioning. All anxiety disorders share common features such as excessive fear (i.e., the emotional response to stimuli) and worry (i.e., the anticipation of future harm or threat). Prevalence rates for anxiety disorders in individuals with ASD range from 22% to 84% (Vasa & Mazurek, 2015). A recent meta-analysis suggested that approximately 7.7 of children (18 and under) experience depression and the lifetime prevalence for adults with ASD is approximately 40% (White et al., 2018). An important factor associated with the development of anxiety and depressive symptoms appears to be age. According to Lever and Geurts (2016), within the ASD population, anxiety disorders are more prevalent in childhood, whereas in adulthood there is a higher prevalence of depressive disorders. Diagnosis of these conditions in individuals with ASD is often challenging due to limitations in communication abilities, emotional expression, theory of mind, and general insight into social interaction. For clinicians, it may be important to understand and address the emergence of mood or anxiety symptoms when individuals with ASD exhibit changes in their functional level or an increase in maladaptive behavior (e.g., anhedonia, reduction in activities of daily living, increases in agitation and compulsive behaviors).

According to Individuals with Disabilities Education Act (IDEA), the school system must provide special education services to children who meet criteria for one or more identified disabilities, provided the disability significantly interferes with the child's educational achievement. Both autism and intellectual disability are identified as being in the disability designation

under IDEA. It is essential that the student meet both criteria (the disability and its negative impact on school progress) in order to qualify for services. In the vignette with Sam, as he progresses through school and he is reevaluated on a regular basis, the global impact of his disability becomes more apparent with age.

Psychotherapy

Psychosocial interventions include, but are not limited to, Cognitive-Behavioral Therapy (CBT), relaxation, and mindfulness training. These treatments will assist with improving insight and the overall presentation of the patient. Secondary benefits may include improvement in other areas of functioning such as social, school, or work performance. In the early 1960s, Aaron Beck originally developed CBT to be a short-term (approximately 10 weeks) structured therapy for those with dysfunctional thinking that led to feelings of depression and anxiety. Beck's CBT has received significant empirical support within the literature (Yang et al., 2017; Li et al., 2018). The basic premise of the approach is that if a patient can become aware of their own maladaptive thinking patterns (i.e., cognitive distortions) and subsequently change these thinking patterns through rational evaluation, improvements in mood and anxiety can occur and have lasting effects (Beck, 2011). Although some of the core features of ASD (i.e., cognitive rigidity, difficulties with developing relationships, and adherence to routine, etc.) may impact the overall effectiveness, meta-analysis findings suggest that CBT can be effective with individuals with ASD (Weston et al., 2016). Some researchers recommend modifications to CBT to support the treatment's efficacy (Walters et al., 2016). For example, modifications suggested by the National Institute of Healthcare and Excellence (Crowe and Salt, 2015) in the United Kingdom include emotion recognition training (e.g., increasing a person's ability to attend to facial expressions, tone of voice, and body language and interpret and respond to these communication strategies) and using concrete and/or structured approaches

such as visual and written activities that incorporate the special interests of the individual to enhance CBT treatment effectiveness.

Mindfulness and relaxation training has shown to be effective in the treatment of anxiety and depressive disorders in individuals with ASD. These therapeutic approaches encourage the individual to identify thoughts and feelings as they occur in the present moment without judgment in order to develop an increased awareness and compassionate stance toward experience. The goals of clinical mindfulness training are to enhance attention and awareness of the self-including thoughts, feelings, and bodily sensations and can reduce social-communication deficits and improve internalizing and externalizing behavior problems, attention, distress, and overall emotional well-being (Ridderinkhof et al., 2018).

