Foundations of Special Education
By Dr. Kathleen VanTol

Chapter 7: Autism Spectrum Disorders

"Different... not less" – Temple Grandin

Temple Grandin, a professor of animal science and a person with autism, at her TED Talk in 2010.

Image: Jurvetson, S. (2010, February 12). Rain Man's Rainbow. Flickr. (CC BY 2.0).

Introduction

Autism spectrum disorder (ASD) is a neurodevelopmental disability that affects how a person communicates, interacts with others, and experiences the world around them. Like all people, individuals with autism have unique strengths, interests, and talents. Because autism exists on a spectrum, no two individuals with ASD are exactly alike. Their characteristics, support needs, and intellectual abilities can vary considerably. Some individuals require extensive support in many areas of daily life, while others need only

minimal assistance. Likewise, while some individuals with ASD have an intellectual disability, many have average or above-average intelligence. Given this diversity, it is not surprising that some students with ASD require specialized instruction and related services, while many others only need minimal supports to be successful in the general education classroom. Although autism can present significant challenges in communication, social interaction, behavior, and sensory processing, these challenges do not define an individual's potential. Temple Grandin's reminder that people with autism are "different… not less" reflects the central message of this chapter.

For children who qualify for special education, IDEA defines autism in this way:

> Autism means a developmental disability significantly affecting verbal and nonverbal communication and social interaction, generally evident before age three, that adversely affects a child's educational performance. Other characteristics often associated with autism are engagement in repetitive activities and stereotyped movements, resistance to environmental change or change in daily routines, and unusual responses to sensory experiences. (IDEA, 2017)

History of Autism

Autism is characterized by deficits in social communication and repetitive patterns of behavior.

Image: RDNE Stock Project. (2021, June 11). *A boy walking while pulling a suitcase*. Pexels.com (CC free to use)

The word autism comes from the Greek word autos, meaning self (NASET, 2024). The first recorded use of the term autism as a medical diagnosis occurred in 1908, when it was used to describe a group of individuals diagnosed with schizophrenia who appeared very self-focused. The next major development occurred in 1943 when Leo Kanner, an American child psychiatrist, published a paper describing 11 children with a condition he called early infantile autism. These children generally had average or above-average intelligence but demonstrated a strong preference for being alone and an insistence on sameness. One year later, Hans Asperger (1944), an Austrian pediatrician, described a similar group of children who also had average or above-average intelligence but displayed intense, highly focused interests and difficulties with social interaction. The pattern of characteristics described by Asperger later became known as Asperger's syndrome. Although autism was beginning to receive greater attention from physicians and researchers during the early twentieth century, it was still a relatively unfamiliar diagnosis and little was understood about its causes or characteristics, leaving the field vulnerable to theories that were later shown to be incorrect (National Autistic Society, 2012).

Unfortunately, in the late 1960s, Bruno Bettelheim advanced the erroneous theory that autism was caused by emotionally distant mothers who failed to provide their children with enough love. He referred to these women as "refrigerator mothers" because of their supposedly cold and unemotional interactions with their children (Cohmer, 2014). This theory not only caused unnecessary guilt and distress for countless families but also diverted research away from investigating the true biological causes of autism. It was not until the late 1970s that researchers began to recognize the role of genetics and neurological differences in the development of autism.

Then, in 1998, a study published in a prominent medical journal suggested a link between the measles-mumps-rubella (MMR) vaccine and autism. The study was later discredited and retracted, and extensive subsequent research has found no evidence of a causal relationship between vaccines and autism. Nevertheless, questions stemming from this

claim continue to arise. Since that time, a variety of environmental factors have also been proposed as possible contributors to autism, and researchers continue to investigate these questions (Children's Hospital of Philadelphia, 2024).

Fortunately, important advances in the understanding and education of children with autism were also occurring during this time. One significant milestone came in 1987 when Ivar Lovaas published a study demonstrating that intensive behavioral intervention, based on the principles of **applied behavior analysis (ABA)**, could substantially improve learning outcomes for many children with autism. Lovaas' work gave families hope that meaningful progress was possible for their children (Herman, 2019). Today, ABA continues to be recognized as an evidence-based best practice for teaching many children with autism. Another important development occurred in 1991, when IDEA established autism as a separate disability category. Before this change, students with autism were typically served under other IDEA eligibility categories, such as intellectual disability, speech or language impairment, or emotional disturbance (IDEA, 2024).

