CHAPTER 1: AUTISM SPECTRUM DISORDER

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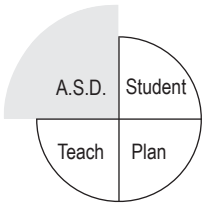

The purpose of Chapter 1 is to provide information about the primary characteristics and associated features of Autism Spectrum Disorder (ASD). This knowledge prepares the team for learning how an individual student is affected by ASD. All students, including those with ASD, are unique. Only once the team understands the student and the particular way in which that student is affected by ASD can the team begin to develop and implement appropriate educational programming.

Autism Spectrum Disorder

Autism Spectrum Disorder (ASD) is a complex neurological disorder that affects the functioning of the brain. It is a lifelong developmental disability that is characterized by impairments in communication and social interaction, and by restricted, repetitive, and stereotypic patterns of behaviour, interests, and activities.

ASD is referred to as a spectrum disorder because the symptoms can be present in a variety of combinations, and can range from mild to severe. ASD can occur with or without other disabilities. No single behaviour identifies ASD, and students generally will not show all possible symptoms.

Students with ASD may be similar in some ways and different in others due to individual variations in

- the number and kind of symptoms
- intellectual ability
- personality and temperament
- family environment
- educational and community experiences and opportunities

The term Autism Spectrum Disorder (ASD) is increasingly used to refer to Autism and the other Pervasive Developmental Disorders. In recognition of current usage, therefore, this handbook uses ASD in reference to all PDDs, including Autism.

Diagnosis

ASD is diagnosed through the presence or absence of certain behaviours, characteristic symptoms, and developmental delays. No biological marker or laboratory test exists to allow diagnosis of ASD. Diagnosticians use their experience, judgment, and *DSM-IV-TR* criteria.

See Appendix A: *DSM-IV-TR* Diagnostic Criteria.

The *Diagnostic and Statistical Manual* (*DSM-IV-TR*) classifies Autism within a broader group of Pervasive Developmental Disorders (PDD). PDD is an umbrella term for disorders characterized by impairments in reciprocal social interaction skills and communication skills, and the presence of

stereotypical behaviours, interests, and activities. Pervasive Developmental Disorders include

- Autistic Disorder
- Childhood Disintegrative Disorder (CDD)
- Rett's Disorder
- Pervasive Developmental Disorder Not Otherwise Specified (PDD-NOS)
- Asperger's Syndrome

Note: Asperger's Syndrome (AS) shares many characteristics of Autism, but there is debate whether AS is an independent diagnostic category or another dimension at the milder end of the Autism continuum. Information specific to AS is provided in Appendix B.

A diagnosis of ASD is made by qualified professionals with appropriate clinical training and expertise. Ideally, diagnosis and assessment involve a multidisciplinary team that includes parents, a pediatrician or psychiatrist, a psychologist, a speech-language pathologist, occupational and physical therapists, and an educator. A medical assessment, including a medical and developmental history taken through discussions with the parents, is conducted to provide a picture of early developmental milestones and parents' recognition of symptoms, and to rule out other possible causes for the symptoms, as many characteristics associated with ASD are also present in other disorders. A psychologist gathers information about the child's developmental level and behaviour, and a speech-language pathologist assesses speech, language, and communicative behaviours. Occupational and physical therapists assess the child's environmental sensitivities, fine and gross motor abilities and needs, and social interaction skills. Teachers and other school personnel provide perspectives on how the child learns and interacts with adults and peers.

The team approach to assessment provides an overall picture of the student and can rule out other contributing factors. It is important because students with ASD typically have an uneven developmental profile.

Causes

The cause or combination of causes of ASD is not fully known. There is evidence of genetic factors, possibly involving the interaction of several different genes. ASD may occur more frequently in families with a history of ASD or related disorders, but it may also occur in families with no apparent history. There is increased likelihood of ASD or other developmental disabilities among siblings of affected children.

Recent investigations suggest a biological basis for ASD. The brains of student with ASD appear to differ in structure and function from those of people without it. Ongoing research may eventually pinpoint the cause or causes of ASD.

There is no clear evidence that ASD is caused by

- parenting style—early theories that blamed parents for causing ASD have been thoroughly discredited
- vaccines—recent studies of large groups of children did not find a connection between vaccines and ASD

- food allergies
- bacterial, parasitic, or viral infections
- persistent infections
- immunological abnormalities

Medical Research Council. *MRC Review of Autism Research: Epidemiology and Causes*, 2001.

Prevalence

The generally accepted prevalence rate for Autism is between 4/5:10,000. Prevalence estimates are higher when the full spectrum of the disorder is included. Recent studies in North America and the United Kingdom suggest a prevalence of approximately 1:300 for the entire spectrum.

There is no present consensus among researchers as to whether these rates represent an increase in the number of children born with the disorder, or changes in diagnostic criteria and higher rates of identification.

There is a higher prevalence of ASD among males. Studies suggest a male-to-female ratio of between 3:1 and 4:1. One exception is Rett's Disorder, which affects only females.

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Primary Characteristics of ASD

The primary characteristics of ASD are shared by all students with ASD. They include significant difficulty in the acquisition and use of social interaction and communication skills and the presence of restricted, repetitive, and stereotyped patterns of behaviours, interests, and activities.

These characteristics are identified by the presence of specific indicators, which are summarized in Table 1.1.

Table 1.1: Summary of Primary ASD Characteristics and Indicators

Primary Characteristic	Indicators
Social interaction	1. marked lack of awareness of the existence or feelings of others 2. atypical seeking of comfort at times of distress 3. atypical imitation 4. unusual social play 5. limited ability to form friendships with peers
Communication	1. significant limitations in verbal and non-verbal communication 2. limited receptive communication 3. limited expressive communication
Restricted patterns of behaviours, interests, and activities	1. restricted repertoire of activities 2. stereotyped and repetitive body movements 3. persistent preoccupation with parts of objects or attachments to unusual objects 4. markedly restricted range of interests or a narrow preoccupation with one interest 5. difficulties with attention and motivation 6. need to follow routines in precise detail 7. marked distress over changes in the environment

While students with ASD share its primary characteristics, no two students are exactly the same. The characteristics (and their indicators) of ASD

provide a foundation for understanding needs typically associated with ASD. This information becomes more meaningful when it is used to develop an understanding of an individual student with ASD.

Social Interaction

Indicators:

1. Marked Lack of Awareness of the Existence or Feelings of Others
2. Atypical Seeking of Comfort at Times of Distress
3. Atypical Imitation
4. Unusual Social Play
5. Limited Ability to Form Friendships with Peers

1. Marked Lack of Awareness of the Existence or Feelings of Others

When six-year-old Jenna wants something at home or in the classroom that she can't get for herself, she takes the forearm of the nearest adult and places the adult's hand on what she wants, without looking at the adult or communicating in any other way.

