What Is Dyslexia?

By Louise Moon

Dyslexia—isn’t that when children see backward—like ‘b’ for ‘d’ or was for saw?” people ask when they hear that we train teachers of dyslexic students. Letter and word reversal is a common way to describe dyslexia. However, the most typical symptom we see is the confusing of similar words or symbols in reading, and bizarre or “creative” spelling. People with dyslexia may have varying symptoms and suffer from a variety of related learning disabilities.

Significant research on this disorder has been done by the Orton Dyslexia Society, named for Samuel Orton, a neuropsychiatrist who pioneered work with dyslexic persons in the United States some 70 years ago. The Orton Dyslexia Society offers a four-way analysis of the language problems of its specialty:

- The differences are personal.
- The diagnosis is clinical.
- The treatment is educational.
- The understanding is scientific.

The personal differences are illustrated by the cases described elsewhere in this issue. This article will describe some of the scientific findings and the educational treatment. A study of these findings and treatments should help educators to understand dyslexia and to identify students with this disability.

Defining Dyslexia

Neurologist Lucius Waites describes dyslexia as a disorder that causes difficulty with the symbols of written language. He cites the following symptoms: “basic problems in learning the alphabet and its phonic properties, as well as word recognition, reading comprehension, writing, copying and spelling.”

Waites stresses that specific dyslexia does not result from mental retardation, brain damage, or a primary emotional or mental problem. Family and home environment do not cause it, nor does faulty school training.

Children with this syndrome usually have no problems in the three-dimensional (everyday) world. Their disability becomes evident with the introduction of abstract symbols, which are the basis of written language.

These problems are complex. They have varying symptoms and severity, and are chronic in nature. Recognition of the problem is sometimes clouded because all of the language differences of dyslexia are normal at some stage of language development. Most children outgrow these problems, but dyslexics do not. “Even up to advanced levels, dyslexia may be reflected in trouble with symbolic formulation and expression.”

Critchley and Critchley describe the dyslexic’s continuing difficulties with reading and writing:

Even when he has achieved some ability to read and write, he often has lingering doubts as to the correct orientation of certain letters. He may experience hesitation in serial thinking, and his ability to spell usually continues to lag behind his modest skill at reading. Furthermore, a dyslexic almost always finds it anything but easy to express his thoughts fluently and rapidly on paper. Creative and imaginative, full of ideas perhaps, he is hindered when setting them down. He is also slow in copying to dictation; and at a later age he finds it difficult to take adequate notes at a lecture or meeting.

Waites reported that “the most pervasive quality observed among dyslexic students at Scottish Rite Hospital was difficulty in learning the alphabet and its phonic properties...The immediate reflex recall of the alphabet and its phonic properties is the basis of learning to read, write, and spell in individuals with dyslexia. Consequently, we are dealing with a cognitive breakdown in the storage and/or retrieval of abstract symbols related to written language.”

Research findings from linguistics and speech/language pathology help to explain how people can be successful in a three-dimensional world but disabled.
in dealing with written language symbols. Dyslexics have trouble associating abstract symbols with sounds because they cannot readily identify the separate sounds within words. For them a word with three sounds like bat is no easier to divide into discrete parts than is "MMMMMMM." Consequently, it is difficult for dyslexics to remember word sequences. For them, "bat" is no more logical than "tab" or "bta," and "what" could just as soon be "that."

Overall, dyslexics have a weak visual memory for words. However, some of them do well in processing and remembering other forms of visual information—for example, concrete three-dimensional information or nonverbal abstract visual-spatial information.

Dyslexics' problems with sound analysis seriously affect their spelling ability. Compare nine-year-old Carrie's work in Figure 1 with teacher's comment to "Listen to the sentence," and "You don't have time..."

Research in neuroscience has provided important facts about dyslexia:

1. Structural differences in the brains of dyslexic persons were noted by Galaburda at Harvard Medical School. In dyslexics, the language portions of the right and left hemisphere of the brain are symmetrical. This is not typically the case in the nondyslexic population. In addition, dyslexics have different neuronal migration. This variation appears to begin at about the 16th week of fetal development. Neuronal migration continues over the next eight weeks in an atypical pattern, due to a different "genetic blueprint" for the dyslexic person.

2. A large percentage of dyslexia cases have a genetic basis.

3. Dyslexia occurs more often in families with a high incidence of mixed or left-handedness. Dyslexics seem to be prone to more than their share of allergies and other immune disorders.

4. Certain special talents and inherent gifts occur with greater frequency among the dyslexic population. These are often the talents that require a strong three-dimensional spatial aptitude. In spite of their written language difficulties, dyslexics may have other language talents, such as ability to orally express ideas with clarity and creativity. Dyslexics' cognitive and rational capacities are generally good or even superior.

**Dyslexia and Related Learning Differences**

Dyslexics often have other learning problems. These include the following:
1. Spatial orientation and directional problems.
2. Impaired sense of time and sequence.
3. Inadequate, inconsistent, or mixed cerebral dominance.
4. Other language defects.
5. Poor figure-background discrimination.
6. Dysgraphia, a handwriting disorder.
7. Dyscalculia, a math concept disorder.
8. Attention-deficit disorders.

Even those who define dyslexia as a learning disorder involving only written language recognize that it is frequently but not always accompanied by one or more of these other neurological deficits or learning disorders.

**Educators' View of Dyslexia Is Changing**

In recent years dyslexia research and public awareness have increased dramatically. Twenty years ago many educators thought dyslexia didn't exist.

Now, as psychologist Michael Ryan comments, "There is more research evidence to document that dyslexia exists than there is for the common cold." Formerly educators viewed dyslexia as a medical, not an educational, term. In some cases teachers would not diagnose dyslexia because special services were not provided for such children.

