National Center for Learning Disabilities

The power to hope, to learn, and to succeed

Dyscalculia

Learning Disabilities in Mathematics

What is dyscalculia?

Dyscalculia is a term referring to a wide range of life-long learning disabilities involving math. There is no single form of math disability, and difficulties vary from person to person and affect people differently in school and throughout life.

What are the effects of dyscalculia?

Since disabilities involving math can be so different, the effects they have on a person's development can be just as different. For instance, a person who has trouble processing language will face different challenges in math than a person who has difficulty with visual- spatial relationships. Another person with trouble remembering facts and keeping a sequence of steps in order will have yet a different set of math-related challenges to overcome.

Early Childhood:
Building a solid foundation in math involves many different skills. Young children with learning disabilities can have difficulty learning the meaning of numbers (number sense), trouble with tasks like sorting objects by shape, size or color; recognizing groups and patterns; and comparing and contrasting using concepts like smaller/bigger or taller/shorter. Learning to count, recognizing numbers and matching numbers with amounts can also be difficult for these children.

School-Age Children:
As math learning continues, school-age children with language processing disabilities may have difficulty solving basic math problems using addition, subtraction, multiplication and division. They struggle to remember and retain basic math facts (i.e. times tables), and have trouble figuring out how to apply their knowledge and skills to solve math problems.

Difficulties may also arise because of weakness in visual-spatial skills, where a person may understand the needed math facts, but have difficulty putting them down on paper in an organized way. Visual-spatial difficulties can also make understanding what is written on a board or in a textbook challenging.

Teenagers & Adults:
If basic math facts are not mastered, many teenagers and adults with dyscalculia may have difficulty moving on to more advanced math applications. Language processing disabilities can make it hard for a person to get a grasp of the vocabulary of math. Without the proper vocabulary and a clear understanding of what the words represent, it is difficult to build on math knowledge.

Success in more advanced math procedures requires that a person be able to follow multi-step procedures. For individuals with learning disabilities, it may be hard to visualize patterns, different parts of a math problem or identify critical information needed to solve equations and more complex problems.

What are the warning signs?

Since math disabilities are varied, the signs that a person may have a difficulty in this area can be just as varied. However, having difficulty learning math skills does not necessarily mean a person has a learning disability. All students learn at different paces, and particularly among young people, it takes time and practice for formal math procedures to make practical sense.

If a person has trouble in any of the areas below, additional help may be beneficial.

- Good at speaking, reading, and writing, but slow to develop counting and math problem-solving skills
- Good memory for printed words, but difficulty reading numbers, or recalling numbers in sequence
- Good with general math concepts, but frustrated when specific computation and organization skills need to be used
- Trouble with the concept of time-chronically late, difficulty remembering schedules, trouble with approximating how long something will take
- Poor sense of direction, easily disoriented and easily confused by changes in routine
- Poor long term memory of concepts-can do math functions one day, but is unable to repeat them the next day
- Poor mental math ability-trouble estimating grocery costs or counting days until vacation
- Difficulty playing strategy games like chess, bridge or role-playing video games
- Difficulty keeping score when playing board and card games.

How is dyscalculia is identified?

When a teacher or trained professional evaluates a student for learning disabilities in math, the student is interviewed about a full range of math-related skills and behaviors. Pencil and paper math tests are often used, but an evaluation needs to accomplish more. It is meant to reveal how a person understands and uses numbers and math concepts to solve advanced-level, as well as everyday, problems. The evaluation compares a person's expected and actual levels of skill and understanding while noting the person's specific strengths and weaknesses. Below are some of the areas that may be addressed:

- Ability with basic math skills like counting, adding, subtracting, multiplying and dividing
- Ability to predict appropriate procedures based on understanding patterns - knowing when to add, subtract, multiply, divide or do more advanced computations
- Ability to organize objects in a logical way
- Ability to measure-telling time, using money
- Ability to estimate number quantities
- Ability to self-check work and find alternate ways to solve problems.

Treating dyscalculia

Helping a student identify his/her strengths and weaknesses is the first step to getting help. Following identification, parents, teachers and other educators can work together to establish strategies that will help the student learn math more effectively. Help outside the classroom lets a student and tutor focus specifically on the difficulties that student is having, taking pressure off moving to new topics too quickly. Repeated reinforcement and specific practice of straightforward ideas can make understanding easier. Other strategies for inside and outside the classroom include:

- Use graph paper for students who have difficulty organizing ideas on paper.
- Work on finding different ways to approach math facts; i.e., instead of just memorizing the multiplication tables, explain that 8 x 2 = 16, so if 16 is doubled, 8 x 4 must = 32.
- Practice estimating as a way to begin solving math problems.
- Introduce new skills beginning with concrete examples and later moving to more abstract applications.
- For language difficulties, explain ideas and problems clearly and encourage students to ask questions as they work.
- Provide a place to work with few distractions and have pencils, erasers and other tools on hand as needed.
- Help students become aware of their strengths and weaknesses. Understanding how a person learns best is a big step in achieving academic success and confidence.