Understanding and Supporting Students with Math Disabilities

A guide for parents and educators

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If you are reading this, you probably have a student who is struggling with math. Perhaps you have a student whose learning challenges are perplexing and you wonder if it could be a disability. Or maybe you have a student who was recently diagnosed with a math disability and you're needing orientation to help you proceed. Or perhaps you have a student with a longstanding math disability whose current supports don't seem to be working. No matter the case, you are likely looking for information to help you to better understand your student(s) and consider ways that you can help and support them.

This guide is a practice-based approach to understanding and supporting students with math disabilities based on extensive experience working with these students. It is designed to give you a practical understanding of why students with math disabilities struggle and what you can do to help. My goal is to give you clear and practical ways of thinking about math disabilities so that you can make thoughtful decisions about how to support your students.

Understanding Students with Math Disabilities

What is a math disability? If you're not quite sure, you're not alone. Part of what is confusing about math disabilities is that they are hard to describe in ways that make sense to students, parents, and educators.

Students with math disabilities are often diagnosed with a Specific Learning Disability in Math, a Specific Learning Disorder in Math, or Dyscalculia. Broadly, all three of these terms refer to a neuropsychological disability that impacts a student's ability to learn and do math. Regardless of diagnostic label, in practice, I refer to all of these disabilities broadly as "math disabilities."

I've found that in practice, most people have a difficult time understanding what math disabilities are. Not only are the diagnostic criteria broad and vague, but they don't do a very good job of explaining why students struggle or what we can do to help them.

In this section, we'll discuss two ways to think about math disabilities that can help you make sense of your student's learning difficulties. First, we'll establish a practical definition of math disabilities. Then, we'll explore five core challenges that students with math disabilities often experience and how they impact students' ability to learn.

A Practical Definition of Math Disabilities

In order for students to learn confidently and effectively, and for parents and educators to be able to support them, we all need to be able to explain concretely what a math disability is.

At its core, a math disability is a brain-based learning challenge that prevents students from learning and doing math. For students with math disabilities, their brains can't process information in the same ways as their peers, making it harder for them to understand math concepts and engage in problem solving. It may seem simple, but I've found that the key to understanding students with math disabilities is knowing that their brains work differently than neurotypical students, and that they need help to process and make sense of information in order to learn math.

Next, we'll go deeper into the specific brain-based challenges that students with math disabilities experience and how these challenges make math hard.

The Core Challenges of Math Disabilities

Learning math is a complex endeavor that requires the brain to do so many types of thinking, reasoning, and processing. For students with math disabilities, many of these cognitive processes are extremely difficult. In my practice, I've found that there are five core challenges that prevent students with math disabilities from learning math. The first three challenges we'll discuss (calculation, visual processing, and executive functioning) are brain-based processing challenges that prevent students from learning math in typical ways, and the last two challenges (anxiety and cognitive overload) are symptoms of their learning disability that further complicate their learning challenges.

Calculation Challenges

Students with brain-based calculation challenges struggle with math fact automaticity — the ability to pull math facts out of their brains easily and automatically. These students have difficulty remembering and recalling math facts, no matter how much practice or repetition they get. Instead of knowing the answers to basic math facts, students have to calculate answers from scratch each time, using strategies like finger counting for addition or subtraction, or repeated addition for multiplication.

Without math fact automaticity, everything else in math becomes harder. Every calculation takes extra time and effort, which makes more complex math problems even more difficult to solve. When learning new concepts, students may struggle to understand and internalize numerical patterns and functions because the calculations aren't instinctual. What looks like slow progress or "careless mistakes" is actually the result of hard work to make calculations make sense.

Visual Processing Challenges

Students with visual processing challenges struggle to "see" math and understand visual information in the same way as their peers. They may have difficulty breaking down complex equations or images into meaningful parts, noticing visual details, organizing spatial information, or remembering what they've seen. They may also take more time to process what they see. Because math is highly visual (e.g., equations, graphs, tables, figures, algorithms), students with visual processing challenges often have difficulty across all areas of math.

Students with visual processing challenges often struggle to make sense of math instruction. They cannot "see" the concepts or grasp the skills being taught in class because their brains aren't understanding what their eyeballs are seeing. They also struggle to break down the visual information in math problems, and to remember and apply visually complex concepts and algorithms needed to solve problems. When students can't "see" the math, they lose access to instruction and learning, and can quickly become lost and confused.

