The PUZZLE of Autism

nea NATIONAL EDUCATION ASSOCIATION

ASA The Voice of Autism. Autism Society of America

National Education Association

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The Puzzle of Autism: What Educators Need to Know

Mr. Davidson begins his signature tennis ball game for reviewing and locating geographical formations, rivers, and towns in his Westward Movement unit. The students clamor for the ball and the chance to go to the map. Michael's hands go over his ears as the noise level rises. His body shrinks into his chair with each scream. When the noise level becomes intolerable, Michael leaves his chair with a book and enters the hallway. He paces the hallway with his nose in a book.

At the end of the game, the door opens to signal Michael that the game is over and class will begin. As Mr. Davidson begins his lecture on the Westward Movement, Michael raises his hand. When called on, he asks, "Did you know that General Custer kept a live lynx in his basement?"

Introduction

The above scenario may sound familiar to any classroom teacher because students like Michael, a student with Autism Spectrum Disorders (ASD), can be found in many of today's classrooms. Throughout the country, educators face the inherent challenges of educating students with ASD despite having had little experience with or training about ASD. Teachers need resources and information to assist them in working successfully with all of their students, including those with ASD.

The information contained in this guide will benefit all education personnel who work with students with ASD. A student with ASD presents a unique combination of strengths and challenges that influences their academic achievement and social integration. This guide is not an all-encompassing guide for the education of students with ASD; rather, it should be considered a brief summary of these students' strengths and deficits, the challenges these deficits create in the classroom, and strategies that education personnel can use to facilitate positive educational and social experiences for students with ASD. For those who wish to gain additional information on autism, specific Web sites and references have been included in the Appendix.

This guide will:

- provide educators with a general understanding of ASD,
- explain the characteristics exhibited by students with ASD,
- suggest evidence-based effective strategies for students with ASD,
- identify resources where additional information on ASD can be found.

Why is it important for education personnel to know about ASD?

According to the United States Department of Education, ASD represent the fastest growing diagnosis within the disability category of Pervasive Developmental Disorders (PDD). Children from all socioeconomic strata, as well as cultural, racial, and ethnic populations, can be diagnosed as having an ASD. The increased identification of ASD means that more students with ASD will be found in every community and neighborhood public school. The Autism Society of America currently estimates the annual cost of educating and caring for individuals with ASD to be around 90 billion dollars. Increased identification of students with ASD will result in increased costs for education and care for these individuals; however, early diagnosis and intervention have shown the potential to reduce their treatment costs by two-thirds.

What causes Autism Spectrum Disorders (ASD)? How do ASD affect the learning and behavior of persons with the disorder?

The Diagnostic and Statistical Manual of Mental Disorders-Fourth Edition IV (DSM-IV, 1994), the main diagnostic reference of mental health professionals, places ASD under the diagnostic umbrella category of Pervasive Developmental Disorders (PDD). PDD includes autism and four other related developmental disorders: Asperger's Syndrome, Childhood Disintegrative Disorder, Rett's, and Pervasive Developmental Disorder—Not Otherwise Specified.

Important aspects to keep in mind about ASD include:

- ASD affect the neurodevelopment system, which results in distinct learning and behavioral characteristics.
- ASD have an underlying biological/genetic cause that produces organic and/or physical changes during brain development, which result in atypical cognitive and social development and behaviors.
- ASD affect individuals uniquely, although individuals will exhibit many of the characteristic behaviors in varying degrees throughout their lifetime.
- ASD do not result from poor parenting.
- ASD impact more than behavior.
- ASD affect the individual's ability to integrate sensory information and regulate their emotions.

What deficits form the basis for a diagnosis of an ASD?

The DSM-IV provides five deficit areas to consider as diagnostic criteria for identifying individuals with ASD:

- Communication
- Socialization/Social skills
- Restricted interests
- Sensory integration
- Behavior

Each of these deficit areas will be discussed in greater detail later in this guide. Any education personnel working with people with ASD must remember that these individuals *always* exhibit varying degrees of difficulties in these five areas. Students with ASD exhibit varying combinations of and degrees of difficulty in each area, which makes ASD look different across student populations.

Do all students with ASD exhibit the same early symptoms?

Yes. Recent research has shown that students with ASD exhibit four early indicators. These include:

- Lack of eye contact
- Lack of joint attention (i.e., attention to the same item or topic as another person)
- Lack of reciprocal conversation (i.e., ability to engage in verbal turn taking)
- Atypical sensory/motor processing

In addition, people with ASD exhibit core deficits of varying degrees and combinations in the following areas:

- Difficulty with identifying important global concepts and elements of tasks (which differentiates ASD from Attenton Deficit Disorder/Attention Deficit with Hyperactivity Disorder);
- Difficulty processing auditory information—understanding, retaining, and retrieving;
- Difficulty generalizing skills—skills must be taught in context;
- Difficulty with sequencing information or steps in a task;
- Difficulty transitioning between different activities;
- Difficulty with time concepts and time management;
- Atypical and/or uneven academic, social, or emotional development (e.g., high functioning in some academic areas, low functioning in others).

Features and Strategies for Intervention

What role do Individualized Education Program (IEP) team members, especially the general education teacher, have in determining goals for students with ASD?

IEP teams must ensure that students with ASD have goals and objectives designed to promote the development of independent living, academic skills, and appropriate social behaviors and skills. These goals need to be introduced early and addressed annually in the IEP. Waiting to address these skill deficits until a child reaches secondary school creates the potential for many students with ASD leaving school unprepared to live independently, succeed academically, or be gainfully employed. The general education teacher provides critical information about how included students function academically and socially in the general education setting and which level and type of supports students will need in the coming year. For students not included in general education, general education teachers can identify the target behaviors students need to master prior to being considered for inclusive settings.

In an effort to provide a smooth transition to a post-high school setting, IEP teams must develop goals and short-term objectives that foster self-monitoring and independent living skills. Whether the student plans to transition to post-secondary education, vocational training, or sheltered workshops, secondary IEP teams have the responsibility to identify the long-term supports these students will require for academic, economic and social independence. IEP team members must ensure students' with ASD have long-term goals specifying the need for explicit instruction in the essential social skills necessary for all post-secondary academic, social, and/or vocational settings. Not only must students with ASD be provided targeted instruction in social skills, they must be given multiple opportunities in a variety of social, academic, and vocational contexts to practice these skills. IEP teams must place the highest priority on ensuring that students with ASD acquire the essential social and daily living skills needed for responsible community integration and participation.

Transition goals and objectives need to provide students with ASD with vocational and career exploration experiences that assist them with identifying careers or college majors that can accommodate their uneven academic and/or social development as well as utilize their unique abilities and interests. Transition activities should provide students with opportunities to acquire vocational and/or work-related behaviors and skills needed for successful employment and/or educational settings.

