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.[1]

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.

How Many People Have Dyslexia?

The National Institutes of Health estimates that about 15 percent of the population suffers from some form of dyslexia. Actually, it is not unusual for virtually every classroom to have several students with this problem.[2] Based on a 15 percent level of prevalence, worldwide there are approximately 900,000 dyslexic Seventh-day Adventists. In the North American Division alone, there are probably more than 112,000 dyslexic Adventists.

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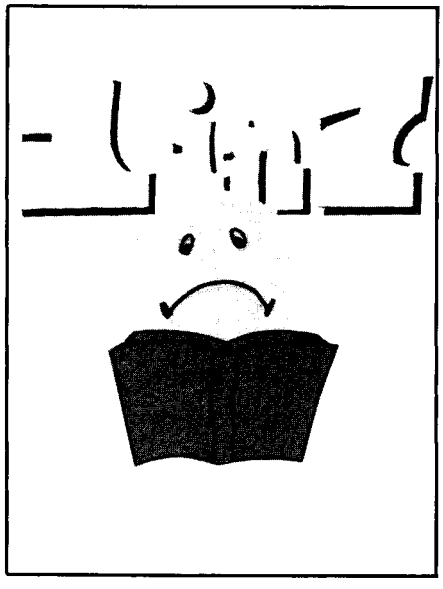

Defining Dyslexia

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."[3]

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.[4]

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.'"[5]

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.[6]

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 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."[7]

Research findings from linguistics and speech/language pathology help to explain how people can be successful in a three-dimensional world but disabled