In addition to individual therapy, children with ASD can benefit greatly from social skill training. Often these treatment approaches target the core deficits of social-communication (e.g., conversation, theory of mind, non-literal use of language) to improve reciprocity and help to develop and understand social relationships. Although there are many approaches to teaching social skills, common applications include group and individual therapy formats. Group treatment is most common and, according to recent meta-analyses (Gates et al., 2017; Wolstencroft et al., 2018), shows moderate efficacy. However, one limitation to group treatment in the clinic setting is generalization of learned skills to other environments (e.g., school, community). Individual treatment often utilizes role-playing and perspective-taking to teach children with ASD social skills. One popular approach is Social Stories™. Carol Gray (2010) developed and used stories to describe common social situations, skills, or concepts. The goal is to improve social responsiveness by teaching individuals the necessary social information and/or typical responses in a given situation. Social stories have received satisfactory empirical evidence (Test et al., 2011). It should be noted that social skills can be learned across the lifespan and social skill development can be an appropriate goal for older individuals

with ASD as well. For example, programs such as Program for the Education and Enrichment of Relational Skills (PEERS), which was initially designed for adolescents (Laugeson & Frankel, 2011), was expanded to include preschoolers (Radley et al., 2018) and adults (Laugeson et al., 2015). Overall, targeted social skills training, in group or individual format, should be considered a priority during treatment planning for individuals with ASD.

Intellectual Disability and ASD

As noted above, a number of neurodevelopmental disorders have been found to be associated with ASD, including intellectual disability (ID), specific learning disability, and attention-deficit/hyperactivity disorder (ADHD). Intellectual disability is characterized by significant deficits in cognitive (Intellectual Quotient less than 70) and adaptive functioning (i.e., conceptual, practical, and social skills). Individuals with comorbid ID and ASD not only typically have difficulty with social-communication and restricted interests and/or behaviors but also struggle with general reasoning and often require enhanced care. Studies show that the co-occurrence of ASD and ID ranges from 30% (Polyak et al., 2015) to 70% (Fombonne, 2005) methodological research differences, severity level of ID symptoms and age of the individual may affect prevalence rates in the literature. Treatment typically involves establishing supports and services through various local (e.g., local speech/language and ABA therapy service providers) and state agencies (e.g., Office of Citizens with Developmental Disabilities) as well as coordination of academic interventions (e.g., special education). As these children progress through school-aged years, parents and other caregivers are encouraged to pay particular attention to limited basic cognitive and academic skills, as this will greatly impact the ability to obtain future employment and may limit independent functioning. In order to monitor a child's progress related to cognitive, social, academic, and overall development, routine psychological assessment should be made at regular

intervals. Monitoring progress is useful for identification/acquisition of appropriate supports and services as the child ages.

Learning Disabilities and ASD

Just as a proportion of children with ASD or NDD will also have co-occurring ID, children with ASD or NDD may also struggle with achievement (i.e., acquisition of academic knowledge) and are susceptible to learning struggles. According to the DSM-5, a specific learning disability (SLD) is defined as significant deficits in an area of academics (e.g., basic reading skills, reading comprehension, fluency; math calculation, problem solving, and fluency; written language and fluency) as measured by standardized instruments in the absence of significant deficits in intellectual/cognitive functioning (e.g., verbal and nonverbal reasoning, working memory, processing speed). Therefore, it is important to note that a specific learning disability is not equivalent to ID. A child with ASD without significant cognitive deficits may struggle in school and may or may not meet DSM-5 criteria for SLD. In other words, ASD is not conceptualized as a learning disability but also does not preclude an SLD diagnosis. Due to the nature of ASD and the underlying neurocognitive deficits often seen in individuals with ASD, these individuals may struggle in school. In general, children with ASD may struggle within the school environment due to executive functioning deficits, sensory processing deficits, and challenging behaviors (e.g., tantrums in response to being overwhelmed). Furthermore, as children progress through school, academic material becomes more complex and abstract. Children with high-functioning forms of ASD (without ID) often struggle with the theory of mind (e.g., the ability to understand the desires, intentions, emotions, and beliefs of others) and conceptual reasoning (e.g., the ability to use previous experience to form new concepts; Williams et al., 2014). Some strategies to combat these deficits include using visual cues to represent the abstract concept, reducing the use of idioms, dual meaning words, and sarcasm to

facilitate learning and understanding. In addition, teaching organizational skills can be an effective intervention to assist with lost materials, homework/classwork, or messy lockers or desks. In a situation in which a child with ASD also meets full DSM-5 criteria for specific learning disorder, strategies and interventions commonly used with individuals with these disorders can also be effective. Although multisensory models are preferred in most cases, some caution and modifications may be necessary when sensory defensiveness or seeking behavior interferes with effective teaching. Ultimately, any curriculum should be tailored to the specific strengths and weaknesses of each individual child.