Seven-year-old Tim bumps classmates seated on the carpet and steps on their hands without seeming to notice their presence or their reactions to him.

Nine-year-old Max sits down in the middle of a hallway full of older students at their lockers at 3:30 p.m. He seems oblivious to the jostling and grumbling, but catches the attention of a passing adult, rolls his eyes, and says, "I'm surrounded by idiots."

Students with ASD typically experience significant difficulty relating to others. In some cases, they may act as if others do not exist. A student may acknowledge someone's presence in order to have a need met (e.g., to obtain an object) and subsequently ignore the person. The student may demonstrate this apparent aloofness by

- appearing to be deaf
- failing to respond when called
- appearing not to listen when spoken to
- failing to produce a facial expression appropriate to the occasion, or producing a facial expression that is inappropriate to the occasion
- avoiding eye contact
- failing to enjoy or return other people's affection
- treating people as if they were inanimate objects or useful tools

Students with ASD may respond socially to others in a variety of ways. Depending on the student, this absent, diminished, or atypical response to others may involve

- not sharing enjoyment, such as showing their objects of interest to others
- an unwillingness or inability to engage in co-operative play
- a tendency to spend inordinate amounts of time doing nothing or pursuing ritualistic activities
- difficulty making personal friendships
- a desire or drive for social interaction without the interaction skills to succeed

They may also be unable to appreciate or even react to others' feelings and emotions, such as pain or distress. This is a characteristic of almost

all students with ASD and often impedes the development of friendships.

Students with ASD may have particular difficulty with interactions that require them to understand that other people may know different information or think different thoughts than they do. This theory may explain why students with ASD typically have difficulty trying to imagine how another person feels, or to understand that another person may not understand their speech or language.

2. Atypical Seeking of Comfort at Times of Distress

Students with ASD typically seek predictability and function best in structured activities and environments. Therefore, they often experience difficulty managing changes to their environment or routines. They may have strong emotional reactions to seemingly insignificant objects or situations, perhaps because they associate them with a previous unpleasant experience.

While typically developing students seek reassurance when afraid or in pain, students with ASD may not know how to communicate their need to others, or may not understand that people can be of assistance.

When distressed, five-year-old Amy calms herself with the noise made by brushing her fingers across a soft brush held close to her ear, rather than wanting to be cuddled or to hold a doll or stuffed toy.

3. Atypical Imitation

Students with ASD usually do not learn effectively through imitation and require direct instruction. While typically developing students may observe and successfully imitate a variety of skills and behaviours spontaneously, students with ASD generally do not. As infants, students with ASD often do not respond to simple games such as “peek-a-boo” or waving “bye-bye.”

Students with ASD may not be able to focus and attend. They may lack the motor planning and coordination needed to imitate multi-step motor routines, such as tooth-brushing or other self-help or household tasks. The ability to learn by observing and imitating often remains limited as the students get older, unless they receive direct instruction and intensive practice.

Nine-year-old Max wants the attention of his classmates and makes frequent social overtures to his peers. Unfortunately, he is often ignored. One day, he approached some older boys on the playground with taunts and insults. In response, they shoved him around and ridiculed him. The next day, he gave tickets to his classmates to come to see him getting beaten up in the afternoon. Because he knows that a fight attracts a crowd (and brings him attention) he believes he has found a way to get his peers to pay attention to him.

Six-year-old Chris communicates with a few words and great agitation that he wants to stop skating with the other students and return to his classroom. His educational assistant tells him that it's not time to leave the ice yet. He looks at her and then begins swearing loudly. In the past, the consequence for swearing has always been an immediate return to his classroom from an outside activity.

Twelve-year-old Anne raises her hand and introduces sexually charged comments in class when she wants to escape tasks. She knows from experience that this behaviour always results in her being sent to sit in the hallway.

4. Unusual Social Play

Students with ASD typically experience difficulty with social and play skills. When they do play, their play is usually routine and repetitive in comparison to the spontaneous, creative, and evolving play of their peers. Many will not play with toys or other objects, or will use them in idiosyncratic ways. A toy plane, for example, may not be a thing that flies but an object that has a metallic taste, rattles when it is shaken, and makes interesting visual patterns when its propellers spin.

Underdeveloped play skills may contribute to students' difficulty interacting with others in later years. If students with ASD are not able to play with other children when they are young, they may not develop the skills necessary to interact with others when they are older. While many students with ASD begin to show interest in their peers as they get older, they often do not have the play and social communication skills required to connect meaningfully with them.

In his Kindergarten class, five-year-old David plays with blocks by lining them up in various ways on a tabletop and then moving his head back and forth to enjoy the visual effect. He loudly resists the efforts of other children to add on to his lines. He does not appear to attend to the ways in which other children use blocks for castles or garages or paths, and his use of blocks has not changed after two months of Kindergarten.

Dale and Michael, both ten, are referred to a social skills group. On the first day, they are told to play with anything in the room that they wish. They walk past the age-appropriate activities such as board games, card games, and construction toys, and head straight for the large toddler toys. They then have difficulty figuring out how they work.

Brenda Smith Myles describes a student, referred to her for aggression on the playground, who told her his favourite game was "Walker Texas Ranger." When asked how to play it, he said that you kicked people and hit them and then at the end people liked you; and that he was doing that at recess and pretty soon people would like him.

—Myles, B. S. "Thinking Outside the Box about Social Supports." Presentation sponsored by St. James-Assiniboia School Division, Winnipeg, MB, 4 February 2005.

5. Limited Ability to Form Friendships with Peers

Students with ASD tend not to spontaneously seek interaction with peers. They may not be able to tolerate being physically close to others, and may withdraw from them. They may also signal a desire for contact with others, but do so in socially inappropriate ways, such as by standing very close to someone but saying nothing, or by silently stroking another child's face or arms. Consequently, they often miss opportunities to acquire and practise social skills, leading to further social distance from others.

Of the many skills required for effective social contact, two are frequently absent or diminished in students with ASD:

- relating to peers and others in a positive and reciprocal manner
- adjusting to meet changing social demands in different contexts; for example, understanding that language or actions acceptable with peers in private conversations may not be appropriate with adults or authority figures

Eleven-year-old Matthew stands nose-to-nose to talk to peers and advances as they retreat, not noticing or understanding the social distance commonly expected.

Nine-year-old Kyle dominates every interaction with peers in group tasks and in social activities, assigning roles and making rules, changing them as necessary to ensure that he is always first and he always wins.

Communication

Indicators:

1. Significant Limitations in Verbal and Non-Verbal Communication
2. Limited Receptive Communication
3. Limited Expressive Communication

1. Significant Limitations in Verbal and Non-Verbal Communication

Students with ASD experience a range of challenges with verbal and non-verbal communication that together represent much more than just a delay in communication development.

Effective communication requires the ability to understand what others say (receptive language skills) and to give information in a way that others can understand (expressive language skills). Both receptive and expressive skills include verbal and non-verbal communication.