Success in post-secondary school life requires assisting students in adapting their current supports to their new environments. When possible, adult service providers should attend final IEP meetings and any person-centered planning meetings in order to ensure that the student's current goals, objectives, supports, adaptations, and modifications can be incorporated into the post secondary school setting.

What intervention strategies can be used with students with ASD?

Intervention strategies for students with ASD have been developed and used in many educational settings; however, no single intervention or approach has proven to be effective for every individual with ASD (National Research Council 2001). Maximizing the effectiveness of any intervention or instructional strategy requires a careful analysis of the family's vision for the student; the student's communication proficiencies, deficits, and preferred mode of communication; as well as the student's cognitive ability, learning style, adaptive and functional independent living skills. Students with ASD require direct instruction in academic, social, and emotional skills because they do not generalize these skills across educational and social contexts. Because these students have poor generalization skills, any intervention or instructional strategy must be explicitly connected to and generalized across multiple contexts, materials, and communication partners. Isolated skill development or intermittent treatments do not produce the range of functional or adaptive skills, especially communication skills, needed for successful integration into educational or social settings.

What strategies can facilitate successful inclusion experiences for students with ASD in the general education classroom?

The following list of general suggestions may help educators provide more effective learning experiences for and interactions with students with ASD:

- Use consistent classroom routines as much as possible. Students with ASD have high levels of anxiety that can interfere with their ability to learn independently. Consistent routines (e.g., asking for help, taking a break, putting away homework, getting assignments, going to the bathroom) lessen all students' anxiety and increase their ability to function independently in the classroom.
- Provide visual instructions, rules, and schedules. Capitalize on their visual strengths with visual reminders that foster and increase their ability to function independently academically and socially. Picture cues or written social stories can be used to promote appropriate behavior and maintain attention. Laminate daily schedules, procedures, and etiquette (e.g., when jokes would be appropriate, how to participate responsibly in class, permitted activities when assigned tasks have been completed), and appropriate social stories about classroom rules. Computer programs like Boardmaker or Writing with Symbols can provide visual icons for task instructions, rules, schedules, or social stories to increase student understanding. For example, to improve student independence, provide a picture or written work system that lists the procedures and tasks to be completed, such as: (1) Listen to teacher directions; (2) Work on page 6, problems 1-4; (3) Place finished work in finished folder; (4) Read car magazine when finished.
- Stay alert for high anxiety levels and signs of sensory integration and/or emotional regulation difficulties and other signs of stress. Signs of stress may include putting hands over ears, plugging ears, squeezing a body part, or repetitive behaviors like rocking. Direct students to a self-calm area. Self-calming areas can be a designated chair in a quiet area or a "sensory area" (a location within the room where stress release activities or items can be found—brushing, compression items such as koosh balls and squeeze toys, weighted blankets, headphones and music).
- Provide students with a visual menu of appropriate classroom behaviors that should be used when they become agitated or overwhelmed. Direct students to their "menu" when their stress levels rise. Periodic breaks will accommodate the ability to regulate sensory information and improve attention and performance.

- Understand the need for transition time and plan for it. Establish and practice transition activities for the student to do when he or she is finished with his or her assigned tasks. Visual reminders of transition times and activities can ease the child through the process.
- Structure the physical space in the room. Knowing the location of work areas and expected behaviors, posting visual schedules to remind them when they need to move, and knowing the length of each work period lessen the students' anxiety. Identify where extra supplies can be obtained. Identify areas where transition tasks or activities can be done when they have finished their assigned tasks.
- Structure the format and presentation of worksheets. Highlighting directions, numbering steps for more complex tasks, and providing a physical example of the completed task assist students' transitions to and from tasks.
- Identify clearly the purpose of all instructional assignments, presentations, multimedia materials, or other learning tasks. Students with ASD have difficulty with making inferences and other kinds of inferential thinking. These students may have difficulty with identifying the importance of the content material unless a teacher explicitly states the purpose for an activity.
- Provide written rubrics with due dates clearly indicated for each component of a multi-step or multi-part project or writing assignment. Assist students with ASD in designing a color coding system to record due dates in their planner. Clear written expectations for tasks, procedures for completing the task, and a rubric to evaluate the finished product are essential items to ensure success for a student with ASD.
- Encourage one or two sentence knowledge summaries. Summarizing key concepts and information from a book, chapter, or unit helps students identify material that can be found on assessments. This technique also can be used with students with ASD in disciplinary situations. Student summaries of social interactions help education personnel understand the student's perception of the situation and underlying motivations.
- Capitalize on interests to introduce new and difficult tasks. Use strong interest areas as motivators to assist students in engaging with new and/or difficult material. For example, learning or practicing newly learned math algorithms may be easier for a student who loves maps if all of the algorithms and word problems involve calculations of mileage using map scales. Likewise, a student who loves trains may learn more quickly or engage more efficiently in an assignment if a train sticker appears at the top of the assignment or the task uses train-related information in the task scenario or directions.

Assign specific roles for collaborative work. Providing a list of expectations or tasks for each role reduces the potential for misunderstandings and facilitates the group process. For example, a written job description and scripted cues for introducing items, new ideas, asking questions, making further suggestions, and expressing dissent appropriately promotes responsible participation of all group members. The following chart shows how to represent roles in a group.

Job	Things I could say
Recorder Keeps a record of what the group does Writes important ideas down	Could you say that again for me please? Let me see if I have this right. Which one should I write down?

- Designate a peer buddy. Provide peer buddies with information on ASD and strategies to use with students with ASD. Teacher modeling of strategies can be helpful as well. To avoid burnout, use multiple peer buddies within a class. In secondary settings, peer buddies could be students who need community service hours for honor societies or students enrolled in an elective peer tutoring/peer assistant class.

What supports can the general education provide for the organizational difficulties of students with ASD?