ADHD and Autism Spectrum Disorder

Attention-deficit/hyperactivity disorder (ADHD) is a disorder characterized by inattention, hyperactivity/impulsivity, and poor executive functions which often manifests prior to age 12 years and significantly impairs multiple areas of functioning. In a review, Leitner (2014) suggested that the co-occurrence of ASD and ADHD symptoms ranged from 24% to up to 85%. Both ASD and ADHD are neurobiologically complex and there is significant overlap in symptoms related to these disorders. For example, the DSM-5 symptoms of “difficulty sustaining attention,” “often does not seem to listen when spoken to,” and “often has difficulty organizing tasks” (APA, 2013, p. 59) can all be seen in individuals with both ASD and ADHD. Therefore, comprehensive psychological and developmental evaluation often is necessary to provide diagnostic clarification. According to the DSM-5, abnormalities of attention (overly focused or easily distracted) are common in individuals with ASD, as is hyperactivity. A diagnosis of attention-deficit/hyperactivity disorder (ADHD) should be considered when attentional difficulties or hyperactivity exceeds that typically seen in individuals of comparable mental age (p. 58).

Children with co-occurring ASD and ADHD often have lower quality of life and poorer adaptive functioning as compared to those with only

one of the disorders (Sikora et al., 2012). And therefore, it will be important to tailor treatment to address both sets of symptoms. According to the literature, ADHD is best treated using a three-pronged approach, which includes parent support and education, behavior modification, and medication. Parent education can provide insight into the nature of both disorders and will improve a parent's knowledge base for intervention and support strategies. Once parents have learned appropriate behavioral strategies, they are encouraged to implement these strategies in order to improve attention to detail and improve academic performance. Knowledge often empowers parents and increases their ability to advocate for their child. Equipped with this knowledge, parents can seek appropriate treatments and support in both the clinical and academic arenas. Parents are encouraged to seek formal academic support through specialized programs such as an Individualized Accommodation Plan (IAP; 504 plan) or an Individualized Education Program (IEP; special education). These are necessary because as children with ASD/ADHD progress through school they will likely find age-appropriate tasks difficult to complete given his difficulty with sustained attention, distractibility, mild impulsivity, and general social-communication deficits. Parents of children with ASD with comorbid ADHD should also provide their child with education about their condition and ways to manage their deficits (e.g., time management training, decision-making, behavioral strategies to improve attention and concentration). It will be important for these individuals to learn coping skills to manage attentional difficulties. To address behavioral concerns, it is recommended that individuals with ASD/ADHD consult with a psychologist or other qualified interventionist who specializes in behavior modification and/or those providing Applied Behavior Analysis therapy (ABA therapy). It is very common for these individuals to complete a functional behavior analysis (FBA). The behavior plan should include preventative and management strategies to address behavioral challenges such as tantrums, aggression, and elopement. Overall, a behavior plan will inform those working with

the individual how to adequately and most effectively prevent and manage any behavioral challenges. Ideally, the interventions should be used in various settings to increase consistency across settings.

Parents are also encouraged to contact the child's pediatrician or other qualified healthcare provider (e.g., medical psychologist, psychiatrist) and discuss whether medication management is necessary to assist with treatment of symptoms related to ADHD. Medication may assist in reducing inattentive, distracted, impulsive, and hyperactive behavior. Some evidence suggests that although certain medications such as Methylphenidate reduce hyperactivity associated with ASD, the degree of improvement is less than in those typically developing children with ADHD (Research units, 2005). Although there is a risk of adverse side effects with the use of medication, the ASD with ADHD population does not appear to be at significantly more risk than children with ADHD alone, especially for symptoms such as irritability with use of stimulant medication (Ghanizadeh et al., 2019). A combination of medication and behavioral strategies will provide the optimal treatment approach for any individual with ADHD and ASD.

