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Why Children Succeed or Fail at Reading

Research from NICHD's Program in Learning Disabilities

Introduction

Most children will learn to read, no matter what method is used to teach them. But unless they receive special help, at least 20 percent of them cannot master this simple task that the rest of us take for granted.

Their difficulty is painfully obvious when they try to read out loud. Children with reading difficulties stop and start frequently, mispronouncing some words and skipping others entirely.

The first casualty is self esteem: they soon grow ashamed as they struggle with a skill their classmates master easily. In the later grades, when children switch from learning to read to reading to learn, reading-impaired children are kept from exploring science, history, literature, mathematics and the wealth of information that is presented in print.

Even what, to the rest of us, are everyday conveniences-- a road map, the instructions for a microwave pizza--become daunting tasks for those with reading difficulties. And as more information becomes available on the Internet, those who can't read will be left behind by an information revolution that is largely text based.

About 10 million children have difficulties learning to read. From 10 to 15 percent eventually drop out of high school; only 2 percent complete a four-year college program. Surveys of adolescents and young adults with criminal records show that about half have reading difficulties. Similarly, about half of youths with a history of substance abuse have reading problems.

Even people with a mild reading impairment do not read for fun. For them, reading requires so much effort that they have little energy left for understanding what they have just read.

Contrary to what many people believe, NICHD research has shown that reading disability affects boys and girls at roughly the same rate. Reading disabled boys, however, are more likely to be referred for treatment, as they are more likely to get the teacher's attention by misbehaving. Reading disabled girls may escape the teacher's attention, as they may withdraw into quiet daydreaming.

Another common misconception is that reading disabled people reverse letters and write in

mirror image. In fact, such reversals are common among all beginning writers--reading impaired and non-reading impaired alike.

NICHD studies have shown, however, that in many cases, reading impairment can be related to deficiencies in the way that the brain processes letter sounds, a language-based task. If no steps are taken to compensate for this defect, reading disability will persist through life. Fortunately, treatment is available.

Overcoming Reading Disability

Teachers and school administrators are the best qualified to determine the specific curricula and lesson plans appropriate to their students' needs. The NICHD research has determined, however, that a particular over all *approach* to teaching reading offers the greatest chances of success for overcoming reading difficulties. Long- term studies funded by NICHD have shown that from 90 to 95 percent of reading impaired children can overcome their difficulties if they receive appropriate treatment at early ages.

The words we speak are made up of individual pieces of sound that scientists refer to as *phonemes*. The word "bag," for example, has three phonemes, "buh, ah, guh." To make normal conversation possible, such sound pieces are strung together rapidly--about 8 to 10 per second--and blended so thoroughly that it's often impossible to separate them.

An oscilloscope (a device for measuring sound) registers the spoken word "bag," as a single sound. Thus, the human ear also hears only one sound when "bag" is spoken. The brain, however, can isolate these pieces of sound and combine them with other such sound pieces to make thousands of words. For the most part, this process is unconscious and automatic, and human beings are unaware of it as they engage in normal conversation.

For many, though, the problem arises in converting this natural process to print. Written English is a kind of code: The 26 letters of the alphabet, either singly or in combination with other letters, stand for the 44 phonemes in spoken English.

When children learn to read, they must first become aware that spoken words are made of these pieces of sound. After they gain this knowledge (known as phonological awareness) then they must be taught that letters or combinations of letters are the way in which we represent these sounds on paper. Most children grasp this concept easily, no matter what method is used to teach them.

NICHD studies have found, however, that at least 20 percent of children must be taught this letter-sound system directly in order to learn to read successfully. The greatest possibility for success lies in identifying and treating these children before they reach third grade. This does not mean that older children cannot be helped; only that teaching them to read at an appropriate level for their age becomes progressively more difficult as they get older.

Identifying a reading disability

NICHD- sponsored research has shown that approximately 85 percent of those children likely to become poor readers can be identified with tests of their abilities to manipulate letter sounds, to rapidly name letters and numbers, and to demonstrate an awareness of the concepts of print. For example, when asked to say the word "cat" without the "kuh" sound, these children will be unable to respond by answering "at." This test and others like it can be performed on children as early as 5 years of age.

Treatment methods

Instructors, usually working in small groups, can explicitly show children that words are made up of tiny sound segments. There are many ways to impart this knowledge. One way is to have children clap in sequence as each speech sound in a word is slowly pronounced. Other methods may involve having children move a small plastic tab or other marker as each sound is made.

After the students master this step, instructors can then teach them that the letters in words stand for the tiny sounds in speech. This teaching technique, commonly referred to as "phonics" instruction, is usually again introduced slowly at first, perhaps in combination with putting plastic markers beneath letters on a page in sequence with each letter the student "sounds out".

After this phase of instruction is completed, and when children can read the words on the page in an accurate and rapid manner, the student can then be exposed to teaching methods that emphasize immersing children in good literature. In the past, controversy has existed over whether such methods, commonly lumped under the term "whole language," are more suited to reading instruction than the practice commonly associated with phonics training. Critics of whole language often say that this method omits the fundamentals that children need to sound out words. Phonics critics maintain that phonics training stresses boring memorization at the expense of meaning and exposure to good literature.

In fact, NICHD research has shown that children taught with a combination of both methods make the greatest gains in reading and fare better than children taught with only one method at the exclusion of the other. If a reading impaired student is to be successful, however, the three methods should be taught in an integrated manner.

Research in Progress

The NICHD is funding a number of projects to gain additional insight into the nature of reading disability. Several research teams continue to refine treatment methods, attempting to find which techniques, used alone or in combination, offer the greatest improvements in reading skills acquisition.

Early results of other NICHD-funded studies suggest that key areas of the brains of people with reading disabilities function differently than in people who read easily. NICHD-funded scientists are also taking advantage of powerful new technologies that allow them to observe the inner workings of the brain. One such method, functional magnetic resonance imaging, uses a computer-directed, magnetic device to obtain brain images. Using this technique, researchers are comparing the brain function of people with reading disabilities to the brain functioning of skilled readers. It is hoped that the technique will allow them to observe the changes that take place in the brain as individuals learn to overcome their reading impairment. These research projects may one day provide the basis for effective new treatments for reading disabilities.

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Technical References

(Available from the NICHD Public Information and Communications Branch)

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