Students with ASD often have significant organizational deficits that must be considered when establishing classroom routines and procedures as well as during unit planning and preparation. Initial instruction of organizational skills must begin when the student with ASD starts school. In reality, all students benefit from instruction in the use of daily schedules, and planners, as well as the use and organization of subject folders or notebooks. Additional activities to promote the development of organization skills include the following:

- Establish a routine and procedure for recording homework, long-term assignments, and tests in a day planner. Teachers need to establish when and how assignments should be recorded. This can be done as a group, especially with long-term projects that need interim due dates to facilitate on-time completion. With an established time and procedure, students should be able to complete this task independently. An Alpha Smart, Neo, or Dana file could serve as the day planner.
- Have daily schedule(s) laminated and placed on the student's desk or in the front panel of a binder. When daily schedules change, water-soluble markers can be used to insert the changes directly into the schedule. Sticky notes can be used for unintended changes, such as weather-related dismissals.
- List tasks to be accomplished during the day. Picture or written task lists can be a helpful organizational tool. Students can check off items as they finish them. A quick perusal of the list provides teachers with an assessment of the student's progress and identifies problem areas.
- Use a color coding system for each subject area. Use pocket folders or binders for subject areas. If multiple subject assignments need to be written on the homework board, write each assignment with markers or chalk corresponding to the color coding system. Color coding enables students to identify their assignments.
- Require all students to keep their school supplies in a pencil bag. Have students monitor the status of their supplies and write reminders to replenish them in daily planner.
- Divide the binder or folder into sections. Clearly identify where homework, completed assignments, and handouts need to be placed.
- Use sticky notes to prepare or calm students in expected stress situations, such as tests, or when unexpected things arise during the day. Preparing notes ahead of time for these situations can be helpful. Notes can be a brief reminder, such as "deep breathing" or a relaxation strategy, "Before I take a test… I need to deep breathe 5 times, count to 10, get a drink, read through the test, do items I know first."
- Establish consistent written rules for each classroom. Students with ASD need to have separate rule sheets for each teacher they have. They will not anticipate or understand that different teachers have different behavioral and academic expectations. Laminate the rules and keep these rules in the student's notebook for easy reference. A color coding system can help students regulate their level

of participation—especially in classes that involve their special interests or knowledge. For example: A green card can be used to signal that the student is behaving appropriately, yellow signals the student that his/her behavior has become disruptive, and, should it continue, a red card will be issued that will signal that the student should leave the room. Chronically disruptive behaviors should be addressed through a functional behavior assessment (FBA) and/or behavior plan (BIP). Special education teachers , school social workers, and school psychologists can complete behavior assessments and help general education teachers in developing behavior plans.

- Provide examples of finished products and writing assignments that meet all project or composition requirements. Examples of correct products are helpful for all students.

Communication

Mr. Thomas: How are you, Jason?
Jason: I fine Mister Thomas.
Mr. Thomas: What did you do in P.E. today?
Jason: P.E. today… P.E. today… P.E. today
Mr. Thomas: Jason, eyes on me. Jason, you did not answer my question. Please tell me what you did in P.E. class today? Did you play hockey?

Characteristics

Students with ASD have difficulty understanding and using language. Their language deficits underlie many of their difficulties with academic content, skills, and socialization. Communication disorders in students with ASD result from their early difficulties with joint attention and symbol development. The extent to which their communication disorders affect students with ASD spans the continuum from mild to severe. Education personnel should consider the extent of the student's communication deficits in order to design instruction and administer discipline. The following information provides education personnel with important considerations to keep in mind when working with students with ASD in instructional, disciplinary, and social contexts.

Students with ASD may exhibit deficits in communication skills that are observed in some or all of these areas:

- Motor planning that interferes with speech development and production—a result of deficient or underdeveloped sensory feedback systems;
- Echolalia—vocal perseveration, distinct and repetitive vocalizations of any speech or sounds they hear, especially sophisticated vocabulary and syntactic structures;
- Abstract and inferential thinking—especially, identifying or deriving main ideas, identifying and explaining cause and effect as well as story characters' or historical persons' motivations, summarizing information, and/or predicting from social situations, movies, television, or text;
- Understanding figurative language—idioms, metaphors, similes, and irony—and multiple meanings;
- Auditory memory, auditory processing, and executive functioning (i.e., organization and time management, completing multi-step tasks and procedures);
- Reciprocity and perspective-taking during conversations;
- Initiating, terminating, and repairing a conversation;
- Challenging behaviors;
- Social interactions.

Strategies for Improving Communication Skills

Comprehension

Students with ASD have deficits in auditory attention and auditory memory that result in difficulties with comprehension. Their comprehension deficits impact their ability to understand many aspects of academic and social communication. Academically, these students have difficulty answering the five "W" questions (i.e., who, what, where, when, how), as well as understanding figurative language, persuasive techniques, and words with multiple meanings. Comprehension deficits also create difficulties with identifying important information from lectures or media and transitions between instructional topics. Many of the difficulties these students experience with transitions between instructional or conversation topics can be attributed to their missing the verbal signals that indicate the conversation topic will be changing.

Socially these students often miss verbal humor, shifts in conversation topics, and opportunities to engage or terminate conversations appropriately. Their difficulty with staying on topic during conversations can in part be attributed to their missing the verbal signals that indicate changes in the conversation topic.

The following suggestions provide strategies to improve the necessary comprehension skills for effective instruction and social interactions:

- **Pre-teach new concepts and content vocabulary to students with ASD prior to group instruction.** Pre-teaching familiarizes them with the new topic and reduces their high levels of anxiety that accompany changes or transitions. Pre-teaching activities can include: multi-media, books, or plays that capitalize on their strong visual skills. Lowering a student's level of anxiety removes one of their greatest obstacles in the learning process.
- **Model procedures, expectations, thinking strategies, or directions.** For instance, after giving the direction "Everyone should have this page in front of them," teachers should hold up the book showing the correct page. After introducing new material, teachers often offer, "Let's work the first problem together." Having a permanent visual reference allows students to monitor their progress, self-check, and self-correct. Providing visual models, examples, or instructions increases all students' ability to complete work independently.
- **Post permanent visual reminders of the lesson's essential questions and concepts to focus attention and learning.** Visual reminders help to remove questions for students who have difficulty with abstract thinking, as well as making predictions or inferences. This strategy supports students' need for additional time to process information in order to understand the task demands or instructional concepts. Visual supports increase their academic and social independence because they can frequently self-check and verify expectations rather than rely on adult or peer assistance. Posting subject goals or learning standards on the walls, writing daily objectives on the board, and creating subject word walls with new vocabulary provide permanent reminders of important content. Identifying how the daily worksheet or activity supports the subject goals for the content area provides another type of visual support. Pictures serve the same function for younger students or students who cannot read.
- **Identify auditory signals that alert students to important information or indicate when and where students should focus their attention.** Signal phrases and clauses need to be visible and easily accessible for review by the student, e.g., a poster with an ear and the words "Listen for these phrases." "Listen up. This is important." "You need to know…" "Remember…." Below the

ear and phrases, add this cue: "When I hear them, I must (a red stop sign) and look at (teacher's name)." Reading a social story that includes these signal phrases and clauses during transition times can remind the student about phrases to listen for and the appropriate behaviors or responses to use when the teacher uses them. An example of a social story follows: *"When I'm at school, I do schoolwork. Sometimes Mrs. Lane needs to tell me something important. When Mrs. Lane needs to tell me something she will start with the words, 'Okay class, listen up,' I will try to stop what I am doing and listen to Mrs. Lane when I hear the words, 'Okay class, listen up.' I need to look at Mrs. Lane when I hear these words because I know she is going to tell me something important."*

- **Pair verbal instructions with visual cues.** Break multi-step instructions into single units by numbering them or introducing them with key terms, such as first, second. Visual cues support independent task completion because students can use the visuals to self-check and self-correct as often as needed.

