



## What Are Learning Disabilities?

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As parents you are familiar with the term learning disability. Yet, it seems that there are so many types, and each educator or other professional you work with uses different terms or ways to describe your son or daughter. The following outline might be helpful in putting these terms and concepts in perspective.

Let me quickly outline a simple scheme describing what the brain must do in order for learning to take place. The first step is input, getting information into the brain, primarily from the eyes and the ears. Once this information has arrived, the brain needs to make sense out of it, a process called integration.

Next, the information must be stored and later retrieved, the memory process. Finally, the brain must send some kind of message back to the nerves and muscles – its output. Let's review each area of possible learning disability.

### Input disabilities

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Information arrives at the brain as impulses, transmitted along neurons, primarily from our eyes – called "visual input" – and from our ears – called "auditory input." This input process takes place in the brain. It does not pertain to visual problems, such as nearsightedness or farsightedness, or to any hearing problems. This central input process of seeing, or hearing, or in any other way taking in or perceiving one's environment is referred to as "perception." Thus we speak of a child who has a perceptual disability in the area of visual input as having a visual perceptual disability, and one with a disability in the area of auditory input as having an auditory perceptual disability. Some children have both kinds of perceptual disabilities, or they may have problems when both inputs are needed at the same time – for example, seeing what the teacher writes on the blackboard while listening to the explanation of what is being written.

#### Visual perceptual disabilities

Your child may have difficulty in organizing the position and shape of what he or she sees. Input may be perceived with letters reversed or rotated: An e might look like a 9; and E might look like a W, or a 3, or an M. The child may confuse similar looking letters because of these rotations or reversals: d, b, p, g, and q, may be confused with any one of the others. The word *was* might be perceived as *saw*, or *dog* as *god*.

This confusion with position of input shows up almost immediately when the child begins to read, to write, or to copy letters or designs.

Another child might have a "figure-ground" problem, that is difficulty in focusing on the significant figure instead of all the other visual inputs in the background. This occurs in real-life situations as well as in looking at printed matter or electronic images. For example, the child is told to pass the salt shaker but has difficulty finding it among the many dishes and platters. Reading requires focusing on specific letters or groups of letters, then tracking from left to right, line after line. Children with this disability may have reading problems. They jump over words or skip lines.

Judging distance is another visual perceptual task which can go awry. Your child may misjudge depth, bumping into things, falling off a chair, or knocking over a drink because the hand reaches too far for it. What you take for habitual carelessness or poor eyesight may in fact be just this sort of perceptual error.

There are other types of visual perceptual problems. While playing in an open field or gym, your child may become confused and disoriented because of trouble organizing his or her position in space. Or the child may have difficulty in understanding left and right, or up and down.

One very common type of visual perceptual disability is related to doing things when the eyes have to tell the hands or legs what to do. When such information is unreliable, activities like catching a ball, jumping rope, doing puzzles, or using a hammer and nails become difficult or impossible. To catch a ball, the eyes must focus on the ball (figure-ground), the brain must perceive the correct position and path of the ball (depth perception) and tell the various parts of the body exactly where to move and when, and then the body must obey. A child who misperceives distance or speed, or whose brain misdirects the body, may miss the ball completely.

## Auditory perceptual disabilities

As with visual perception, your child may have difficulty with one or several aspects of auditory perception. Those who have difficulty distinguishing subtle differences in sounds will misunderstand what you are saying and respond incorrectly. Words that sound alike are often confused – *blue* and *blew* or *ball* and *bell*. You may ask a child, "How are you?" He may answer, "I'm nine." He thought he heard an *old* instead of, or in addition to, *are*.

Some children have difficulty with auditory figure-ground. He or she might be watching television in a room where others are playing or talking. You are in the kitchen and call out to the child. You might be into your third paragraph before he or she begins to pick your voice (figure) out of the other sound inputs (background). It appears that the child never listens or pays attention.

Some children cannot process sound input as fast as normal people can. This is called an "auditory lag." If you speak at a normal pace, the child may miss part of what you are saying. You have to speak slower, or give separate instructions, before he or she can follow you. If you were to say, "It's getting late – go upstairs, wash your face and get into your pajamas, then come down for a snack," your child may hear only the first part and stay upstairs. If you gave the first part of the instructions, then waited a few seconds before you added the rest, however, the child might hear the whole thing.