The next major development occurred in 2013, when the American Psychiatric Association published the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-V). In this edition, the separate diagnostic categories previously associated with autism, including Asperger's syndrome, were combined into a single umbrella diagnosis of autism spectrum disorder (ASD). Under the DSM-5, a diagnosis of ASD is based on two broad areas of characteristics:

1. Persistent deficits in social communication and social interaction
2. Restricted and repetitive patterns of behavior, interests, or activities

Individuals who demonstrate significant difficulties with social communication but do not exhibit restricted or repetitive behaviors may instead receive a diagnosis of **social pragmatic communication disorder** (Autism Speaks, 2022). These diagnostic changes reflect our growing understanding of autism as a spectrum disorder and provide the framework for identifying the characteristics discussed in the following sections.

Symptoms of Autism

Children with autism may prefer to play alone. They may line up their toys in a specific order or repeatedly spin the wheels on a toy car.

Image: Polesie Toys. (2023, November 3). *Boy lying down on floor and playing with toys.* Pexels.com (CC free to use)

The characteristics of autism often become apparent during the first few years of life, although the age at which symptoms are recognized varies from child to child. One of the earliest characteristics often observed in young children with autism is difficulty with **joint attention**. Joint attention refers to the ability to coordinate attention with another person by focusing on the same object or event. For example, a child may not follow another person's gaze or pointing gesture to look at something of interest. Likewise, the child may not point to or show an object to draw another person's attention to something they find interesting. Although this may seem like a small thing, joint attention is an important precursor for communication, language development, and learning. Typically developing infants begin this dance of coordinating their attention between their caregivers and the objects and events in their environments at 6 to 9 months of age (Before Their First Words, 2015; NICHD, 2017).

Difficulties with social interaction are another well documented characteristic of autism. Challenges with joint attention may contribute to these difficulties by making it harder for

children to understand and respond to the thoughts, feelings, and intentions of others. Some children with autism are very interested in interacting with those around them but may not know how to do so effectively. For example, they may have difficulty gaining another person's attention, joining a group activity, initiating or maintaining a conversation, or participating in cooperative or pretend play. Others may appear to prefer solitary activities or seem less aware of the people around them (CDC, 2024).

Communication skills can also be affected. Some children with autism do not develop spoken language, while others repeat words or phrases they hear without using them in a typical conversational manner. Some prefer to talk about a limited range of topics that are of particular interest to them, such as trains or dinosaurs. Even individuals with well-developed language skills may have difficulty identifying and expressing their emotions, communicating their needs, or understanding abstract language, humor, sarcasm, and other forms of figurative language (CDC, 2024; NASET, 2024).

Many individuals with autism also experience differences in the way they respond to sensory input. They may be unusually over sensitive or under sensitive to sounds, lights, smells, tastes, textures, or other sensory input. For example, some may find eye contact uncomfortable because the visual experience is too intense, while others may dislike being touched and may even have resisted cuddling as infants. Many also have difficulty adapting to changes in routine and prefer that activities always occur in the same manner or in the same sequence. Their play may have an unusual sensory or repetitive component, such as smelling or licking unusual items or performing certain actions repeatedly, such as spinning the wheels on a toy car or lining up their toys rather than playing with them in a more typical manner. Not every individual with autism will display all of these characteristics, and the type and severity of symptoms vary widely from person to person (CDC, 2024; NASET, 2024).

Definition

Children with autism may be uncertain when playing with others.

What will they do? Will they mess up something that has been carefully constructed?

Image: Cottonbro studio. (2020, January 27). *Boy in white long sleeve shirt and green pants sitting on floor beside girl in red.* Pexels.com (CC free to use)

Many of the characteristics described in the previous section are reflected in the formal diagnostic criteria used by clinicians. The DSM-5 organizes these characteristics into two broad domains that must be present for a diagnosis of autism spectrum disorder. First, the individual must demonstrate challenges in social communication and social interaction. Second, the individual must display restricted or repetitive patterns of behavior, interests, or activities. These characteristics must have been present during early development, interfere significantly with daily functioning, and cannot be better explained by intellectual disability or developmental delay alone (APA, 2013; Autism Speaks, 2024).