An example for a daily routine for a younger student could be:

- *First, get my homework out of my backpack.*
- *Second, put my backpack in my cubby.*
- *Third, put my homework in the finished homework bin.*
- *Fourth, sit down in my seat.*
- *Fifth, wait quietly for morning exercises to begin.*

Or, an example for an older student of how to use the writing process could be:

- *First, I do a web for the content of the paper.*
- *Second, I do a web search for supporting information.*
- *Third, I write my notes on the computer.*

- **Provide visual supports on overheads or whiteboards for lectures.** Writing key words or concepts in either place helps students maintain focus and identify important information to be learned.
- **Identify verbally and visually when transitions will occur.** Young children may need to transition with picture choices or a picture schedule. Older children may use a written schedule accompanied by a verbal safety signal (e.g., "In a few minutes, we'll be moving on to math."). Specify when a task is complete using verbal alerts like, "We're all finished with the punctuation worksheet. It's time for math now."

Expression

Students with ASD demonstrate difficulties with expressive language. In some cases, students will repeat sounds and dialogue verbatim from movies, media, or conversations that exceed their cognitive ability or level of understanding. Their ability to use sophisticated vocabulary and syntactic systems often reflects their superior memory rather than their mastery and understanding of the language. Many younger students with ASD memorize conversations or dialogue that they use to communicate information. For instance, a student who becomes sick at school may use the command, "Stick out your tongue and say 'ah" to communicate that he or she does not feel well instead of the expected, "I feel sick." **(Be especially careful of comments, opinions, or information you say around students with ASD—they will readily copy it, including inappropriate language. Your comments may come back to you at the least appropriate moment.)**

Non-verbal or minimally verbal students communicate using behavior. Developing an effective communication system for these students should take precedence over all other interventions when developing a behavior intervention plan.

Verbal students experience difficulties with expressive language that directly relate to their comprehension deficits. These students' difficulties with understanding and using pronouns provide a clear example of how comprehension deficits impact their ability to express themselves. These students frequently use their given name instead of nominative possessive pronouns, for instance, "Joshua wants Joshua's cookies," instead of "I want my cookies" or "The lady needs to leave," instead of "You need to leave."

The following suggestions provide strategies to improve the necessary expressive skills for students with ASD:

- **Develop a functional communication system.** For non-verbal students or students with limited communication, identifying and instructing them in the use of augmentative and alternative communication systems must be the highest priority because augmentative and alternative communication systems can support the development of speech and language in these students as well as reduce challenging aggressive behaviors. Augmentative or alternative communication systems may include the use of picture boards or computerized communication devices. The primary goal for any student with ASD must be developing a functional communication system.
- **Create assessments that do not rely heavily on essay or short answer questions.** Students with ASD perform better on assessments that contain fill in the blank items utilizing a word bank or multiple choice questions. Highlight or boldface important words to assist students with identifying the needed information. Higher functioning students with ASD often retain detailed information in what could be described as encyclopedic knowledge banks making it difficult for them to isolate the piece of information needed to answer the question correctly. If students need to integrate or retrieve information from multiple sources, list questions that elicit the essential elements that will demonstrate their mastery of the information. For example, the following question could be rewritten: "Pick a biome and describe its location, geography, climate, plants, and animals. Identify one plant and animal adaptation that help it survive." Instead, the prompt could be written as follows:

  Question:
  Biome Name:
  Where is the biome located?
  What kind of geographical features does it have?
  What are the average temperatures?
  What is the rainfall?
  List some plants in your biome:
  List some animals in your biome:
  List one plant and its adaptation:
  How does that adaptation help it survive?
  List one animal and its adaptation:
  How does that adaptation help it survive?

- **Provide communication supports that facilitate student independence in initiating conversations to solicit help or clarification.** Written cue cards or index cards support students' independence in initiating communication. Teach students procedures for asking peers for help. Directions that teach students flexibility and flexible thought patterns can be written on a card, for example: (1) Try working with the Touch Math technique; (2) If you have trouble or have a question, ask John, your peer buddy; (3) Ask another person at your table or next to you on the other row; and (4) If no student can answer your question or fix your problem, ask the teacher for help.
- **Use semantic mapping.** Semantic mapping incorporates visual strategies to help students stay on a selected topic and teaches turn taking. A center circle with the predetermined conversation topic written in it provides students with ASD with a visual reminder to help them self-select pertinent contributions to a group discussion. As each student provides an appropriate contribution, the teacher or conversation facilitator draws a line connecting the contribution and center circle. When a student with ASD contributes an off-topic contribution, the facilitator records the contribution in a different color significantly distant from the center circle. The lack of a connecting line between the off-topic contribution and the center circle provides a visual reminder to the group members that the comment does not pertain to the selected topic. The facilitator then verbally redirects the students' attention to the selected topic by pointing to the center circle with simultaneous verbal prompts, e.g. "We're talking about China today." "We may talk about weather another day." (The facilitator points to the different color circle.) "What can you tell me about China?" In addition, having a written idea bank clearly visible to students provides them with a support that facilitates an appropriate response.

Sensory Integration and Regulation

Shawn stands in the hall edging closer to the classroom door. His hands press together palm to palm, the increasing redness of his hands reveals his anxiety with transitions through doorways. He bounces on the balls of his feet when he crosses the threshold and quickly backs out into the hall. For 15 minutes this dance of transition continues until he finally enters the class.

Characteristics

The brain processes information provided by the sensory systems: touch, kinesthetic, spatial awareness, sight, sound, smell, and the pull of gravity. Sensory integration refers to the manner in which the brain processes, organizes, and interprets information coming from the sensory system. Processing sensory information provides a critical foundation for later, more complex learning and behavior.

In most typically developing children, sensory processing develops during ordinary childhood activities; however, students with ASD often have a variety of sensory impairments. Typical sensory integration deficits include difficulty coordinating gross and fine motor movements, locating their bodies in space, and regulating the level of sensory input. Sensory processing problems negatively impact academic learning, social skills, behavior, and self-esteem. Many repetitive rote behaviors of students with ASD appear to be obsessive, but actually alleviate some of their difficulties with sensory regulation.