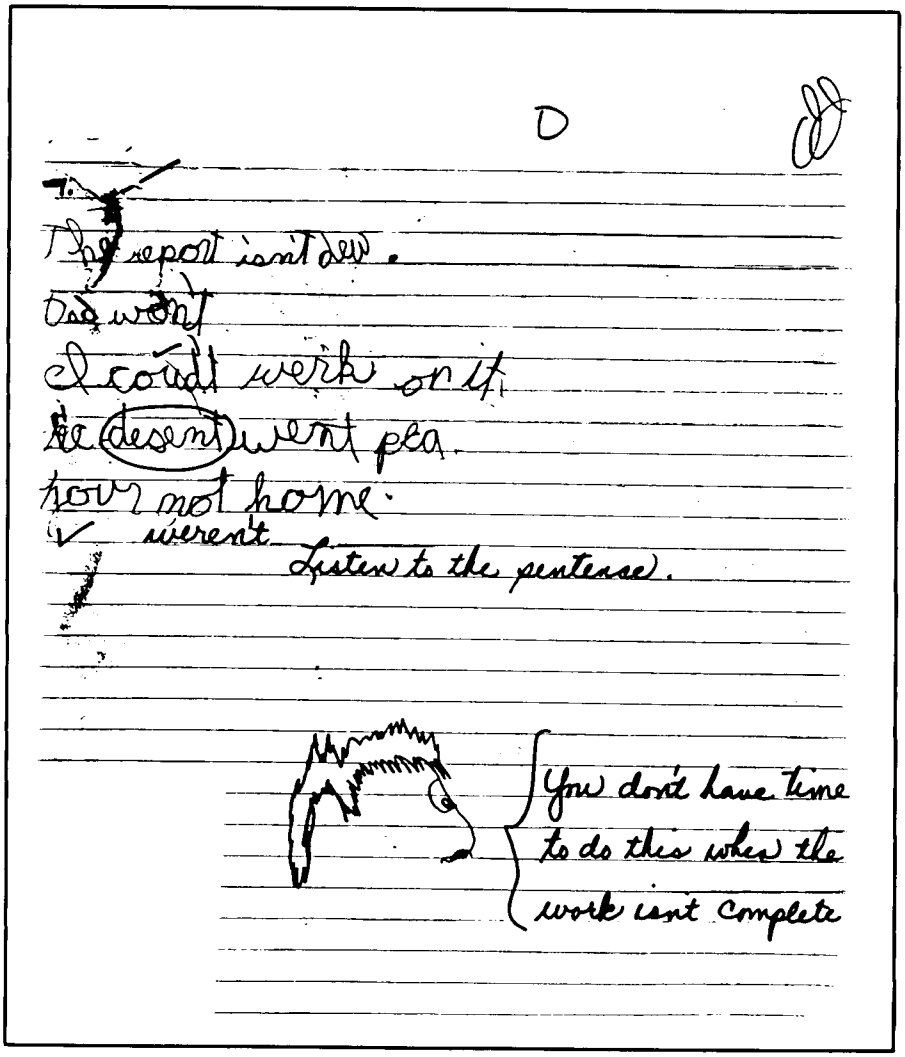

Figure 1. Carrie's Spelling Lesson

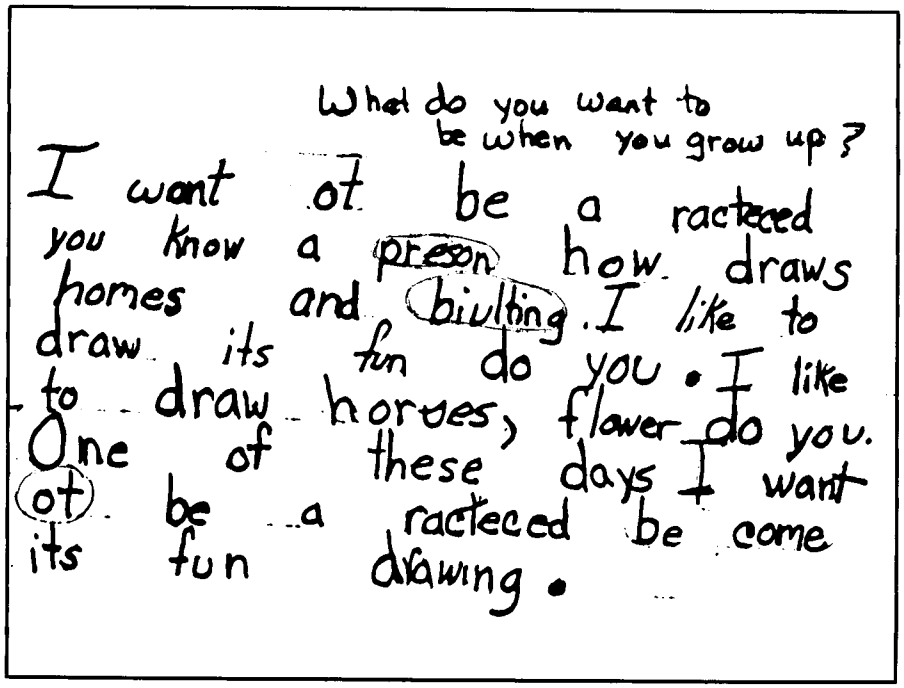

Figure 2. Ann Example's Writing Sample

in dealing with written language symbols. Dyslexics have trouble associating abstract symbols with sounds because they cannot readily identify the separate sounds within words.[8] 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.[9] 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.[10]
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.[11]
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.[12] In spite of their written language difficulties, dyslexics may have other language talents, such as ability to orally express ideas with clarity and creativity. Dylexics' 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[14] and in dyslexia clinics.[15]

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 dyslexia is educational.[16]

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 Silvaroil's Classroom Reading Inventory,[17] Children's Handwriting Evaluation Scale,[18] and Test of Written Spelling.[19]

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

GLOSSARY OF TERMS

Dyslexia — a disability in written language processing (reading, writing, and spelling) that has a neurological basis. Language-processing problems include difficulty in remembering the printed forms of words, inability to differentiate the sounds within words, and difficulty in associating sounds with their written symbols. Dyslexia is frequently accompanied by other learning problems or disorders.

Concrete three-dimensional information — things that can be pictured or touched and experienced, in contrast to abstract symbolic information. Letters of the alphabet are abstract; a picture of a key word or the object named by the word are concrete or three-dimensional. In math, the numerals and operation symbols are abstract; objects or pictures used to represent the quantities or numbers involved are more concrete and may be three-dimensional.

Nonverbal abstract visual-spatial information — refers to non-language information. It includes concepts about space, such as an artist's sense of perspective, or the sense of direction, and proportion that engineers or mechanics need in their work. Its abstract aspects require ability to do this type of work mentally vs. actually manipulating objects.

Cerebral dominance — refers to the dominance of one hemisphere of the brain in "taking the lead" in a task and doing the greater share of the work.

Figure-ground discrimination — selectively paying attention to one part of information while treating the rest as background. For example, this could mean paying attention to one speaker, even though several are speaking at the same time. Or it could mean picking out the hidden objects within a picture. For reading it may mean seeing segments within words as one sounds them out.

Early Indicators of At-risk Children

Several factors signal that a student may be at risk for learning problems. Jansky and deHirsch[20] 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

comes too quickly, or with too "dense" an information load. These students may also have difficulties finding the right word. Thus they say, "that thingamajig," or "you know, that thing" instead of calling the item by name.