Verbal communication involves the use of language in spoken form to give and get information from another person.

Non-verbal communication involves the sharing of information without using spoken language. Examples of non-verbal communication include body language, facial expressions, tone of voice, and so on. Because they are unaware of many of the subtle non-verbal cues of communication, most students with ASD are unable to respond to the nuances of communication.

Underlying these problems is a difficulty in using the rules of social communication. Often, difficulty with language may reflect a lack of understanding about what is socially acceptable. It may also reflect an inability to use listener feedback to monitor speech and language.

Tony Attwood, an Australian clinician and author, tells of a young man who, when Attwood reminded him of the necessity to look at him when they conversed, said, "Why should I keep looking at you? I know where you're sitting."

—Attwood, T. "Effective Strategies to Aid Social/Emotional Development for More Able Individuals with Autism and Asperger's Syndrome." Presentation sponsored by Geneva Centre for Autism. Winnipeg, MB, 4 November 2000.

Depending on the individual, difficulties with communication may include

- absent or delayed spoken language (without the corresponding use of gesture or mime to compensate)
- failure to initiate interaction with others or to respond to the attempts of others to initiate communication (for example, not responding when called by name)
- inability to maintain an interaction by taking turns in conversation
- use of stereotypical language and repetitive use of language such as echolalia (the rote repetition of words previously heard, such as in conversations or television commercials)
- pronoun confusion, such as referring to self or others in the third person or using proper names rather than personal pronouns such as I, you, he, or she
- idiosyncratic use of words and phrases, such as echoing memorized words or phrases in situations which seem appropriate, or inventing phrases such as "I lost my remembering" to mean "I forgot"
- abnormalities in the pitch, stress, rate, rhythm, and intonation of speech

Eight-year-old Adam says "I'll give you a clue" when he means "I need help," and repeats "My name is…" with agitation when he meets a new person, meaning "What's your name?"

2. Limited Receptive Communication

Students with ASD process information differently than their peers do. These differences may include

- attaching little or no meaning to verbal language
- showing little or no interest in conversation
- paying insufficient attention to the speaker

- failing to understand the meaning of words or phrases that are abstract or that have more than one meaning
- taking words and expressions such as "step on it" literally
- focusing on how a message is communicated, rather than focusing on its meaning
- failing to understand sarcasm, teasing, or the subtle changing of the meaning of words by tone of voice
- hearing what he wants to hear; ignoring parts of the message that signal something unpleasant or that require a change in expectations
- misinterpreting non-verbal cues used by others
- failing to coordinate the verbal and non-verbal components of speech
- misunderstanding language involving abstract or imaginary activities

Eight-year-old Adam, when asked if he liked the parade, says, "I liked the end of the parade," meaning the football game which started after the parade.

Ten-year-old Helen participated in a lengthy class discussion after listening with her classmates to a radio news report about a robbery in which someone had been seen waving a gun. When asked about the radio item following the discussion, she insisted that the person had been waving a flag because "you wave a flag."

Ten-year-old Miranda is distressed when school staff try to discourage her from running for student council. She insists that she can run and win because she knows that she is an excellent runner.

Nine-year-old Justin is going to the park with other children and adults. After 15 minutes of exhaustive preparatory discussion involving words and pictures drawn on the board showing playground equipment and a script for what would happen at the park, Justin collapses in distress on the sidewalk when he realizes the group is not going to the parkade, where he knows his family car is parked.

Nine-year-old Mark is involved in a good listener/bad listener activity. Children have been told that a good listener listens carefully and faces the speaker. When he is asked to identify one way in which another child was a good listener, he says, "because his ear was facing Sam."

3. Limited Expressive Communication

Most students with ASD experience significant delays or difficulties with spoken language. Many will not acquire spoken language. Those who do often use it differently than their typically developing peers. These differences include

- failing to use body language to communicate
- using language in socially inappropriate ways, such as repeating words or phrases without intending to communicate something
- failing to provide non-verbal feedback, such as a head nod or a smile to a speaker
- using associational speech, memorized words, or phrases which the student tries to fit into a particular situation because he cannot phrase language more conventionally

- experiencing difficulty adjusting speech in response to listener feedback, cues of approval, amazement, disbelief, or boredom
- confusing listeners with incorrect use of pronouns
- staying with a conversational topic well past the point of listener interest
- experiencing difficulty with maintaining appropriate loudness, pitch, stress, rate, rhythm, and intonation of speech

In the following examples, each student uses a memorized "chunk" of speech he has heard before because he cannot produce the appropriate language for the situation.

Five-year-old Shaun, walking with his mother, approaches a heavy-set woman. He looks her up and down, then looks at his mother and says, "It's not over until the fat lady sings."

Six-year-old Tim has very poor motor planning and can neither pedal a tricycle nor figure out how to get off. As he sits stuck against a wall he says loudly, "Alright, I've had just about enough of you for one day," a phrase he had probably heard an adult say when frustrated.

Eighteen-year-old Owen writes "I'll follow the sun" (a song title) in order to answer a science question about plants requiring light.

Students with ASD often produce echolalia, the repetition of words, signs, phrases, or sentences spoken or used by other people. Echolalia may be *direct* (the student repeats immediately what someone else has just said) or *delayed* (the student repeats later what someone else said).

Echolalia appears to be a developmental stage in the acquisition of communication and language for some students with ASD, involving a progression from non-verbal to echoic verbalization to spontaneous, creative, non-echoed utterances. Changes in the original echoed utterance, signalled by new words or different intonation, often indicate the beginning of the movement to increasingly creative language use. This changed echolalia is called *mitigated echolalia*.

Echolalia may offer the student a functional means to communicate. For example, in response to the question "Do you want a cookie?" a student with ASD might echo "Want a cookie?" to indicate "yes, please." The repetition by the student of a phrase such as "Sit down and work" might assist in self-regulating behaviour. For these reasons, it is appropriate to encourage and develop the student's use of echolalia.

Nine-year-old Vanessa cannot independently use words to make requests. She approaches her mother and says, "Don't you want to listen to the music?", exactly duplicating her mother's intonation when she has asked Vanessa the question previously.

A note on behaviour and communication: All behaviour communicates, or may have the potential to communicate, information that is important to the student with ASD. When trying to understand the reason for a behaviour, ask yourself: "If this behaviour could talk, what would it be saying?" This means that students who do not develop

verbal language may communicate through other means. These may include subtle communication acts that require familiarity with the student to interpret, or direct expressions such as screaming, crying, acts of aggression, or self-injurious behaviour.