Students with ASD may exhibit deficits in sensory processing in some or all of these areas:

- Sensitivity or insensitivity to sensory information
- Attention and focus
- Regulation of activity level
- Transitions between activities
- Control of impulses, behavior, and/or fear in dangerous situations
- Fine or gross motor skills, motor planning, or coordination
- Oral motor—may put objects in his/her mouth or may not be able to use a straw
- Recognition of personal space—respecting others' personal space and/or escalated reaction to purposeful or accidental invasions of their personal space

Strategies for Accommodating Difficulties with Sensory Integration and Regulation

The following suggestions identify supports for assisting students with sensory regulation during the school day:

Physical Layout of the Classroom

- Locate student desk in an area that will allow the student to adjust to changes.
- Display visuals listing instructions, routines, behavioral expectations, and schedules around the room. Use colors to identify steps for procedures and or schedule changes. Individual laminated visuals of these items in the notebook or on the desk top foster independence and quick references.
- Delineate work areas, sensory areas, leisure/free time areas using labels or line room dividers or a combination of both.
- Provide an air pillow for the student's chair during seat work—this allows for movement without leaving the desk.
- Provide a quiet "reading corner" with a bean bag chair that can be used by the student as a respite spot from over-stimulation. Do not be surprised if the student prefers the pressure of the bean bag on his body to sitting in it.

Movement Activities that Promote Task Engagement and Focus

- Provide opportunities for rhythmic, sustained movement (jumping on a jogging trampoline, marching, or bouncing on a ball) to organize the nervous system.
- Suggest a 5 minute sensory task (swinging or rocking at recess) before seat work.
- Encourage students to hang by their arms on the monkey bars.
- Identify tasks that provide additional opportunities for movement—erasing the blackboard, washing desks, taking and/or retrieving messages.
- Provide a rocking chair in the classroom.
- Use timers for specific tasks to help with timely task completion.

Accommodations and Modifications for Writing Difficulties

- Encourage keyboard use for writing assignments, e.g., Alpha Smart, Neo (the updated Alpha Smart with two important new features: a bigger screen and the ability to adjust font size), or Dana (has embedded Palm Pilot capability and can beam information to a desktop computer).
- Provide keyboard instruction to students with severe difficulty with fine motor skills.
- Incorporate technology use into instruction, assessments, and projects. Project and assessment requirements should provide for a diversity of possible products and formats to demonstrate knowledge and mastery.
- Use graph paper to organize math problems and lined paper for writing tasks.
- Provide pencil grippers for poor pencil grasp.
- Provide mechanical pencils to students who press too hard when writing.
- Provide markers that require minimal pressure to those who press too lightly.

- Remind students to use their non-dominant hand to hold the paper.
- Ensure ergonomic seating—feet should touch the floor.
- Modify assignments according to student needs. Possible modifications could include shortened assignments, reduced copying from the board to paper, varied pencil sizes and textures, audiotaped or typed responses to tests, and a peer note taker.

Accommodations for Sensory Sensitivities

- Create a menu of, and daily schedule for, stress release activities (e.g., leaving a noisy environment, leaving secondary classroom early to avoid crowds, "chill" corner) or alternate pleasurable activities that can be used when students tire or feel overwhelmed.
- Have "obsessive" items or stress relief materials in a designated place. Provide students with written instructions (laminated or placed in a sheet protector) about where, when, and how to appropriately use them.
- Minimize auditory and visual distractions.
- Identify appropriate activities for unstructured time, or after assignments have been completed, on a class poster or picture menu.
- Avoid crowded places (e.g., choose the least-crowded lunch period).
- Allow chew toys or water bottles at the desk—satisfying oral motor cravings can assist with improving and maintaining focus.
- Approach the student from the front.
- Adjust the amount of information presented verbally to enable students to transition from situation to situation more efficiently. When a student is overwhelmed, dramatically lower your verbal directions, e.g., speak in short phrases.
- Use headphones to lower stimulation from the surrounding environment.

Students with sensory difficulties should not be denied sensory breaks, privileges, or physical education (P.E.) as they serve an important function for these students. Taking away privileges or P.E. time from a "sensory seeker" can result in escalated fidgeting or aggressive outbursts.

Socialization/Social Skills

Allison: I know you. You're that lady that used to come to my class at Grant Elementary. What is your name?
Ms. Allen: Yes, I did see you at Grant. My name is Ms. Allen. You're Allison, right?
Allison: Yes. What kind of car do you drive?
Ms. Allen: A Volkswagen Beetle
Allison: How old are you?
Ms. Allen: Allison, it is not polite to ask adults their age. You could ask me where I live or how many people are in my family.
Allison: Okay. Okay. Where's your car?

Characteristics

Deficits in social cognition, social interactions, executive functioning, and abstract reasoning directly impact the social integration of students with ASD in educational, employment, and social settings in three ways.

- Many students with ASD experience social difficulties because they fail to understand the nonverbal aspects of communication and social reciprocity—understanding their conversation partners' thoughts, feelings, ideas, and desires.
- Their auditory deficits diminish their ability to attend to conversation signals for transitions, important information, and when conversations need to be repaired.
- Their heavy reliance on routines assists them with organizing and understanding the social world. This makes them inflexible to anticipate and adapt to changes in their social milieu.

Students with ASD may exhibit deficits in social skills in all or some of these areas:

- Engaging in reciprocal social interactions
- Maintaining eye contact during conversations
- Attention to nonverbal aspects of communication, i.e., gestures and facial expressions
- Adapting and conforming to rules governing social behavior
- Engaging in nonpreferred topic or topics selected by conversation partner that do not interest student with ASD
- Transitioning between conversation topics that do not incorporate the specific interests or idiosyncratic preoccupations of the student with ASD
- Feeling empathy because they tend to intellectualize feelings
- Demonstrating age appropriate social or play behaviors
- Initiating or engaging others appropriately in social situations
- Initiating, terminating, and repairing conversations

- Understanding and using the importance of small talk and other social speech
- Transitioning between activities, especially between preferred to nonpreferred
- Self esteem

Strategies for Improving Socialization Skills

Below, you will find a list of strategies to increase and improve the social interactions for students with ASD in your classroom:

- **Teach students to associate different facial features with emotions.** Use sorting cards to match facial expressions to emotional words, or identify the nonverbal emotional message from real photos.
- **Teach students pro-social behaviors to communicate their needs, especially the need to be alone.** Inappropriate social behaviors will not disappear until students learn more appropriate skills and pro-social behaviors. Teaching specific skills for improving social competencies in daily living situations and in work situations will allow students to successfully transition to work or independent living environments.
- **Provide explicit instruction and reminders of conversation etiquette.** Students need frequent reminders about their body position (e.g., too close or too far), maintaining personal space, face position and expression (e.g., looking away or inappropriate facial expression), and voice tone or pitch (e.g., bossy or condescending; inside or outside voice). In addition, students must be explicitly taught how to initiate or enter conversations. These students do not understand the use of small talk and social pleasantries that contribute to successful communication and conversation.
- **Teach students how to participate in conversations.** Rehearsing ways to initiate or enter conversations can improve the ability of students to function socially. Teaching students techniques for augmenting or modulating ongoing conversations can help them identify important nuances that occur in many social situations and conversations. Due to their literal interpretation of language, the speed with which conversations take place, and their poor auditory memory and attention, students with ASD often miss jokes, innuendo, verbal cues to topic changes, and other implicit information. Their lack of perspective makes it difficult for them to know when a conversation needs to be repaired much less how to repair miscommunications or misunderstandings. Finally, students need specific instruction on how to end conversations appropriately. For most students with ASD, they end their conversations abruptly; they turn away and leave.
- **Rehearse skills needed for appropriate social interactions, either conversations or large group skills, individually or in small groups.** The instructional focus of these initial sessions should include maintaining eye contact during conversations, learning social greetings, and maintaining social interactions. These students' difficulty with understanding and incorporating the explicit and implicit rules of conversation and the nonverbal aspects of communication make it difficult for them to participate effectively in group work, as well as unstructured and structured social settings.
- **Practice newly learned skills with puppets, peers, or adults prior to having students use their new skills in an unstructured social situation, like the cafeteria or recess.** Students may benefit from structured settings with a nonpreferred topic of conversation that requires the conversation partners to take turns. During each turn, the initiating partner contributes the initial information on the topic and the other partner adds information about the topic. Information continues to be added with each turn taken. Students in the initial learning stages may need physical or visual reinforcement, like a token or sticker, to understand the turn taking process. After each practice session, have the student self-assess his or her progress with the skill.

- **Practice a menu of relaxation strategies and establish code words to signal when they should be used.** Prior to beginning nonpreferred activities, review a social story on how to transition to a nonpreferred activity using the "chill" corner or sensory area. "Chill" area or sensory areas are designated areas in the classroom where the student can calm down using sensory or comforting materials, e.g., bean bag chair or a koosh ball. Have the student practice that procedure. Practice sessions can consist of prompting the student to move to the "chill area" or sensory area with a verbal prompt, visual icon, or social story prompt. Subsequently, at the first sign of stress or increasing agitation after the introduction of a nonpreferred activity give the verbal or visual prompt, "Chill corner," to prompt the student to the need to self-calm. The student can choose to self-calm at the present location or in the designated area. Difficulties with time concepts and organization often influence this aspect of social functioning.
- **Develop a card system for use during high stress times.** A card system reduces the child's need for language in rapidly escalating periods of sensory overload. Have the child place a WAIT card on his/her preferred materials or tasks to remind them that they can return to the desired task after the nonpreferred task has been completed.
- **Introduce procedures for using a stress thermometer or tension gauge.** Students place a mark or arrow on the level of a stress thermometer or tension gauge that shows how they feel. A mark is placed higher on the gauge when the students feel more anxiety. Students need frequent practice during nonanxious periods in how to use the stress thermometer or tension gauge. These gauges, which function like a car speedometer, teach them how to self-monitor their stress or anxiety levels.
- **Schedule frequent daily review of social stories that describe strategies and techniques for self-monitoring and reducing their levels of stress, anxiety, or sensory stimulation.** Social stories should identify their most difficult stressors and appropriate strategies for reducing their stress or anxiety levels. To learn more about using and writing social stories, see the References section for a list of Carol Gray's books.
- **Practice transition procedures between preferred topics or activities to non-preferred activities.** Transitions raise the level of stress and anxiety in students with ASD and the likelihood that they will behave inappropriately. Easing students through transitions can be done by engaging them with an item of preference. Another strategy for included students would be to substitute individual activities within the content area for large group instruction, discussion, or lectures. Until the student becomes comfortable with the content and its related activities, transitions to the material will be difficult.
- **Assist peers with understanding their unique strengths and challenges and those of the student with ASD.** Fostering this knowledge in all students facilitates and improves peer social interactions.
- **Support engagement in group discussions or lectures with visual cues.** A visual organizer on the board, overhead, or on paper can help students attend to the information presented in a lecture. Teaching students how to participate appropriately in class discussions and how to maintain conversation topics can be done with conversational topic bags or shoeboxes. With younger students, place pictures or objects related to a topic in a bag. Each child's turn consists of selecting an item and providing information about the item to the group. Repeated experiences like these teach students the process of turn taking and maintaining a nonpreferred conversation topic. The same process could be used with older students using strips of paper or magazine photos placed in a shoebox.

Behavioral Issues

Prior to handing out the math tests, Mr. Holmes lists on the board the procedures for the test and completing the extra credit problems. Alicia starts rocking in her seat, her hands pressing hard on her legs. When she receives her test, she arranges her pencils and erasers five times and continues to rock in her seat.

Mr. Holmes approaches Alicia to see if he can help her get started. He knows Alicia has mastered the skills from her class participation and homework. Alicia continues rocking, the anxiety covers her face and she repeats, "This is too hard. I can't do this." Her voice gets louder and louder, disrupting the whole class.

Mr. Holmes gives Alicia a social story on taking tests for her to read. While Alicia reads the social story, Mr. Holmes circles in pink (Alicia's favorite color) which problems he thinks Alicia can do easily to get started. After reading the social story, Alicia follows the stories' instructions: she breathes deeply 5 times, gets a drink of water and returns to do the problems circled in pink.

Characteristics

Students with ASD can exhibit immature and developmentally inappropriate behaviors that cannot be attributed to their level of cognition or academic achievement. Behavior outbursts often result from frustration and anxiety due to difficulties with communication, sensory regulation, and/or social interactions. Analyzing what happens before (i.e. the antecedent conditions) aggressive behavior and the consequences that reinforce it or encourage it to reoccur provides essential information for designing appropriate intervention strategies. Aggressive, acting-out behaviors usually result from heightened levels of anxiety due to unexpected changes in the routine or schedule or an inability to transition to a nonpreferred activity.

A Functional Behavioral Analysis (FBA) analyzes an individual student's disruptive behaviors in order to identify appropriate interventions. The "ABC analysis" guide for FBA requires IEP team members to identify the *Antecedent* conditions that come before the undesirable *Behavior*, and appropriate *Consequences* to eliminate the behavior. The team develops a Behavior Intervention Plan (BIP), a structured program of positive behavioral supports or strategies to change the student's behavior. Behavioral support programs include rewarding, ignoring, and/or redirecting the student's behaviors. Defining a menu of rewards for positive behaviors, identifying which inappropriate behaviors need to be ignored, and determining when to redirect the student completes the process. All education personnel should be aware of the menu of rewards to use when the student behaves appropriately, which behaviors should be ignored, and how to redirect the student. Regularly scheduled meetings allow all education personnel working with students with ASD to discuss and monitor progress.