## Disabilities with input from the other senses

Some children appear to be unable to understand tactile input or touch fully and appear to dislike being touched. Children who are clumsy may be having difficulty with messages coming into the brain from certain nerve endings in the muscles (called "proprioceptors"). At this time we know very little about such perceptual disabilities. Future studies should help us to understand them better. We also have to wait for future studies for more knowledge of smell and taste disabilities.

## Integration disabilities

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Once the information coming into the brain is registered, it has to be understood. At least two steps are required to do this: sequencing and abstraction.

Suppose that your brain recorded the following three graphic symbols: *d*, *o*, *g*. No problems with visual perception. But to make sense of the perception, you have to place the symbols in the right order, or sequence. Is it *d-o-g*, or *g-o-d*, or *d-g-o*, or what? Then you have to infer meaning from the context in which the word is used, both a general meaning and a specific meaning. For example, *the dog* and *your dog* have very different meanings. The ability to draw general applications from specific words and to attach subtle shading to the basic meanings of words is referred to as "abstract thinking."

The process of integrating input, of understanding what your brain has recorded, thus requires both sequencing and abstraction. Your child might have a disability in one area or the other, or both. A child who has difficulty sequencing what comes in from the eyes is said to have a visual sequencing disability. So, too, the child might have difficulty with visual abstraction or auditory abstraction.

## Sequencing disabilities

A child with such a disability might hear or read a story, but in recounting it, start in the middle, go to the beginning, then shift to the end. Eventually the whole story comes out, but the sequence of events is wrong.

Or a child might see the math problem as  $16 - 3 = ?$  on the blackboard, but write it as  $61 - 3 = ?$  Or a child might see  $2 + 3 = ?$  and write  $2 + 5 = 3$ . The child knows the right answer but gets the sequence wrong. Spelling words with all of the right letters in the wrong order can also reflect this disability.

Or a child may memorize a sequence – the days of the week, for example – and then be unable to use single units out of the sequence correctly. If you ask what comes after Wednesday, the child cannot answer spontaneously, but must go back over the whole list, "Sunday, Monday, Tuesday, Wednesday..." before she or he can answer. A child with a sequence disability might hit the baseball then run to third rather than first base or have difficulty with board games that require moving in a particular sequence. Or when setting the dinner table, he or she might have trouble placing each item in the proper place.

## Abstraction disabilities

Once information is recorded in the brain and laced in the right sequence, one must be able to infer meaning. Most learning disabled children have only minor difficulties in this area. Abstraction – the ability to derive the correct general meaning from a particular word or symbol – is a very basic intellectual task. If the disability in this area is too great, the child is apt to be functioning at a retarded level.

Some children do, however, have problems with abstraction. The teacher may be doing a language-arts exercise with a group of second graders. He or she reads a story about a police officer, let us say. The teacher then begins a discussion of police officers in general, asking the pupils if they know any men or women who are police officers in their neighborhoods, and if so, what do they do? A child with an abstraction disability may not be able to answer such a question. He or she can only talk about the particular officer in the story and not about law officers in general. Older children might have difficulty understanding jokes. Much of humor is based on a play on words which confuses them.

Short-term memory is the process by which you hold on to information as long as you are concentrating on it. For example, when you call the information operator for a long-distance number, you get a ten-digit number with an area code. Like most people, you can probably retain these numbers long enough to dial the number if you do it right away and nothing interrupts your attention. However, if someone starts talking to you in the course of dialing, you may lose the number. Or, you might go to the store with five things in mind to buy, but by the time you get there so many different impressions have intervened that you've forgotten an item or two on your list.

Long-term memory refers to the process by which you store information that you have repeated often enough. You can retrieve this information quickly by thinking of it – you can come up with your current address and phone number quite readily, for example – or you may have to spend a little more time and effort to think of it – your mother's home address, for example.

If your child has a memory disability, it is most likely a short-term one. Like abstraction disabilities, long-term memory disabilities interferes so much with functioning that children who have them are more likely to be classified as retarded. It may take ten to fifteen repetitions for a child with this problem to retain what the average child retains in three or five repetitions. Yet the same child usually has no problem with long-term memory. Your child probably surprises you at times by coming up with details that you have forgotten about, something that happened several years ago.