Restricted Patterns of Behaviours, Interests, and Activities

Indicators:

1. Restricted Repertoire of Activities
2. Stereotyped and Repetitive Body Movements
3. Persistent Preoccupation with Parts of Objects or Attachments to Unusual Objects
4. Markedly Restricted Range of Interests or a Narrow Preoccupation with One Interest
5. Difficulties with Attention and Motivation
6. Need to Follow Routines in Precise Detail
7. Marked Distress over Changes in the Environment

1. Restricted Repertoire of Activities

Students with ASD are often more oriented to objects than to people, and yet many have a very small repertoire of activities they can enjoy doing with the objects or materials that they like. They may need to be systematically taught to broaden their range of interests and activities so that they can entertain themselves, increase their attention span, improve trial-and-error learning skills, and master activities that will then become vehicles for social interaction.

Five-year-old Luis has ASD and a significant cognitive disability. He seems to have no repertoire of ways to enjoy himself, other than eating. When he is exposed to a large variety of toys and materials, he is observed to watch briefly toys that spin, such as tops and musical bells, even though he doesn't attempt to use them.

He is then taught, using demonstration and hand-over-hand support and a simple script of "push…look," to push on a top and watch it spin. He is praised each time he pushes and offered one piece of sweet cereal as a reinforcer after three pushes. Eventually, when he is being taught to do a new activity, he is offered cereal as a reinforcer, but he pushes it away and points to the top instead.

He has now enlarged (pushing on the top) the repertoire of activities which he can enjoy doing and which can be used as reinforcers to teach new activities.

2. Stereotyped and Repetitive Body Movements

Students with ASD may show "stereotyped" behaviours such as hand flapping, finger flicking, rocking, hand clapping, lunging, and grimacing which compete with purposeful tasks or activities. The desire to perform these movements often seems strongly internally motivated. Attempting to halt them without providing alternatives may lead to other similar behaviours.

Students with ASD may also show abnormalities of posture, such as toe-walking or walking flat-footed rather than using the more typical heel-and-toe movement.

3. Persistent Preoccupation with Parts of Objects or Attachments to Unusual Objects

Students with ASD often develop preoccupations with particular objects (for example, wheels, light switches, string, fans) or sounds, colours, or textures that go well beyond the stage of a simple interest. Again, like the stereotyped and repetitive body movements described above, the internal motivation behind these preoccupations and attachments may be very strong. For example, a student's preoccupation with spinning a toy car's wheels might be more interesting than rolling it along the floor.

4. Markedly Restricted Range of Interests or a Narrow Preoccupation with One Interest

Most students with ASD show an intense interest in a narrow range of objects, activities, or people. In higher-functioning students, these interests often become preferred conversational topics that dominate social interaction with others.

> Eleven-year-old Marcel has chosen John Coltrane as his topic for a classroom project on musicians, and in the process he has developed an intense interest in jazz. Every spontaneous conversation between Marcel and his peers or adults at school is used to relay the latest things he has learned about Coltrane or other jazz "greats," and he is very creative about inserting his topic into apparently unrelated classroom discussions. He also brings tapes so that his teacher can play them during class. He shows no awareness that, while his teacher is charmed, his Grade 6 peers are uninterested at best.

5. Difficulties with Attention and Motivation

Students with ASD often demonstrate a range of unusual patterns of attention that affect communication, social development, and learning. Specifically, they may

- focus attention on one aspect of a situation and ignore the rest. For example, a student may look at the ball but not at the person to whom the ball is to be thrown, or notice an insignificant detail such as a staple in the corner of a paper, but not the information on the paper itself.
- experience difficulty shifting attention from one thing to another
- be unable to sustain attention to people or activities
- fail to attend to information from two sources at the same time
- respond to irrelevant social cues that have caught their attention
- attend to limited portions of a conversation and not understand the intent of the speaker
- not attend to multiple cues in speech and language and so miss important subtleties of the message

> Twelve-year-old Millie, asked to put away coins after a coin-counting task, turns all the coins face down and whispers to herself "the ones with the leaves." She used that cue to discriminate pennies from dimes and nickels, rather than colour as many students would do.
>
> Five-year-old Martin has a parent who is a gemologist, and he is interested in gems and rocks. He appears to pay close attention to a story read by his teacher as he sits on the carpet in front of her. Asked afterward to say what he liked best about the story, he responds, "What a whopper," pointing to the teacher's engagement ring. This left his teacher wondering whether his fascination with gems kept him from paying attention to the story.

Frequently, what motivates students with ASD is different from what motivates their peers. Internal motivators, such as the need to fit in with

peer groups or to share experiences, may not be meaningful. Similarly, students with ASD may not find external rewards (or reinforcers) motivating. In fact, students with ASD may not be able to understand or tolerate many things a typically developing student might find rewarding, such as

- physical contact (for example, a light pat or a hug)
- non-verbal signals such as a wink or head nod
- verbal praise
- extra time for social contact
- reinforcers, such as checkmarks, to be exchanged for money or privileges

Students with ASD are typically motivated by highly individual preferences and interests. If these are understood and incorporated appropriately into learning activities, it may be possible to increase the motivation of students with ASD and by so doing, improve their attention.

Seven-year-old Cole reads well and loves books, especially ones new to him. His teacher identifies a selection of books and stores them in a labelled box in the classroom. The books are available to him only for a few minutes after he has worked successfully in math each day.

Seven-year-old Rajinder is motivated by being in control of choices and by being able to photocopy and then complete dot-to-dot pictures. He has a visual schedule reminding him that after he fills in two circles (after completing two tasks), he can choose

1) to go to the office and choose a piece of coloured paper from the colours available from the school supply, or
2) to photocopy a dot-to-dot of his choice from the teacher's workbook

6. Need to Follow Routines in Precise Detail

All students (and adults, too) require a degree of structure, routine, and predictability in their day. Some students with ASD, however, need to maintain highly consistent routines in order to function with any success. Similarly, students with ASD usually perform tasks exactly as they are taught. With thoughtful planning and teaching, this can be a learning strength. Conversely, unlearning one skill and relearning another may require considerable time and effort.

Six-year-old Sharon has learned to follow a picture script for removing and putting on outerwear. When spring arrives and she does not always come to school with snowpants, a hat, or a scarf, she has a tantrum each time it is necessary to dress or undress if the items of clothing matching the pictures are absent.

7. Marked Distress over Changes in the Environment

Seemingly minor changes may provoke strong reactions. Change that might go unnoticed or be welcomed by a typically developing student

might lead to distress or a tantrum in a student with ASD. For example, a student with ASD may be distressed if

- seating at desks or tables is rearranged
- bulletin boards are changed
- play materials are removed and replaced with different ones
- different centres are open on different days
- the class uses a different bathroom in the school than usual, or enters through a different door
- gym class occurs outside rather than in the gym
- the classroom teacher stands in a different place than usual to talk to the class
- instead of the usual activity, a special visitor speaks to the class or there is a special assembly

Associated Features of ASD

In addition to the primary characteristics that are central to the diagnosis, associated features are frequently observed in students with ASD, but are not central to making a diagnosis (as are the primary characteristics). Familiarity with these associated features provides a more complete understanding of the individual student with ASD.