Within the domain of social communication and social interaction, the DSM-5 further identifies three areas of difficulty. Individuals with ASD demonstrate challenges in all three of these areas:

1. Social-emotional reciprocity – Difficulty initiating or responding to social interactions, engaging in back-and-forth conversations, or sharing interests, emotions, and experiences with others.

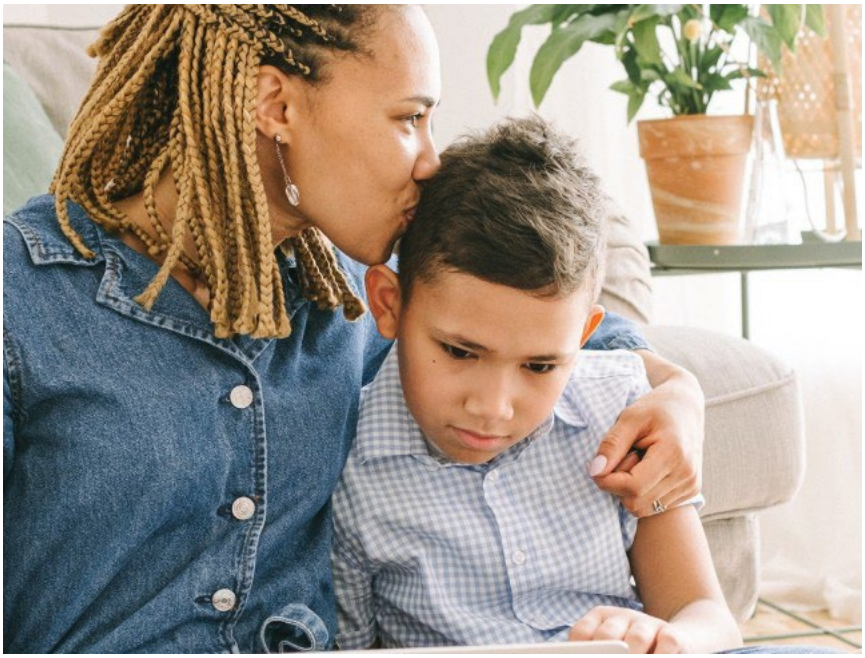
2. Nonverbal communication – Difficulty understanding or appropriately using nonverbal forms of communication such as eye contact, facial expressions, gestures, and body language.
3. Developing and maintaining relationships – Difficulty adjusting behavior for different social situations, engaging in imaginative play, making and maintaining friendships, or understanding social relationships.

In addition to these social communication and social interaction challenges, individuals with ASD must demonstrate at least two of the following characteristics related to the domain of restricted or repetitive behaviors:

- Repetitive movements, speech, or use of objects, such as hand flapping, **echolalia**, **idiosyncratic phrases**, lining up toys, or repeatedly manipulating objects in unusual or stereotypical ways.
- A strong preference for routines and sameness, including difficulty with transitions, distress when routines change, or rigid patterns of behavior.
- Highly focused or unusually intense interests that may dominate the individual's attention or activities.
- Differences in responding to sensory input, including being unusually over sensitive or under sensitive to sounds, lights, textures, tastes, pain, or other sensory experiences, or demonstrating unusual interest in sensory stimulation.

The DSM-5 also specifies that these characteristics must have been present during early childhood, although they may not become fully apparent until the child is older and social expectations increase. Finally, the characteristics must significantly affect every day functioning and cannot be explained solely by another developmental condition (APA, 2013; Autism Speaks, 2024).

Prevalence



Some people with autism prefer not to be touched.

