About Dyslexia

Historical Overview

Dyslexia, initially referred to as congenital word-blindness, was first recognized in 1896 by three physicians, Dr. W. Pringle, Dr. James Hinshelwood, and Dr. James Kerr. In 1925, Dr. Samuel T. Orton referred to the condition as a "specific developmental language disability," and named itstrephosymbolia, to represent the twisted symbols he frequently observed in his patients' reading and writing.

Dr. Orton's theory of dyslexia differed from the founding doctors' view, in that he did not confine the effects of the disorder to reading and writing. As a neuropathologist and a psychiatrist, his concern was with the whole of human language function, including listening, speaking, reading, writing, and verbal formulation. Today, arithmetic reasoning has been added to the list of brain processing difficulties common in dyslexics. Over the course of time, Dr. Orton speculated that language learning problems come from a built-in developmental anomaly in the brain.

As an outgrowth of Dr. Orton's studies, the Orton Dyslexia Society was formed in 1949. A nonprofit organization with nationwide and international membership, the Society offers leadership in language programs, research, and publications. It has a medical-educational orientation, integrating research from neurology, psychology, and education into an interdisciplinary approach to the field of language learning disabilities.

In 1997, with an expanding membership world-wide, the Orton Dyslexia Society changed its name to The International Dyslexia Association. Of the 45 branches, 43 are located in the United States, with the remaining two in Canada and Israel. In addition, at-large members represent 36 other countries and Provinces in Canada. There are currently 10,500 members in the U.S. and abroad dedicated to the study and treatment of the learning disability, dyslexia.

Dyslexia Defined

The Syndrome of dyslexia has been a topic of controversy since its recognition a century ago. It has been incorrectly called a "reading problem" or "reversals problem." The most recent college edition of Webster's New World Dictionary continues to perpetuate the confusion surrounding this disorder by defining it as, "...impairment of the ability to read, often as the result of genetic defect or brain injury." Not all reading problems stem from dyslexia. They are often the result of low intelligence, emotional problems, brain injuries, and perceptual impairments. Thus, although most dyslexics have reading problems, not all people afflicted by reading problems have dyslexia.

As Dr. Orton suspected, dyslexia is a specific difficulty in dealing with language. Typically, there are problems in understanding written or spoken language an in organizing, storing, and retrieving language information. The most accurate definition of dyslexia to date was adopted by the Orton Dyslexia Society on November 1994:

Dyslexia is a neurologically-based, often familial, disorder which interferes with the acquisition and processing of language. Varying in degrees of severity, it is manifested by difficulties in receptive and expressive language, including phonological processing, in reading, writing, spelling, handwriting, and sometimes in arithmetic. Dyslexia is not a result of lack of motivation, sensory impairment, inadequate instructional or environmental opportunities, or other limiting conditions, but may occur together with these conditions. Although dyslexia is life-long, individual with dyslexia frequently respond successfully to timely and appropriate intervention.

Characteristics

The National Institutes of Health estimates that 15 percent of the population is dyslexic. Recent research suggests that dyslexia is heritable (runs in families) and is possibly linked in some families to genetic markers on chromosomes 15 and 6. In addition, research indicates that dyslexics are often either left-handed or ambidextrous, and many are prone to allergies and other immune disorders.

Research has identified phonemic awareness as a high predictor of success in learning how to read. Phonemic awareness involves the ability to recognize, think about, and manipulate the individual sounds in words long before school age. Dyslexic children often lack this awareness, which is apparent as early as age three or four. They are unable to deal with rhyme and often demonstrate a delay in acquisition and/or use of spoken language.

By the time these children reach kindergarten and first grade, they may have difficulty learning letter names, learning how to write the alphabet, differentiating words that are similar in appearance or sound, sequencing and blending sounds and letters, and using phonics to decode.

Traditionally, the left hemisphere of the brain contains the center for language processing (verbal, linguistic, and phonetic), so it stands to reason that dyslexics may have an anomaly in the left hemisphere. According to Richard I. Masland, M.D., Professor Emeritus of Neurology, Columbia University, a small percentage of dyslexics may have problems with the right hemisphere, commonly referred to as a "reversals problem." This backwards learning results from interference on the part of the right side of the brain. It sends a mirror image signal to the left side of the brain which is responsible for analyzing and answering, Thus, the child writes letters or even words backwards.

Leonardo DaVinci represented a classic case of this anomaly. In the nearly 7,000 pages of his notes preserved to this day, his sketches are accompanied by his comments which are written backwards. It has been reported that he used a mirror to read his own handwriting.

It should be noted, however, that a form of dyslexia such as this is not common, yet the general population mistakenly identifies dyslexia by this characteristic. One should also be aware of the fact that it is not uncommon for nondyslexic children before the age of seven to reverse letters when writing. This fact, coupled with the understanding that not all dyslexics have a reversals problem, leads us to a clearer understanding that the existence of or absence of the reversals problem can neither indicate nor rule out a dyslexic condition.

Although non-dyslexics prior to the age of seven may reverse letters and words, another form of reversals is often found among dyslexics before and especially after the age of seven. These reversals occur with the meaning of words, especially those dealing with time and space (before/after, left/right).

As the tools of technology have become more advanced, research findings have become more revealing. For many years, it was believed that dyslexia occurs more often in males than in females (4:1). Recently, however, research indicates that the gender difference in occurrence originally indicated may have been misleading, in that expectations for females were lower many years ago. A significant number of recent findings indicates that the incidence of dyslexia is equally distributed between males and females. Although acceptance of this equality of gender in dyslexics seems to be the recent trend, research in this area continues.