Executive Functioning Challenges

Students with executive functioning challenges have difficulty regulating their thinking and learning. Many may have ADHD or other executive functioning-related diagnoses. In math, these students struggle to fully engage with learning; they may miss details, think they understand more than they think they do, or rush through problems without fully engaging their minds. They have difficulty monitoring their understanding or knowing when they need more practice or help.

When students are unable to regulate their thinking, learning often becomes superficial. They may over-rely on memorization instead of understanding underlying concepts, leading to gaps in knowledge and difficulty with flexible problem solving. Students may think that they fully understand, but then fail to solve problems on tests. Without sufficient executive functioning, students miss out on opportunities for deep learning and understanding, and are unable to problem solve to their full potential.

Anxiety Challenges

Anxiety is extremely common among students with math disabilities. By middle or high school, most have spent years struggling with math, often without the support they need. The stress of wanting to do well but not understanding the material, watching classmates "get it" easily, and worrying about not being able to complete assignments or pass tests all contribute to anxiety. Students may feel anxious when instruction moves too quickly, when math problems look overwhelming, or when they fear being the only one who doesn't understand.

When anxiety is triggered, students lose access to their thinking and reasoning skills. In class, students may zone out or shut down. During problem solving, students often panic and frantically throw numbers at the page instead of strategically solving problems they know how to do. When students become anxious, they can't show what they know. Their anxiety response makes it extremely difficult to focus, process information, and engage in meaningful problem solving.

Cognitive Overload Challenges

Cognitive overload occurs when the mental demands of learning or problem solving go beyond what a student's brain can handle. Neurotypical students' brains can generally handle the mental demands of grade-level math. However, for students with math learning disabilities, learning math is a larger cognitive task. In addition to general learning and problem solving, their brains must also juggle the work of compensating for their calculation, visual processing, executive functioning, and/or anxiety challenges. This accumulation of cognitive demands causes overload.

Because students have to work harder than their peers to learn, their energy and "brain juice" drain more quickly. As this happens, they tend to have difficulty focusing and become tired and overwhelmed. Instruction stops making sense and students lose access to their problem-solving abilities. Once students hit cognitive overload, they stop being able to take in new information, reason through problems, or demonstrate their abilities on assessments.

Supporting Students with Math Disabilities

As we've discussed, students with math disabilities face many challenges. The good news is that these students are smart and capable, and have the ability to not only learn math, but to understand concepts deeply and become strong and independent problem solvers. With the right support, students can access learning, participate in instruction, and even come to enjoy math.

In my practice, I've found that the best way to help students succeed is to provide supports that help them to overcome their specific core learning challenges and address their math learning needs. In this section, we'll explore four types of support (intentional instruction, math-related accommodations, psychoeducation, and supportive learning environment) that can help students to address their disability-related learning challenges and access grade-level instruction.

Intentional Instruction

The most powerful way to support a student with a math disability is to provide instruction that's intentionally designed to meet their learning needs. Intentional instruction doesn't require a special curriculum or packaged program. Instead, it involves making small adjustments to how lessons are taught so that math becomes clearer and more accessible for students with math disabilities. Intentional instruction may include teaching explicitly, scaffolding students' core challenges, and building on their strengths.

Explicit instruction

Students benefit greatly from explicit instruction, which means making learning goals and concepts unmistakably clear. Students with math disabilities struggle to pull out important information during instruction—they may miss the "point" of a lesson or get lost in examples or activities. Teachers can cut through this confusion by clearly communicating what students need to know, understand, and do. When teachers directly address concepts, skills, and the connections between them, students can concentrate their focus on deeply learning what's most important.

Scaffolding core challenges

As described earlier, core challenges such as calculation, visual-processing, and executive functioning prevent students from learning and doing math. By scaffolding core challenges, teachers can help students to compensate for the skills that their brains cannot do on their own so that they are able to learn. Scaffolding in this context means finding ways to help students work through and around their core challenges, whether that's using friendly numbers to ease calculation challenges, modifying visual information to make it easier to "see," or helping students to regulate their thinking.

Teaching to strengths

Teachers can also enhance students' learning experiences by teaching to strengths. When teaching engages the stronger parts of students' brains, learning feels easier and more intuitive. For many students with math disabilities, this often means using language to leverage their verbal strengths, and drawing on personal interests and "common sense" when teaching complex concepts and problem solving. Teaching to strengths gives students clear entry points to learning and helps them to compensate for their core challenges.