Image: Ivan S. (2020, June 10). *Woman in blue denim jacket kissing boy in blue button down shirt.* Pexels.com (CC free to use)

The prevalence of autism spectrum disorder has increased dramatically over the past two decades. In 2000, approximately 1 in every 150 children was identified as having autism. By 2020, CDC surveillance data estimated that among 8-year-olds, approximately 1 in every 36 had been identified with autism. Autism is found at similar levels across all racial, ethnic, and socioeconomic groups, although boys are approximately four times more likely than girls to receive a diagnosis (CDC, 2024). The reasons for this increase in prevalence are not fully understood. It may be due, in part, to changes in the criteria for the diagnosis. It may also be the result of greater public recognition of the characteristics of autism. Increased awareness has also led to more accurate identification of autism. In the past, some children with autism may have been identified under other disability categories, such as intellectual disability, rather than being recognized as having autism (NASET, 2024).

Causes

Current research evidence has consistently demonstrated that genetics play a role in the development of autism spectrum disorder. However, although neurological differences

have been identified in the brains of individuals with autism, no single cause of autism has been found. Instead, researchers believe that autism results from a complex interaction of multiple genetic and environmental factors. This conclusion is supported by studies of families. For example, if one child in a family has autism, the likelihood that a younger sibling will also be diagnosed is approximately 15%. Twin studies provide even stronger evidence for a genetic component, showing that autism is much more likely to occur in both children when the twins are identical than when they are fraternal. Overall, researchers estimate that 40% to 80% of the likelihood of developing autism is influenced by genetic factors. However, rather than being associated with a single gene, autism appears to involve variations in many different genes. Interestingly, even though research has been able to identify several genes that are linked to autism, not all people with autism have the same combinations of these genetic differences (Medline Plus, 2021; NASET, 2024).

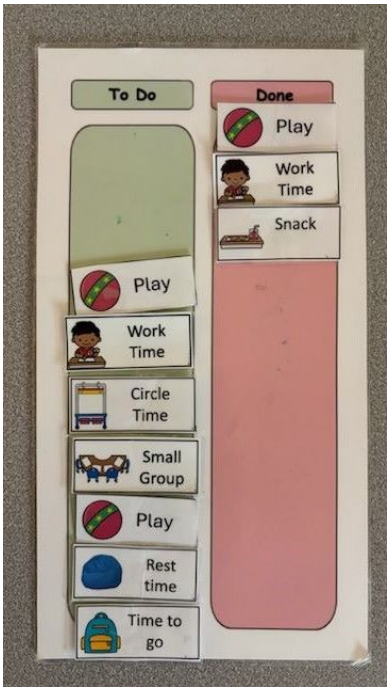
Neuroimaging research has also identified differences in the brains of many individuals with autism when compared to their typically developing peers. In particular, researchers have found differences in the white matter connections that allow different regions of the brain to communicate with one another. These research studies have shown that these nerve fibers are altered or underdeveloped in children with autism. This includes the corpus callosum, which connects the left and right hemispheres of the brain. Some studies have found that structural differences in the corpus callosum are more common in boys with autism than in girls with autism. While current research has shown that this alteration to the white matter of the brain is strongly correlated with an increased likelihood of developing autism, more research is needed to explore the cause of this disruption and its effect on the symptoms of autism. However, some researchers feel that understanding this disruption in neural connectivity is a key to understanding autism (Ha et al., 2015; Askham, 2020).

Researchers have also identified differences in the size of certain brain structures in some individuals with autism. For example, some studies have found that the hippocampus, a brain structure involved in learning and memory, is larger than expected, while the

cerebellum, which plays an important role in motor coordination as well as learning and social functioning, may be smaller. In addition, many studies have shown that some infants and young children with autism experience unusually rapid brain growth during the first two years of life. This accelerated growth appears to occur primarily in the frontal and temporal lobes of the brain. Researchers have also identified that excess spinal fluid may be produced during this time of rapid growth. They found that those children with the greatest amount of extra spinal fluid also had more intense symptoms of autism than those with lesser amounts of extra spinal fluid (Ha et al., 2015; Askham, 2020).

Clearly this is an area where continued research is needed. Although these discoveries have improved our understanding of the biological basis of autism, many questions remain unanswered. Learning more about the underlying biology of autism should help us to develop better treatments for individuals with autism. It is even possible that subtypes of autism will be identified based on identifiable changes in genetic makeup or in brain structures and this will help us differentiate treatments based on these subtypes. Additionally, identifying these characteristics may help us in our quest to recognize autism earlier and to determine the optimal time for interventions to be implemented (Askham, 2020).