Hidden Signals

Sometimes dyslexia shows up most clearly in the contrast between weekly spelling test performance and retention of spelling over time; or by the way words are learned. An adult dyslexic says that in the third grade he passed weekly spelling tests by memorizing the list in sequence as though it were a "picture." As the words were dictated, he reproduced the first line of that picture, and so on line by line.

One day he was caught by the teacher. He finished the "picture" before she got to the end of the word list. Thereafter she varied the sequence of the list. He began flunking spelling tests. He wonders, "Did she just think I was cheating? Why didn't she recognize it as a need for help?"

This same very bright student thought the alphabet had 27 letters:. . . pq*u*rstu . . . Since "q" and "u" are often placed together on wall charts because of the spelling pattern, he memorized that in his alphabet sequence. He still says "u" for "y" because the word *you* starts with "y." His dyslexia therapist was unaware of this problem even after several months of work, until the man explained why he hesitated during drills. He was not illiterate; he scored at the 12th grade level on word recognition tests and read *Business Week* regularly.

This story shows that typical tests and procedures do not always reveal the extra mental steps a dyslexic must take to compensate for language-processing differences. This man advises teachers to ask students how they learn, and to really listen to their answers.

Better Early Than Late

A concerned mother brought her first-grade son to the Andrews Reading Clinic after he fled school one day and walked eight miles home. This and other signs of school frustration spurred the mother to action. Early signs showed the boy was at risk for dyslexic confusions.

Since the family lived two hours' drive from the clinic, the mother sought remedial help in their local area. However, the school psychologist believed it was too early to recommend remedial work, especially since the child had not attended kindergarten. This child struggled without any help until fourth grade, when he attended a dyslexia clinic.

Early treatment of learning disabilities can provide the gift of time. It also results in fewer language confusions 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

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[2] W. Anderson, Presentation at Andrews University, Berrien Springs, Michigan, October 1990.

[3] Lucius Waites, *Specific Dyslexia and Other Developmental Problems in Children: A Synopsis* (Cambridge, Mass.: Educators Publishing Service, Inc., 1990), p. 4.

[4] Ibid.

[5] Rawson, p. 5.

[6] Betty J. Roy, "A Cooperative Teacher Education and Language Retraining Program for Dyslexics in West Texas." Research in Action V, Conference, Texas Tech University, 1986, p. 4.

[7] Lucius Waites, *Specific Development Dyslexia and the Present State of the Art.* Unpublished Hospital Bulletin (Dallas: Texas Scottish Rite Hospital for Crippled Children, 1983). p. 1.

[8] I. Y. Liberman, "Language and Literacy: The Obligation of the Schools of Education," *Intimacy With Language* (Baltimore: The Orton Dyslexia Society, 1987), pp. 2, 3.

[9] Neuronal 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.

[11] Rawson, p. 5.

[12] Ibid., p. 5.

[13] Personal communication.

[14] Mary Lee Enfield, "A Cost Effective Classroom Alternative to 'Pull Out' Programs," *Intimacy With Language* (Baltimore: The Orton Dyslexia Society, 1987), pp. 45-48; K. S. Vickery, V. A. Reynolds, and S. W. Cochran, "Multisensory Teaching Approach for Reading, Spelling, Handwriting, Orton-Gillingham Based, in the Public School Setting," *Annals of Dyslexia* (1987), pp. 198-200; Lenox Hutcheson, Harry Selig, and Norma Young, "A Success Story; A Large Urban District Offers a Working Model for Implementing Mulitsensory Teaching Into the Resource and Regular Classroom," *Annals of Dyslexia* (1990), pp. 79-96.

[15] Roy, "A Cooperative Teacher Education and Language Retraining Program."

[16] Rawson, p. 3.

[17] Nicholas J. Sivaroli, *Classroom Reading Inventory* (Dubuque, Iowa: Wm. C. Brown Publishers, 1990).

[18] Joanne Phelps, Lynn Stempel, and Gail Speck, *Children's Handwriting Evaluation Scale* (Dallas: Texas Scottish Rite Hospital for Crippled Children).

[19] Stephen Larsen and Donald Hammill, *Test of Written Spelling* (San Rafael, Calif.: Academic Therapy Publications, 1987.)

[20] Jeannette Jansky and Katrina de Hirsch, *Preventing Reading Failure* (New York: Harper and Row, 1972), pp. 58, 108.

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 has 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.*