These positions are changing. Texas now has legislation that requires identification and multisensory teaching for dyslexic students. Similar legislation has recently been adopted in Louisiana. Universities in several states now offer dyslexia teacher training. A number of school systems have achieved success in preventive training for groups in regular as well as special-education classrooms and in dyslexia clinics.

Dyslexia is not "cured." However, the dyslexic person's language disabilities can be treated with considerable success. Several types of controversial treatments are available, including colored lenses, vision training, as well as motion sickness and allergy medications. However, most researchers and practitioners in the field agree with the Orton Dyslexia Society that treatment for dys.la is educational.

The best educational treatments are based on a thorough clinical diagnosis. However, an informed teacher can make a difference in the child's achievement, even before test results are in.

**Identification of Dyslexia**

The Teacher's Checklist on page 7 can help identify different learners. Teachers should also learn to use basic tests and procedures to diagnose language skill problems. Such tests include: Woodcock Reading Mastery Test, published by American Guidance Service; an Informal Reading Inventory such as Silvaroll's Classroom Reading Inventory; Children's Handwriting Evaluation Scale; and Test of Written Spelling.

Referrals should be made for clinical diagnosis when parents or teachers believe this is warranted.

**Early Indicators of At-risk Children**

Several factors signal that a student may be at risk for learning problems. Jansky and deFurzhc reported that the best predictive indicators are letter naming (alphabet knowledge), picture naming, word matching, copying designs, and sentence repetition.

Several behaviors should alert teachers and clinicians to the probability of learning differences in preschoolers. These behaviors include:

- Lack of awareness that letters are upside down.
- Looking at picture books upside down.
- Drawing a person from the feet upward.
- Confusing commands related to place or time: up/down, inside/outside, soon/later, or yesterday/tomorrow.
- Disinterest in the alphabet or in books at preschool age.

**Inconsistencies**

Note nine-year-old "Ann Example's" writing sample in Figure 2 on page 5. Compare this to the teacher's description of Ann.

She is a delightful, outgoing little girl with many strengths. She is quite knowledgeable in many areas and communicates orally in a manner above her age level. She is an asset in group situations because of her leadership ability, and her ability to verbalize.

Ann is very creative and artistic. She likes drama and art projects. Math is also a strength. She feels good about her ability in this area. Ann has a strong desire to achieve and does want to become a good reader. She does try so hard and has a problem.

Ann's Chapter I reading teacher wrote:

Ann is having trouble reading, both aloud and silently. She knows the rules for sounding out words, but has difficulty applying the rules to her reading process. This causes frustration. Soon she gives up on the word and waits for someone to tell her what it says...

She doesn't really see what is there...

She will be working off the board and try to correct my spelling. Really, the error is in her perception of what she is seeing.

As dyslexics progress through the grades, the brighter ones with mild learning differences score at or above grade level on standardized tests. On closer look, however, they have gaps in basic skills and feel frustrated in academic areas because of the mismatch between their thinking/learning style and that of their classmates.

Dyslexics are often accused of being lazy. When a child appears to be lazy or unmotivated, it is time to probe for causes.

Some bright students' written work fails to match their intelligence and creativity. This discrepancy can be caused by handwriting disability (dysgraphia). These students' problems may be caused by (1) a poor mental image for the formation of letters, (2) a weak integration of eye/hand coordination, or (3) poor fine-motor skills. This difficulty can be as much of a handicap as poor reading. Often the dysgraphic person makes letters with strokes beginning at the bottom rather than the top, and may draw circles clockwise rather than counter clockwise.

Some students may have poor oral language skills as well as dyslexia or dysgraphia. They may misunderstand spoken directions if the information
and stronger self-esteem. This does not mean pushing children into stages of learning for which they are not ready or diagnosing dyslexia prematurely based on immaturity. For teachers, it means knowing their students and helping them learn in ways best for them.

Finally, when a parent or teacher has a gut feeling that something is different about a child, it is usually so. Action should be taken to identify the difference and to do something about it.  

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NOTES AND REFERENCES
4. Ibid.
5. Rawson, p. 5.
9. Neural migration describes a process occurring in prenatal brain development in which neurons are expected to reach prescribed cortical destinations. However, in the dyslexic brains studied by Galaburda (cited in Rawson, pp. 10, 11), some neurons go “out of bounds” and come to rest in the outermost layer of the cortex, making little projections in that surface.
10. Rawson, p. 11.
12. Ibid., p. 5.
13. Personal communication.

Teacher’s Checklist for Recognizing Students With Language Problems

- Is he/she unable to read satisfactorily in spite of adequate intelligence and educational opportunity?
- Does he/she have unusual difficulty with handwriting?
- Does he/she have unusual difficulty in spelling (beyond the weekly spelling test)?
- Is he/she able to recite the alphabet in sequence?
- Can he/she write the alphabet in sequence?
- Are there letter reversals, rotations, and transpositions in his/her reading, writing, or spelling?
- Has he/she a downward spiral in achievement test scores?
- Does he/she confuse directions — left, right, before, after, over, under?
- Does he/she have difficulty following directions?
- Does he/she forget assignments or lose homework papers?
- Is he/she unable to copy accurately from close up, far away, or both?
- Does he/she have auditory discrimination problems or confuse similar speech sounds?
- Does he/she have no definite preference for right or left hand?
- Does he/she have a short attention span?
- Is he/she hyperactive and disruptive in the classroom?
- Is he/she unusually passive and withdrawn?
- Does he/she lack organizational skills?

*List based on guidelines from the Aylett Royal Cox Institute, Garland, Texas.