Students with ASD may exhibit all or some of the following behavioral deficits:

- Ritualistic and compulsive (i.e., highly repetitious activities);
- Impulsivity (i.e., disruptive behaviors related to the student's sensory needs combined with a lack of understanding of how behavior impacts others);
- Stereotypic behaviors (i.e., behaviors involving physical movements that seemingly serve no purpose);

- Aggression (i.e., aggression may be towards self or others);
- Inappropriate social interactions (i.e., range of behaviors from complete indifference to others to socially inappropriate when dealing with others).

Strategies for Minimizing Behavior Difficulties

Suggested intervention strategies for dealing with each specific type of behavior:

Ritualistic and Compulsive

- Intervene early before behavior becomes a habit.
- Teach students when ritualized behaviors may appropriately occur during the day (e.g., structure when hand washing can occur).

Impulsivity

- Create procedures for managing the environment to minimize opportunities for impulsive behaviors.
- Use social stories to teach social skills, see Reference Section for more information about social stories.
- Rehearse appropriate behaviors the student should use.

Stereotypic

- Develop a menu of appropriate sensory interventions to aid with sensory. regulation and heightened anxiety or stress, for example: squeezing a koosh ball; swinging; jumping on a trampoline; wearing a weighted blanket.
- Develop a daily sensory schedule.

Aggression

- Remove or minimize environmental stressors that trigger aggressive behavior. For example, remove any student who is sensitive to noise or flashing lights from the building prior to a fire drill.
- Restructure necessary stressors to ease transitions. For example, having a student dress in a stall in the boy's bathroom instead of the boy's locker room minimizes sensory overload before and after physical education class.
- Clearly identify all components of task.
- Provide clear directions.

Inappropriate Social Interactions

- Rehearse appropriate social interactions.
- Reward appropriate behaviors.
- Use social stories.

Restricted Interests

Ms. Walker's class is discussing the story of Little Red Riding Hood. Ms. Walker asks students to brainstorm about what kinds of things could fit in the basket that Little Red Riding Hood carried. Michael offers that a dinosaur could fit in the basket. Ms. Walker reminds Michael and the rest of the class that large items like dinosaurs would be too big for the basket and she asks Michael to try again. Michael begins to rock back and forth in his place and flap his hands in the air. This time, Michael says "I think Little Red Riding Hood wants to have a dinosaur in her basket. But she has a frog in her basket because frogs have green skin like dinosaurs."

Characteristics

Students with ASD have very restricted interests that border on obsessions. These narrow topics of interest dominate their concentration and contribute to their inflexibility and inability to transition. Routines and procedures help students organize and understand their world and any changes in routines or procedures increase their stress levels. Students with ASD exhibit stereotypical mannerisms including, repeated hand and body movements and atypical response patterns to sensory stimulation and input. They may have difficulties with attention, even when their attention appears focused on objects. Students often become preoccupied with parts of objects and prefer to observe objects rather than teachers. They enjoy watching environmental stimuli that may seem irrelevant to others, (e.g., shifting light sources, sounds often irrelevant to others). The play behaviors of students with ASD can be solitary or parallel in nature (often lacking symbolic routines). They may use nonfunctional elements of play (i.e. lining up items by their color, shape, or feel as opposed to their function). Play routines may appear scripted or part of a routine.

Strategies for Accommodating Restricted Interests

The following intervention techniques and strategies can be used to ease the restricted interests of students with ASD:

- Allow breaks for students to pursue their own topics of interest during the day. These periods lower the students' anxiety level and enhance their productivity during work times; however, they need a clearly delineated time period and strict enforcement of the time limits.
- Introduce new activities incrementally. Allow sufficient time for guided practice before demanding independence.

Future Directions/Research Areas

Autism Research

The increased reporting of students being identified as having an autism spectrum disorder has resulted in increased interest in and funding for research relating to the diagnosis and treatment of ASD. Through the collaborative efforts of parent advocacy organizations and agencies of the National Institutes of Health (NIH) funding for research on autism has increased. NIH established an Interagency Autism Coordinating Committee (IACC) that has proposed an agenda for future autism research. In its 2003 report to Congress, the IACC proposed a research matrix of short and long term goals for national autism research. The identified research topics contained in the matrix include:

- Characteristics of autism and associated research related to genetic markers and the cause or etiology of the disorder
- Screening protocols for early identification of children with the disorder
- Identifying effective early intervention strategies
- School and community interventions
- Specific treatments (medical or behavioral/psychosocial)
- Neuroscience (neuroimaging)
- Environmental factors (genetic and nongenetic)
- Epidemiology (changes in the rates of autism incidence)

Recent advances in autism research may be found at the following Web sites:

www.nih.gov
www.cdc.gov\ncbddd
www.cureautismnow.org
www.naar.org
www.autism-society.org
www.nea.org

Appendix

Federal Guidelines and National Definitions

Several federal guidelines prescribe the kind and type of services provided for students with disabilities. As a result of the passage in 1975 of P.L. 94-142, (Education for All Handicapped Children Act)—the original federal special education law—all children with disabilities in this country have been guaranteed the right to a free and appropriate public education (FAPE) in the least restrictive environment (LRE) until 21 years of age. The most recent reauthorization of the law—the Individuals with Disabilities Education Improvement Act (IDEA 2004), signed into law on December 3, 2004—continues the provisions of special education and related services to students with disabilities, including children with ASD.

Definition of Autism: IDEA '97 defines autism as a developmental disability that significantly affects a child's ability to communicate and use nonverbal cues (e.g., facial expression, tone of voice), which inevitably impact all of these individual's social interaction. Other characteristics often associated with autism can include engagement in repetitive activities and stereotypic movements, resistance to change or change in routines, and unusual responses to sensory experiences. [IDEA 1997 sec300 (7) (c) (i, ii)]

Least Restrictive Environment: IDEA '97 mandated that, to the maximum extent appropriate, children with disabilities be educated with children who are not disabled. [IDEA 1997 sec300 (550) (b) (1)]

Transition Services: Transition services have been defined as a coordinated set of activities for a child with a disability that focus on improving the academic and functional achievement of the child with a disability in order to facilitate the child's movement from school to post-school activities. These post-school activities can include post-secondary education, vocational education, and integrated employment (including supported employment), continuing and adult education, recreation, independent living, and responsible community participation. Transition services must be based on the individual child's needs, strengths, preferences, and interests. Transition services can also include instruction, related services, community experiences, the development of employment and other post-school adult living skills, and functional vocational evaluation. [IDEA 2004: SEC 602(34)].