Educational Decisions



Predictable routines and visual schedules are helpful for many children with autism.

Image: Hawley, S. (2025, November 19). Visual schedule. Dordt University. (CC-BY-NC-SA 4.0)

Students with autism spectrum disorder (ASD) often benefit from instructional programs that are systematic, individualized, and highly structured because these approaches provide the predictability and explicit teaching that many students with autism need to be successful. As discussed earlier in this chapter, applied behavior analysis (ABA) provides the foundation for many evidence-based instructional practices used to teach students with autism. ABA emphasizes the use of positive reinforcement to increase desired behaviors while providing clear expectations, explicit instruction, and frequent opportunities for active student responding. Instruction is organized around clearly defined learning objectives, and teachers provide timely reinforcement and corrective feedback to maximize student success. Another hallmark of ABA is its emphasis on ongoing data collection, with instructional decisions guided by continuous progress monitoring. ABA-based practices can be used to teach academic, adaptive, and functional skills. Although ABA is often associated with one-to-one instruction, ABA-based strategies can be used effectively in both individual and group instructional settings (Autism Speaks, 2024).

Many students with autism have communication deficits. Depending on the severity of the deficit, the student may need to be taught an alternative way to communicate. One evidence-based intervention grounded in the principles of applied behavior analysis is the **PECS®: Picture Exchange Communication System** developed by Bondy and Frost (1985). The goal of PECS is to teach functional communication through the use of picture cards. The protocol for teaching a child to communicate using PECS follows six very scripted phases. In Phase I, the student learns to request a desired item by exchanging the corresponding picture card with a communication partner, who immediately provides the requested item. Once this skill is mastered, the student progresses to Phase II, where the communication skill is generalized across people and settings. In Phase III, the student learns to discriminate among multiple picture cards to select the one that best represents the desired item. The remaining phases focus on expanding communication by teaching students to construct simple sentences, respond to questions, and use descriptive vocabulary such as colors, sizes, and numbers. Research on PECS has mainly focused on Phases I through III and has demonstrated positive effects for developing functional communication skills (Ganz & Simpson, 2019).

PECS is one possible **augmentative and alternative communication (AAC)** system. Other AAC options include manual sign language and speech-generating devices. Manual sign language uses hand shapes and gestures to communicate and has traditionally been associated with individuals who are deaf or hard of hearing. However, it can also be an effective means of communication for some students with autism and other communication challenges. Speech-generating devices use computer technology to produce spoken words or phrases when the user selects symbols, pictures, or text on the device. These methods are intended to compensate for communication deficits and can be used in addition to speech to augment the effectiveness of communication or as an alternative in place of speech. One common concern about teaching a child to use an AAC method is that it will adversely affect speech development. Research to address this concern has shown that none of these AAC methods impedes speech development and, in

some cases, even advances the development of spoken speech (Ganz & Simpson, 2019; ASHA, n.d.).

Another evidence-based instructional approach derived from the principles of ABA is **Pivotal Response Treatment (PRT)** (Autism Speaks, 2026). PRT is based on the idea that teaching certain foundational, or pivotal, skills will lead to improvements in many other behaviors without requiring direct instruction for each one. Examples of these pivotal skills include functional communication, the ability to make choices, and self-management. Teaching pivotal behaviors should increase the efficiency of learning by fostering generalization of what has been learned to new situations and shortening the intervention time. Typically, PRT is used in a one-to-one teaching situation and implemented in the context of child-preferred activities (Ganz & Simpson, 2019; Cooper et al., 2020).

Another evidence-based strategy that is particularly effective for teaching complex skills to students with autism is **task analysis**. Task analysis involves breaking a complex skill into smaller, sequential steps that can be taught one at a time, providing a systematic way to teach skills that might otherwise be overwhelming. Many skills consist of a series of individual behaviors performed in a specific order, a sequence known as **a behavior chain**. Many independent living skills such as preparing meals, cleaning, dressing, and doing laundry are especially well suited to instruction using task analysis. The number of steps included in the task analysis and the point in the sequence at which instruction begins should be individualized based on the student's current skills and learning needs. Task analysis will be discussed in greater detail in a later chapter (Cooper et al., 2020).