Autism spectrum disorder impacts three main areas in an individual's life: the social aspect, communication, and their behaviors. While individual signs and symptoms vary from person to person, regardless of the degree of impairment present (high functioning versus low functioning), all individuals present with the same core triad of deficits (Center for Disease Control, 2018). A child may look "more autistic" at a young age due to the presence of stereotyped behaviors, such as hand flapping and toe walking, as this child ages, if they continue to meet diagnostic criteria for autism the core deficits of impairments in all three areas will remain, although the degree to which symptoms may be observed can change. For example, some high-functioning individuals with ASD who have intact language may be mistaken for demonstrating signs of ADHD. A referral to a psychologist who specializes in ASD should be able to accurately determine the correct diagnosis. Using

record reviews, parent and teacher interviews, and a variety of psychological tests, including some specific to ASD, the psychologist should be able to differentiate between the core features of ASD and other clinical conditions.

When Sam turned 15 years old, his IEP was updated to include a work transition plan. The psychologist was one of several professionals who participated in planning and developing goals that would help transition Sam from the school system to the work force. The goal was to have Sam remain in school until he was 21 years of age, but he would spend his later years learning job skills and begin the process of exiting the school system and into a supported work environment. Outside community agencies, such as Vocational Rehabilitation Services, began to attend his IEP meetings and supported Sam and his family during this transition process. Sam also began seeing a psychiatrist who prescribed anti-anxiety medication, which helped with Sam's difficulties with transitions and learning in new environments.

Genetics

The etiology of ASD is complex and it is a genetically heterogeneous disorder (Waye & Cheng, 2018). As our understanding of the architecture of the human genome improves, one area of increasing research interest is in the underlying genetic variations associated with ASD. At present, heritability estimates are varied, and some estimates are as low as 37% and some as high as 90%, and approximately 15% of ASD cases seem to be associated with a known genetic mutation (APA, 2013). These figures suggest that parents who have ASD are at an increased risk of a child also having ASD as well as parents without ASD who have a child with ASD have a significantly increased chance of having a second child with ASD. These are important factors due to the increase of ASD over the past three decades (CDC, 2017). Given the increase in genetic understanding as well as the value of genetic counseling for families who are considering future pregnancies, psychologists routinely referred newly diagnosed children and their families for genetic counseling. Psychologists follow the guidelines recommended by the American

Academy of Pediatrics and the American Academy of Neurology and the Child Neurology Society, which state, among other things, "genetic testing in children with autism, specifically high-resolution chromosome studies (karyotype) and DNA analysis for Fragile X, should be performed in the presence of intellectual disability (or if intellectual disability cannot be excluded), if there is a family history of Fragile X or undiagnosed intellectual disability, or if dysmorphic features are present. However, there is little likelihood of positive karyotype or Fragile X testing in the presence of 'high-functioning autism'" (CDC, 2017). By understanding these and other genetic risks factors, researchers hope to ultimately find an accurate and reliable diagnostic marker to assist clinicians in the accurate diagnosis of ASD. In addition, the benefits of genetic testing can enable the parents to have a deeper understanding regarding the cause of ASD and may lead to earlier diagnosis and enhance treatment options (Rutz et al., 2019). Although additional research and understanding is necessary for genetic testing to become a more reliable diagnostic option, several organizations such as the American Academy of Pediatrics (AAP) and American College of Medical Genetics (ACMG) recommend that genetic testing be offered to all families affected by ASD.

Summary

This chapter summarizes the identification process of ASD as well as behavioral (e.g., ABA, PRT, DTT, TEACCH) and alternative (e.g., speech, occupational therapy) interventions for the disorder. Psychologists play an integral part in the identification and treatment of individuals with ASD and work closely with individuals with ASD, their families, and other treatment providers to help reduce symptoms, improve cognitive ability and daily living skills, and maximize the ability of the individual to ultimately live as independently as possible within the community. The treatment process is ever-evolving to the needs of the individual.

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