Assistive Technology and Technology Services: IDEA 2004 mandates the provision of Assistive Technology and Technology Services. IDEA 2004 defines an assistive technology device to be "...any item, piece of equipment, or product system, whether acquired commercially off the shelf, modified, or customized, that is used to increase, maintain, or improve functional capabilities of a child with a disability." [IDEA 2004: SEC 602 (1)] This law defines Assistive Technology Services to include: an "...evaluation of the needs of such child, including a functional evaluation of the child in the child's customary environment; purchasing, leasing, or otherwise providing for the acquisition of assistive technology devices by such child; selecting, designing, fitting, customizing, adapting, applying, maintaining, repairing, or replacing assistive technology devices; coordinating and using other therapies, interventions, or services with assistive technology devices, such as those associated with existing education and rehabilitation plans and programs; training or technical assistance for such child, or, where appropriate, the family of such child; and training or technical assistance for professionals (including individuals providing education and rehabilitation services),

employers, or other individuals who provide services to, employ, or are otherwise substantially involved in the major life functions of such child." [IDEA 2004: SEC 602 (2)]

Positive Behavioral Supports: In an effort to balance the need for a safe learning environment against the mandate for providing students with challenging behaviors a free and appropriate education (FAPE) in the least restrictive environment (LRE), IDEA '97 mandated the consideration and inclusion, when appropriate, of functional behavior assessments and/or positive behavior supports /behavior plans in the student's individualized education plan (IEP). In an attempt to maintain all students with behavioral difficulties in their LRE and ensure that these students have been provided the appropriate behavioral supports, IDEA '97 and IDEA 2004 require functional behavior assessments and behavior plans be included in the IEP of any student who displays challenging behavior. IDEA 2004 allows school officials to remove students with disabilities for certain behaviors (i.e., drugs, weapons, dangerous behavior, or causing serious bodily harm) for up to 45 days. Except in these circumstances, the school and the IEP team must show evidence of implementing and revising the behavior intervention plan prior to significant behavioral consequences and/or changes in placement, [IDEA 1997: SEC 346 (a) (2) (i); SEC 520 (b) (1) (i, ii); SEC 146 (b)]

Physical Education: IDEA '97 specifically mentioned the need for physical education in order to develop physical and motor fitness, fundamental motor skills, and patterning as well as skills in aquatics, dance, and individual and group games and sports (including intramural and lifetime sports). Physical education includes special physical education, adapted physical education, movement education, and motor development. [IDEA 1997: 300.26 (2) (i, ii)]

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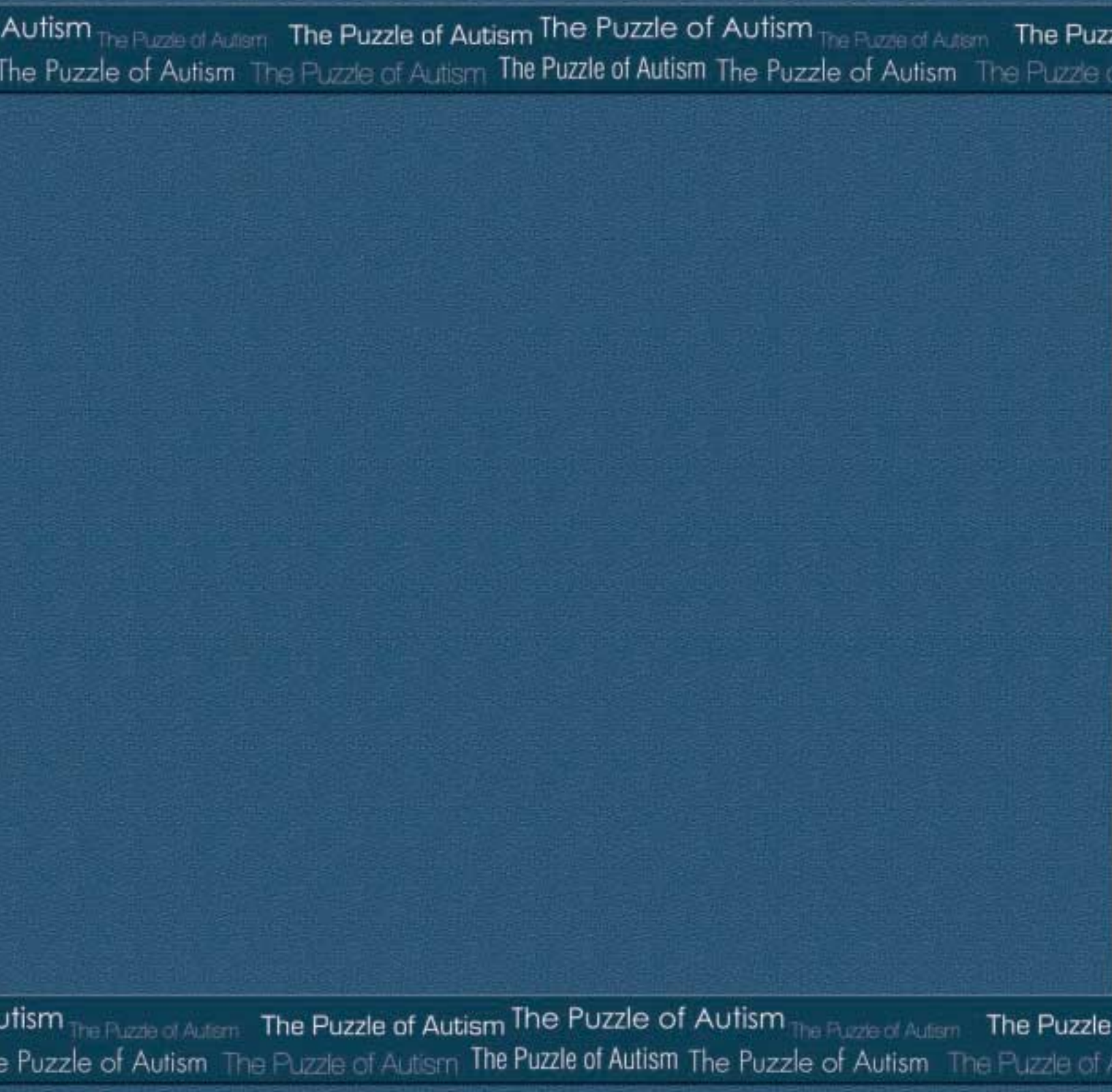
"In a time when students with disabilities are in the regular education classroom more than ever, and schools are accountable for making the general curriculum accessible for all students, this is a valuable guide to help classroom teachers and related service providers work collaboratively to support the academic achievement and social competence of students with autism."

–President Dolores E. Battle,Ph.D.,CCC-SLP
American Speech-Language & Hearing Association

The Puzzle of Autism tells it like it is and succinctly informs the entire school community to capably address the complex social, communication, and learning needs of students with autism.

–Susan Gorin, Executive Director
National Association of School Psychologists



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