Associated features of ASD include

1. unusual responses to sensory stimuli
2. anxiety
3. resistance and anger
4. limited problem solving and independence
5. scattered developmental profile

Unusual Responses to Sensory Stimuli

Students with ASD usually differ from typically developing peers in their responses to sensory information. One or more of their senses may be either hypo-("under")sensitive or hyper-("over")sensitive to environmental stimuli.

The extent to which differences in sensory processing impact the student with ASD varies. Consideration should be given to both the nature of sensory stimulation in the student's environment, and how he responds to it.

Table 1.2: Location and Functions of the Sensory Systems

System	Location	Function
Tactile (touch) 	**Skin** – density of cell distribution varies throughout the body. Areas of greatest density include mouth, hands, and genitals.	Provides information about the environment and object qualities (touch, pressure, texture, hard, soft, sharp, dull, heat, cold, pain).
Vestibular (balance) 	**Inner ear** – stimulated by head movements and input from other senses, especially visual.	Provides information about where our body is in space, and whether or not we or our surroundings are moving. Tells about speed and direction of movement.
Proprioception (body awareness) 	**Muscles and joints** – activated by muscle contractions and movement.	Provides information about where a certain body part is and how it is moving.
Visual (sight) 	**Retina of the eye** – stimulated by light.	Provides information about objects and persons. Helps us define boundaries as we move through time and space.
Auditory (hearing) 	**Inner ear** – stimulated by air/sound waves.	Provides information about sounds in the environment (loud, soft, high, low, near, far).
Gustatory (taste) 	**Chemical receptors in the tongue** – closely entwined with the olfactory (smell) system.	Provides information about different types of taste (sweet, sour, bitter, salty, spicy).
Olfactory (smell) 	**Chemical receptors in the nasal structure** – closely associated with the gustatory system.	Provides information about different types of smell (musty, acrid, putrid, flowery, pungent).

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- **Tactile (or touch):** Touch allows us to perceive and respond appropriately to our environment. Information, such as temperature and pressure, is gathered by the skin through touch and transmitted to the brain and interpreted. We use touch to tell the difference between a dime and a nickel in a pocket without looking, for example, or to register pain. Students with ASD may interpret tactile information in unique ways. They may be tactile defensive and withdraw from touch. They may react strongly to light touch but seem insensitive to pain such as a skinned knee. They may have strong reactions to certain textures of objects, clothing, or food, or may show no reaction at all. Students who are under-sensitive to touch may seek out more sensory input by choosing tight-fitting clothes or clothes with very tight elastic, by wearing their shoes on the wrong feet, by resisting wearing shoes and socks at all, or in other ways.

  Six-year-old Tony is easily agitated whenever something soft brushes lightly against his skin. His educational assistant has long hair that occasionally touches his cheek or neck when she works with him. Recently, he has started to show agitation when she comes near him, anticipating (and trying to avoid) the unpleasant sensation on his skin.

- **Vestibular (or balance):** The inner ear contains structures that detect movement and changes in position. Students with ASD may have differences in this orienting system that leave them fearful of movement or with difficulty orienting themselves on stairs or ramps. Some students may actively seek intense movement that vigorously stimulates the vestibular system, such as whirling, spinning, or other movements that typically developing students could not tolerate. The opposite, however, can also be true, and the student may not be successful with activities such as climbing a ladder, somersaulting, or bending at the waist to pick up an object or to put on boots. Some students with ASD may experience little or no difficulty with motor movements or balance.

  Temple Grandin is an author who writes from the perspective of someone with ASD. "Spinning was another favorite activity. I'd sit on the floor and twirl around. The room spun with me. This self-stimulatory behavior made me feel powerful. After all, I could make a whole room turn around. Sometimes I made the world spin by twisting the swing in our backyard so that the chain would wind up. Then I'd sit there as the swing unwound, watching the sky and earth whirl. I realize that non-autistic children enjoy twirling around in a swing, too. The difference is the autistic child is obsessed with the act of spinning."

  —Grandin, T. "An Inside View of Autism." *High Functioning Individuals with Autism*, 1992: 22

- **Proprioceptive (or body awareness):** Students with ASD may have difficulties knowing how much pressure to use to hold something or someone, or to use a pencil or keyboard. A student with reduced body awareness may stamp his feet as he walks; crash into desks, door frames, or people; or fall hard when sitting on a carpet. Motor planning,

the sequencing of motor activities required for such activities as getting on a tricycle or opening a door, may be related to difficulties with body awareness.

- **Visual (or sight):** Some students with ASD cover their eyes to avoid certain lighting or visual effects (such as flickering fluorescent bulbs) or in response to reflections or shiny objects, while others seek out shiny things and look at them for extended periods of time or enjoy moving their heads or moving objects before a light source to produce visual effects.

  A student may have difficulty finding something directly in his field of vision, such as a science book or a pen, because he doesn't pick it out from the background or because motivation is not high enough to support visual concentration; the same student may be able to "Find Waldo" or notice a word or numbers of perseverative interest on the side of a truck a block away.

- **Auditory (or hearing):** Students with ASD may show strong response to sounds. Seemingly insignificant sounds, such as the squeak of a marker on a page or the bubbling of an aquarium, may cause extreme distress. Normally occurring sounds may be experienced as painful or frightening. Students may tolerate loud sounds when they like them or are in control of them (for example, banging a drum) but react catastrophically to a ringing school bell or the buzzing sound of a TV when a video ends. Alternatively, students with ASD may not respond to sounds in their environment and act as if deaf or hard of hearing. One student with ASD may not be able to focus on one sound and screen others, such as listening to the teacher's instructions while other students are talking in groups. Another student may be so focused on an activity that he is oblivious to sounds in the environment, including having his name called loudly.

  
  Seven-year-old Sherry becomes withdrawn and unresponsive at the same times every day in her classroom. Her teacher eventually realizes that Sherry shuts down in anticipation of the sound of the bell ringing and shuts down again to recover from it.

- **Gustatory (or taste):** Some students with ASD can tolerate only a narrow range of tastes and textures in food or drink, making it a challenge to ensure adequate nutrition. This may cause problems with chewing, swallowing, gagging, and regurgitating. Eating things that are not food may also be an issue. Children who are hypo-responsive to taste or require more oral stimulation may seek out strong flavours or very cold materials, or mouth or lick objects.
- **Olfactory (or smell):** Some students with ASD may react to odours from perfumes, deodorants, food or drink, or the chemical residue of classroom cleaning products. Others may use smell in unusual ways to seek out information about their surroundings, such as recognizing a person by smell or having a stereotyped response to a certain smell such as baby powder.