Many students with autism find transitions between activities challenging and benefit from advance warning before a change occurs. They may also benefit from being taught a consistent transition routine that they can follow each time this skill is needed. Because unexpected changes can be particularly stressful, maintaining a predictable daily schedule and providing a visual schedule can help students understand what to expect throughout the day. At the same time, it is also important to teach flexibility. One way to work on normalizing the unpredictable is by occasionally including a symbol, such as a question mark, on the visual schedule to indicate that a change in routine will occur at the time. By

practicing planned changes in routine on a regular basis, teachers can help students learn that unexpected events are a normal part of everyday life and can be managed successfully (NASET, 2024).

Many students with autism interpret language very literally, making it important for teachers to communicate clearly and concretely. Simple, direct language is often easier for these students to understand than figurative expressions or implied meanings. Although similes, metaphors, and other forms of figurative language can and should be taught as part of the academic curriculum, teachers should avoid relying on sarcasm, idioms, or ambiguous language during everyday instruction. Because autism can also affect language processing and comprehension, visual supports can be helpful. Visual schedules, graphic organizers, picture cues, and written directions can reinforce spoken language and improve understanding. However, teachers should be careful to balance the use of visual supports with the need to minimize unnecessary sensory stimulation and distractions. Teachers should prioritize the visuals that are the most functional for their learners. Many learners with autism will also benefit from the option of moving to a calm, quiet space in which to work (NASET, 2024).

Because autism is a spectrum disorder, no single instructional approach is appropriate for every learner. Effective teachers continually assess each student's strengths, interests, and support needs, then select the evidence-based practices that best match that learner's needs and maximize learning, independence, and participation. As our understanding of autism continues to evolve, educators should remain committed to lifelong learning and to refining their instructional practices in light of new research.

Conclusion

Autism spectrum disorder affects how a person communicates, interacts with others, and experiences the world. Because autism exists on a spectrum, each learner has unique strengths, interests, abilities, and support needs. Effective teaching begins with understanding these individual characteristics and using them to guide educational decisions. When educators use evidence-based practices, provide appropriate supports,

and maintain high expectations, students with autism can develop their abilities, build meaningful relationships, and successfully participate in school, work, and community life.

Notice and Reflect Challenge

During the coming week, observe a classroom or another setting where children are learning or interacting. Notice the ways adults support communication, participation, and successful transitions between activities. Look for examples of visual supports, predictable routines, explicit instruction, or other strategies that help learners understand expectations and successfully engage in activities.

Reflect

- How did the environment or the actions of adults either support or create barriers to participation and communication?
- Which of the strategies you observed might also benefit a student with autism? How might these same strategies benefit other learners in the classroom?
- What did you learn from this observation about creating structured, supportive, and inclusive learning environments?

Glossary

- **Applied behavior analysis (ABA).** A scientific approach to understanding behaviors.
- **Augmentative and alternative communication (AAC).** Means of communication that do not rely solely on speech. This includes pictures, sign language, and speech-generating devices.
- **Autism spectrum disorder (ASD).** Umbrella diagnosis that includes autism and Asperger's syndrome.
- **Behavior chain.** A sequence of distinct actions linked together that complete a more complex task.
- **Echolalia.** Involuntary repetition of words or sounds spoken by someone else.

- **Idiosyncratic phrases.** Unique or atypical expressions that may only be understood by an individual and those closest to them.
- **Joint attention.** Two or more people paying attention to the same thing at the same time.
- **PECS: Picture Exchange Communication System.** A system that teaches children to communicate using picture cards.
- **Pivotal Response Treatment (PRT).** A play-based therapy for children with autism that is initiated by the child.
- **Social pragmatic communication disorder.** Diagnosis for children who have impaired communication but do not demonstrate repetitive behaviors.
- **Task analysis.** Breaking a task into smaller, more manageable steps.

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