Math-Related Accommodations

Accommodations are adjustments to students' learning experiences that allow them to learn and demonstrate their understanding without being hindered by their disability. Accommodations work best when they are individualized to a student's specific learning needs as well as to their class's math content and course demands. Accommodations will support students' learning in the classroom, on assignments, and during tests.

Classroom accommodations

In order to fully access and benefit from instruction, students may require classroom accommodations. These supports ensure that students don't miss learning opportunities at school because of their disability. Classroom accommodations may include access to specific tools and learning materials (e.g., calculators, calculation tables, extra paper), flexible routines (e.g., breaks, ability to take photos of board work), and any other arrangements that allow them to keep up and fully learn in class.

Assignment accommodations

When completing classwork, homework, and projects, students may require assignment accommodations. These accommodations help students to gain the most from these learning activities without being unfairly burdened by their disability. Students may need due-date extensions so they can complete work over multiple days or have time to collaborate with tutors or support staff. They may also benefit from limits to the amount of work that they are required to do (e.g., time or problem limits) so that assignments remain meaningful but manageable.

Testing accommodations

When taking quizzes, tests, or exams, students may require testing accommodations to ensure that they are able to demonstrate their full understanding and abilities. Without these supports, students' core challenges tend to block access to their brains and prevent them from showing what they know. Common testing accommodations include tools and materials to support calculation or visual-processing difficulties, extended time to adjust for their brains' processing needs, breaks to reduce fatigue and cognitive overload, and quiet testing spaces to support focus and calm anxiety.

Psychoeducation

One of the most lasting forms of support for students with math disabilities is teaching them how they learn. Psychoeducation helps students to understand their disabilities and how their unique challenges make learning more difficult. By teaching students how their brains work and what they can do to compensate and advocate for themselves, students can build awareness, skills, and confidence that will extend far beyond the classroom.

Teaching students how their brain works

Students benefit greatly from education about how their brain works. Most students don't understand what their disability means or how it makes learning different for them. By teaching students about their brains and unique core challenges, they gain insight into why math feels so hard. They are often relieved to know that their math difficulties are not their fault. This new understanding gives them language to describe their experiences and helps them begin connecting that awareness to strategies and supports that can help.

Teaching students how to get the support they need

Once they understand how their brains work, students will benefit from education about how to get the support they need. Teaching students specific strategies to mitigate their core challenges can empower them to support their own learning needs. Students can also learn how to explain their challenges and needs to their teachers and advocate for their needed accommodations. Finally, teaching students about their accommodations – what they are, why they help, and how to use them – helps students to make effective use of these important supports.

Supportive Learning Environment

Supporting a student with a math disability means not only supporting their academic difficulties, but supporting the whole child. Supportive learning environments provide safe spaces for students to grow their self-confidence, advocate for their learning needs, and feel a sense of belonging. We can cultivate these environments by promoting positive beliefs and values, and engaging in inclusive practices.

Positive beliefs and values

Students will thrive in learning environments that promote positive beliefs and values about math and math learning. Students feel safer and more willing to take risks when their teachers and peers value all learning styles and encourage students to learn in the ways that work best for them. Students know that it's okay to use their strategies and accommodations, to take their time, to get confused, and to be wrong.

Inclusive practices

Finally, students will learn best in learning environments that promote inclusive practices. Learning is much smoother when students have easy access to their accommodations, when they feel at ease asking for help, and when they feel recognized for their efforts and successes. When teachers are able to seamlessly integrate supports into students' daily classroom experiences, students can get the most out of their learning experiences and feel supported both academically and emotionally.

Moving Forward

The goal of this guide was to give you a meaningful understanding of math disabilities and practical ways to think about student support. As you think about the student(s) you support, you may begin to see what a next step could look like for you, whether it's gathering more information about your student's math learning challenges and needs, having a school team meeting to explore enhancing supports, or reaching out to an expert for additional guidance.

I have seen first hand through my work with students that it is possible to create meaningful learning experiences for students with math disabilities, and for them to become strong and successful math learners. With your understanding and support, students with math disabilities can thrive.

About the Author

Adena Young, Ph.D., is a Licensed Educational Psychologist specializing in math learning challenges and disabilities. Through her private practice, she works extensively with middle and high school students experiencing persistent difficulties with math, helping them develop deep understanding, confidence, and the learning strategies they need to succeed in mathematics. Adena also provides professional development, consultation, and coaching for math teachers, school psychologists, and school leaders, helping them to understand why students struggle with math and how to create meaningful math learning experiences that support access for all students. To explore her work and connect further, visit **adenayoung.com**