Anxiety

For many students with ASD, school is a stressful place. Anxiety may be expressed in many ways, depending on the student. For some, there may be few visible signs; for others, it may be expressed very directly. There are as many potential causes of anxiety and responses to anxiety-producing situations as there are individuals. Although anxiety is not identified in the *DSM-IV-TR* criteria, many students with ASD (and their parents and teachers) frequently identify anxiety as a potential cause of learning and behaviour difficulties.

Nine-year-old Kelly is distraught when he is not able to spell a word correctly and begins to lose control. When an adult quickly tells him that "that word is at least a Grade 6 word, and no one would expect a boy in Grade 4 to be able to spell it," he says, "You mean it's OK if I can't spell it? Are you sure?" With several more reassurances, he is able to return to the activity.

Eleven-year-old Michael is told he can choose a game to play with a school clinician after a session of work. He looks at various games but can't choose, telling the clinician that he isn't sure in which game he can be the winner, and that he can't play a game unless he's sure he can win.

Eight-year-old Marni was non-verbal as a younger child, but has begun to use words well. She has always strenuously resisted efforts by parents or school personnel to take her outside in the winter. She is heard one day to say quietly to herself, "It's OK, the trees won't really poke your eyes out."

In the first two examples, the student's perfectionism and need for control causes anxiety and emotional upset or resistance. In the third, the student's anxiety and resistance is caused by fear which she can't explain in words.

The student with ASD may be anxious because he

- may not be comfortable and bonded with a significant adult, or may be over-dependent on the presence of one particular adult
- may have specific fears he can't communicate
- can't communicate successfully or can't understand other people's communication
- relies on particular visual or routine cues which are absent or changed
- may be stressed by an unpleasant sensory aspect of the environment, or by anticipating something unpleasant, such as a school bell ringing, noise and jostling in the hallway, or overwhelming smells in the art room or lunchroom
- may be unsure of the routine and doesn't know what to expect next
- may not be able to do a particular task, or may recognize the task as something with which he was previously unsuccessful, or may not know what "finished" is
- knows from experience that he gets over-stimulated in a particular

Temple Grandin describes the example of the squeeze chute which she constructed to ease her feelings of anxiety. "Children have to be taught to be gentle. Since I missed out on this, I have to learn it now. The squeeze chute gives the feeling of being held, cuddled and gently cradled in Mother's arms."

—Grandin, T., and M.M. Scariano. *Emergence: Labeled Autistic*, 1986: 105

setting or activity and is afraid of not being able to calm down or of other people's negative reactions
- is distressed at having to leave a task before it is completely finished

Difficulty in any or all of these areas may lead to unmanageably high levels of anxiety. The typical result, however, is a decreased ability to pay attention, learn, communicate, and function optimally.

Resistance and Anger

Many of the natural reinforcers available to typically developing students are not accessible to students with ASD. Social interaction may be a constant source of stress because the student sees no need for interaction, or because he has a high drive for social interaction but no skills to connect with peers. Learning may be difficult and a pervasive source of low self-esteem. A student may resist task expectations because he does not understand them and cannot communicate his confusion, or because he fears that he cannot be perfect, or because the emotional and intellectual effort does not seem worthwhile. Students may resist passively by shutting down, or explosively with verbal or physical aggression.

Fourteen-year-old Charles, seen by school staff as not working to his potential, refuses all assignments geared to his ability level as "baby work" and refuses grade-level work as "too hard." He is prepared to spend all of every school day sitting with his arms folded and glaring at people who try to engage him in tasks or in conversation. He lashes out physically at adults who persevere.

Limited Problem Solving and Independence

Problem solving is often difficult for students with ASD. Whether the problems are interpersonal, organizational, or academic, problem solving involves skills of interpreting information, attending to some elements but screening out others, planning, organizing, and sequencing. These are weak areas for many students with ASD.

Students who have learned to rely on and to enjoy adult assistance may resist expectations of independence, whether in problem solving or in task completion. Some students become skilled in using passive problem-solving styles, communicating a need for help to adults by doing nothing or by looking distressed.

Scattered Developmental Profile

The developmental profile of students with ASD is typically scattered (or uneven). A student with ASD may also have a cognitive disability (or mental retardation). A cognitive disability, like ASD, may range from mild to severe and have a significant impact on a student's ability to learn.

Learning involves many interrelated and overlapping skills. The challenges with social interaction and communication described previously will have a significant impact on learning, as will a student's attention, responses to sensory stimuli, and anxiety. As a result, students with ASD learn and function differently than their peers do.

"When you've worked with one child with autism, you've worked with one child with autism."