A short-term memory disability can occur with information learned through what one sees – visual short-term memory disability – or with information learned through what one hears – auditory short-term memory disability. Often the two are combined. For example, you might go over a spelling list one evening with your son. He looks at it several times, listens to you, and can write down the spellings correctly from memory. He seems to have it down pat, but that's because he's concentrating on it. The next morning he has lost most or all of the words. Or a teacher may go over a math concept in class until your daughter understands it – she's concentrating on it. Yet when she comes home that night and does her homework, she has completely forgotten how to do the problems.

## **Output disabilities**

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Information comes out of the brain either by means of words – language output – or through muscle activity, such as writing, drawing, gesturing, and so forth – motor output. A child or adolescent may have a language disability or motor disability.

### **Language disability**

Two forms of language are used in communication, spontaneous language and demand language. You use spontaneous language in situations where you initiate whatever is said. Here you have the luxury of picking the subject and taking some time to organize your thoughts and to find the correct words before you say anything. In a demand language situation, someone else sets up a circumstance in which you must communicate. A question is put to you, for example. Now you have no time to organize your thoughts or find the right words; you have only a split second in which you must simultaneously organize, find words, and answer more or less appropriately.

Children with a specific language disability usually have no difficulty with spontaneous language. They do, however, often have problems with demand language. The inconsistency can be quite striking. A youngster may initiate all sorts of conversation, may never keep quiet, in fact, and may sound quite normal. But put into a situation that demands a response, the same child might answer "Huh?" or "What?" or "I don't know." Or the child may ask you to repeat the question to gain time, or not answer at all. If the child is forced to answer, the response may be so confusing or so circumstantial that it is difficult to follow. She or he may sound totally unlike the child who was speaking so fluently just a minute ago. This inconsistency or confusion in language behavior often puzzles parents and teachers. A teacher might put a child down as lazy or negative because he or she does well when volunteering to speak or answer a question, but won't answer or says "I don't know" when called on. The explanation could lie in the child's inability to handle demand language, but contradictory behavior like this makes sense only if you know about the disability.

### **Motor disabilities**

If a child has difficulty in using large muscle groups, this is called a gross motor disability. Difficulty in performing tasks that require many muscles to work together in an integrated way is called a fine motor disability.

Gross motor disabilities can cause your child to be clumsy, to stumble, to fall, to bump into things, or to have trouble with generalized physical activities like running, climbing, or swimming.

The most common form of fine motor disability shows up when the child begins to write. The problem lies in an inability to get the many muscles in the dominant hand to work together as a team. Children and adolescents with this "written language" disability have slow and poor handwriting. A typical expression of this problem is, "My hand doesn't work as fast as my head is thinking."

Watch your own hand as you write something and notice the many detailed fine muscle activities that it takes to write legibly. Writing requires a constant flow of such activities. Now place your pen in your non-dominant hand and try to write. If you go very slowly, it is tedious but your handwriting is legible. If you go at a regular pace, however, your hand aches and your handwriting deteriorates immediately. Shape, size, spacing, positioning – everything about it looks awful no matter how hard you try. A child with fine motor disability goes through this all the time.

When a child has a visual perceptual problem, the brain, which has incorrectly recorded or processed information, will probably misinform the muscles during activities that require eye-hand coordination. This is referred to as a visual motor disability.

## Establishing your child's profile

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Obviously the learning process is much more complex, but this simple model for describing specific learning disabilities should be helpful. The important thing is that if your child has one or more of these disabilities, you must know that, along with your son's or daughter's specific profile of strengths. Look at the checklist of specific learning disabilities below. Do you know where your child's disabilities lie? Where the strengths lie? If not, ask the special-education team at your school or the person who does the testing to clarify this for you.

### Specific learning disabilities

- Input memory
- Visual perception
- Visual short-term memory
- Auditory perception
- Auditory short-term memory
- Visual long-term memory
- Auditory long-term memory

### Integration output

- Visual sequencing
- Spontaneous language
- Auditory sequencing
- Demand language
- Visual abstraction
- Gross motor
- Auditory abstraction
- Fine motor

For more information, contact the **Learning Disabilities Association of America**.

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[http://www.ldonline.org/article/What\\_Are\\_Learning\\_Disabilities%3F?theme=print](http://www.ldonline.org/article/What_Are_Learning_Disabilities%3F?theme=print)

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