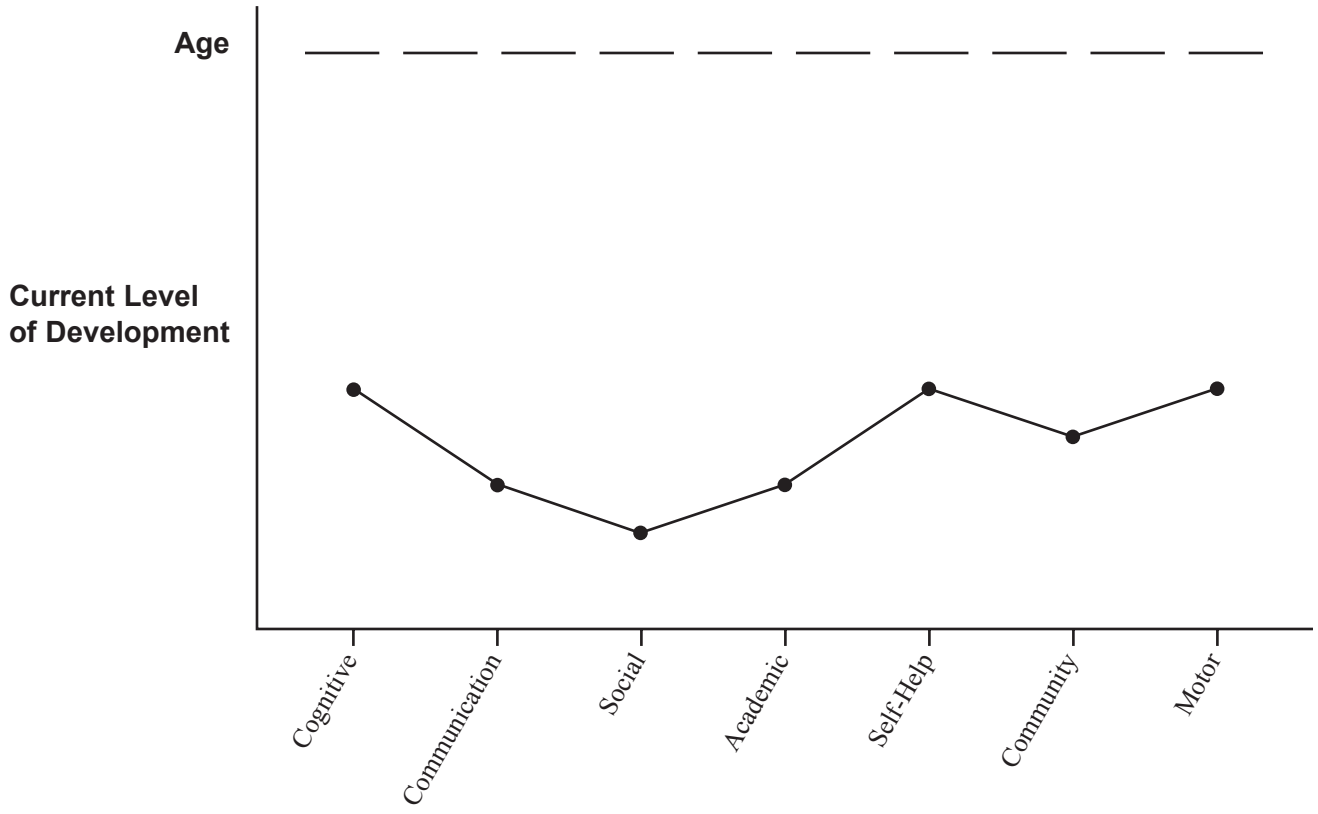
—Brenda Smith Myles

The following developmental profiles of three hypothetical students with ASD illustrate how students with the disorder may develop differently. The line across the top of the profile represents the student's chronological age. Developmental domains are listed along the bottom line. The circles represent the current level of development for the hypothetical student.

The circles that are closer to the student's age line represent areas of relative strength. The circles that are farther away from the age line represent areas of relative weakness. It is important to identify areas of relative strength and weakness. The student's strengths can be used to develop areas of weakness.

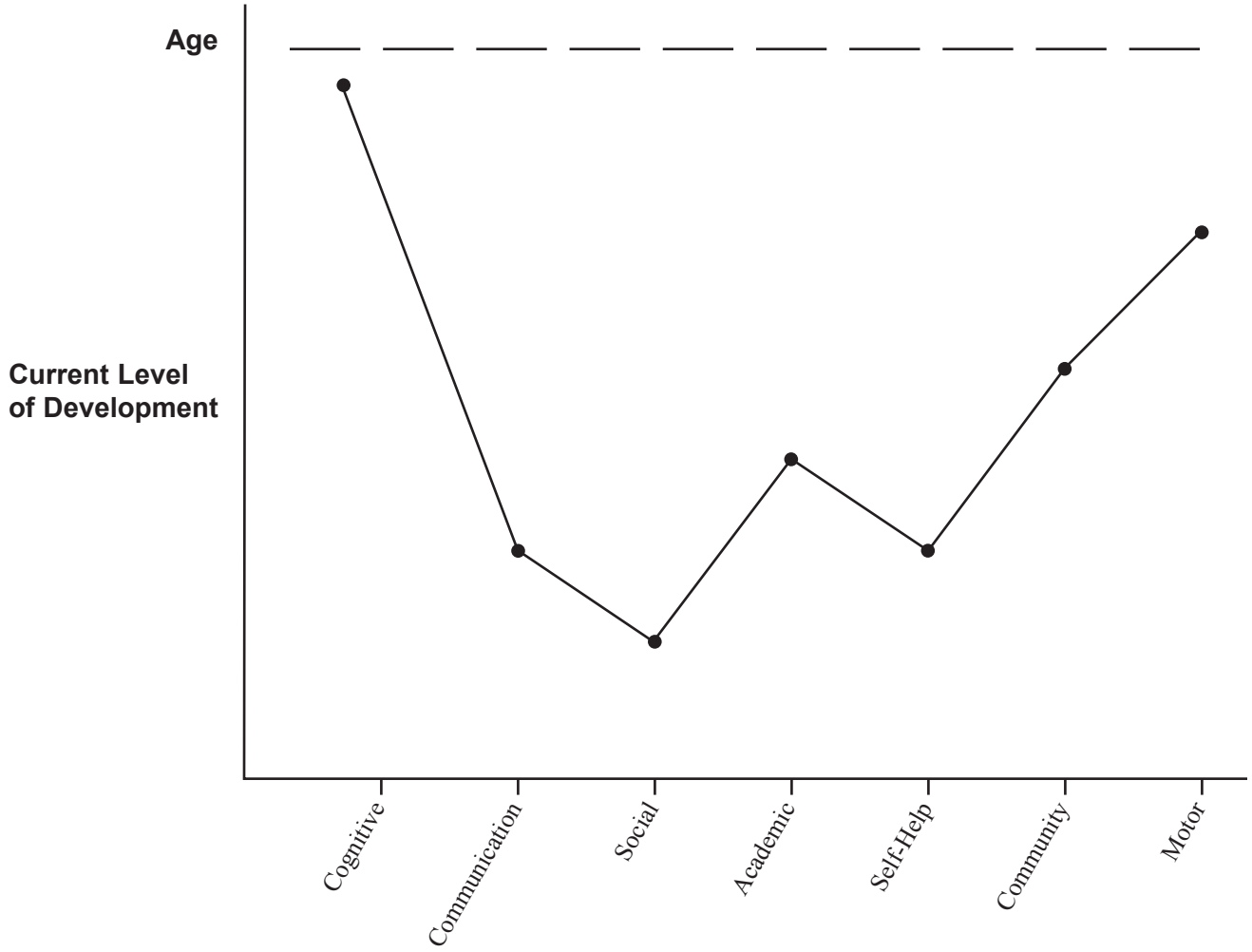
Student A has a diagnosis of ASD and cognitive disability. The scattered developmental profile shows the deficits of ASD as well as the overall delay caused by the cognitive disability.

Student A: Hypothetical Profile of a Student with ASD and a Cognitive Disability



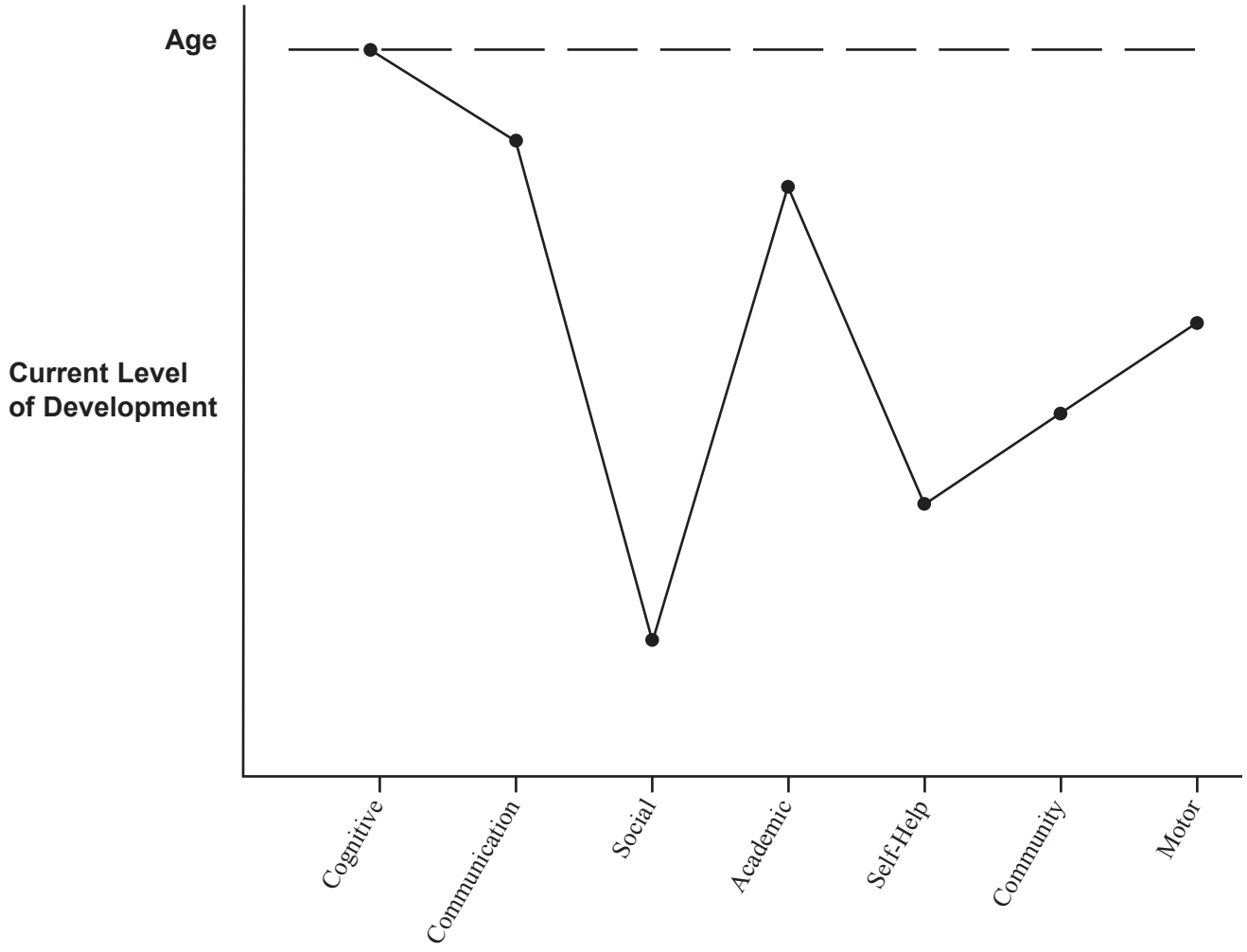
Student B has a diagnosis of ASD. The developmental profile shows the deficits in the primary characteristics of ASD. Other developmental domains, however, show near-normal development (including the cognitive domain). This type of developmental scatter is found frequently in students with ASD.

Student B: Hypothetical Profile of a Student with ASD



Student C has a diagnosis of Asperger's Syndrome. The developmental profile shows normal or near-normal development in cognitive and communication skills, and scattered development among the other domains, particularly in social skill development.

Student C: Hypothetical Profile of a Student with Asperger's Syndrome



Understanding the unique learning profile of individual students is central to developing an appropriate educational plan. Many students with ASD, for example, can more easily learn and remember information that is presented in a visual format. Students who have difficulty comprehending verbal information often follow directions successfully when they can see the information in written or visual form.

Some higher-functioning individuals may demonstrate reading skills by identifying words, applying phonetic skills, and knowing word meanings. They may demonstrate strength in certain aspects of speech and language, such as sound production, vocabulary, and simple grammatical structures, and yet have significant difficulty carrying on a conversation and using speech for social and interactive purposes. They may perform computations on paper with ease but be unable to solve mathematical word problems.

Students with adequate language comprehension and strong visual and rote memory skills may learn basic academic skills and appear to comprehend written material in the first few years of school. In Middle Years, as language, concepts, and social interaction become more complex and abstract, they may begin to experience great difficulty. This may be especially troubling for a student who sees being smart and doing well as an essential part of his identity, and confusing for teachers and parents who have not realized how much the student has relied on a strong memory and a good vocabulary to succeed.

Most students with ASD perform new skills exactly as they have been taught. Often, students learn the task without understanding how changes in setting might influence their performance of the task. This is known as difficulty with generalizing the new skill. It occurs when students are unable to understand differences and similarities between settings, and how this guides them in using their skills. A student who has been taught to use the toilet at home, for example, may not use the toilet at school because it looks different. A student who has learned to remove his shoes when entering his home may remove his shoes when entering other buildings, even if it is not required.

It is important to know the student's areas of strength and weakness. Students with ASD will show weakness in social and communication development. They may have a cognitive disability. They may also show areas of strength that are often associated with ASD. Typical areas of strength and weakness are listed in Table 1.3.

Table 1.3: Typical Areas of Strength and Weakness in Students with ASD

The ability to:

- Take in chunks of information quickly—the whole thing
- Remember information for a long time
- Learn to use visual information meaningfully
- Learn and repeat long routines
- Understand and use concrete, context-free information and rules
- Concentrate on narrow topics of specific interest

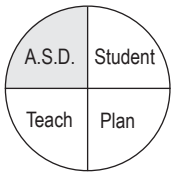
Predictable Personality Traits

- Perfectionism; honest, naive, and overly compliant

An inability or decreased ability to automatically, consistently, and/or independently:

- Modulate and process or integrate sensory stimulation
- Control attention, scan to identify, and focus on important information (overfocuses on irrelevant details)
- Analyze, organize, and integrate information to derive meaning (memorizes details, rote responses, and rules rather than concepts)
- Retrieve information in sequential order (interferes with learning cause/effect relationships and ability to predict and prepare for future events)
- Perceive and organize events in time and understand language related to time (leads to confusion and time-related anxiety)
- Understand the complex and changing meanings and nuances of the language (understands and uses the language literally)
- Integrate auditory information efficiently (leads to delays in response time and information gaps)
- Generate alternatives or solve problems that involve hypothesis testing and social judgment (often repeats the same responses over and over)
- Modify or generalize information from one situation to another (learns and uses concepts and skills exactly as taught)
- Control thoughts, movements, and responses (perseverates and gets stuck in motor and verbal routines or responses; may seem driven and compulsive)
- Adjust to new or novel information and events (leads to extreme anxiety associated with change and trying new things)
- Initiate communication to ask for assistance or clarification (leads to confusion, frustration, anxiety, and ineffective behavioral responses)
- Perceive social/cultural rules and the perspective of others (leads to confusion, misunderstandings, and unexpected and ineffective responses)

In summary, those with autism are unable to independently integrate bits and pieces of information to make meaning, to expand, or to use information flexibly.



At this stage, the team is familiar with the

- ❑ primary characteristics of ASD
- ❑ associated features of ASD
- ❑ general instructional implications of ASD