Neuroanatomical Research

Medical researchers have found differences in the brain structure of dyslexics. Albert Galaburda, M.D., Chief of the Division of Behavioral Neurology at Beth Israel Hospital in Boston and the Emily Fisher Landau professor of Neurology and Neuroscience at Harvard University Medical School, is widely known for his research on the neural mechanisms of dyslexia. His theory of brain function depicts the brain as having processing stations connected by complex pathways. If there is a failure on one neural pathway, it may adversely affect processing else where. Based on extensive research, he believes that the fundamental problem in dyslexia is a result of the brain's propensity to develop small malformations (anomalies) in the cerebral cortex.

According to Dr. Galaburda, in a normal brain, the thalamus, which contains relay centers for sensory and motor information to and from the brain, signals neurons to go to the language centers, In a dyslexic brain, something goes wrong and these neurons form excessive connections, causing nodules, or ectopias, to form on the cerebral cortex (surface of the brain). These nodules, which look like small bumps, represent a collection of brain cells which have migrated to the cerebral cortex in areas other than the known language centers. Their propagation causes systemic changes in the brain. In fact, the dyslexic brain is so different from the mature brain that it is hard to determine just where its language centers are located.

As Dr. Galaburda noted, the fact that the low level visual processing and auditory processing brain cells located in the thalamus are 30 percent smaller than those of the ondyslexic brain is substantial and significant. Although small neurons cannot function as fast as large neurons, this in no way suggests that dyslexia is associated with low intelligence. In fact, most dyslexics are average or above average in intelligence. They just need more time to process information.

Dr. Galaburda offered two theories regarding brain functions in dyslexia. The first theory places the onus of abnormality in the low-level processing areas of the brain. Because the neurons in this area are smaller than normal, the brain hears sounds in distortion and sees letters incorrectly. Consequently, when these garbled messages are sent to the higher level processing areas to be analyzed and used, they are further confused. This is referred to as a bottom-up problem.

The second theory places the problem with the higher level processing areas of the brain. Since these are malformed, even if the auditory and visual messages are being correctly perceived, it is as if the top part of the brain says to the low level processing part of the brain, "Don't bother to give me the message. I can't use it anyway." This theory would account for the presence of underdeveloped neurons in the low-level structure of the brain. They are not being stimulated to send messages, so they have no reason to grow to a mature size. This is referred to as a top-down problem. Whichever is the case, the dyslexic can't process the information in the same way that a nondyslexic brain can. Dr. Galaburda suspects that the problem is genetic and he is working with colleagues to map the gene.

Through the use of the modern tools of anatomy, such as PET, EEG, SPECT, CAT, fMRI, rCBF, and BEAM, researchers are able to examine how the brain functions as it relates to language processing. February of 1998 made a breakthrough in understanding the functioning of the brain as it related to reading. Sally Shaywitz, M.D., and Bennett Shaywitz, M.D., co-directors of the Yale Center for Learning and Attention at Yale University Medical School, identified the "glitch in the circuitry" of the dyslexic brain's pathway that is used for reading.

Through the use of functional magnetic resonance imaging (fMRI), Drs. Shaywitz and Shaywitz were able to observe the brains of both dyslexics and non-dyslexics as they performed reading tasks. The fMRI enables researchers to distinguish between blood carrying oxygen and blood that is depleted of oxygen. An active area of the brain uses fresh supplies of oxygen-rich blood and appears to light up on the fMRI.

In normal readers, the reading pathway encompasses fingertip-sized regions on the surface of the brain and moves from the back of the brain to the front. The path starts with the primary visual cortex, the area which registers what the eyes see. Then the visual association area, or angular gyrus, takes over, translating the abstract scrolls of words and letters into language. The final area, behind the eyes and toward the front of the brain, is the superior temporal gyrus, or Wernike's area. Here the brain takes the sound of language and converts them into words.

Comparative results of the study indicate that dyslexics barely use the normal reading pathway in the brain. Instead, they use the interior frontal gyrus, or Broca's area, a region toward the front of the brain which pairs words with units of sound. According to Dr. Sally Shaywitz, "This provides evidence that dyslexia is a real biological entity."

Because of the brain's plasticity, especially when young, Drs. Shaywitz and Shaywitz, aware of the prospect these implications reflect, plan to continue their research in hopes of learning how best to address this anomaly.

Gifts of Dyslexia

The list of famous people said to have been dyslexic includes such names as Leonardo DaVinci, Thomas Edison, Albert Einstein and Woodrow Wilson, Adding to this distinguished list of people who have impacted our history are Hans Christian Andersen, Winston Churchill, Walt Disney, General George Patton, and Nelson Rockefeller. In more recent times, the list includes banker John Reed, athletes Bruce Jenner and Greg Louganis, and entertainers Tom Cruise, Whoopi Goldberg and Cher. What is it that these famous dyslexics possess that enables them to turn a disability into a gift? The answer seems to lie in the right hemisphere of the brain.

Research indicates that the plenum temporale in the right hemisphere of the brain of dyslexics is often larger or equal in size to its counterpart in the left hemisphere. This is the reverse of what is considered the norm. Consequently, many dyslexics display extraordinary right brain abilities. Their superior visual spatial skills enable them to see objects acutely in relation to the space surrounding them. Thus, there is a high incidence of dyslexics who excel as mechanics, artists, engineers, surgeons, athletes and architects.

Despite the problems experienced with calculations in linear mathematics, dyslexics often demonstrate skill in mathematic conceptualization, another right brain ability. This talent further supports some dyslexics' gravitation to the fields of engineering, science, and architecture. In addition, the right brain abilities of social competence and keen intuition direct other dyslexics to the fields of sales and administration.

Traditionally, the right brain has been considered the wellspring of creative imagination. Thus, the performing arts is often a comfortable work or play environment of dyslexics. Many dyslexics who have become musicians, painters, sculptors, and actors or actresses have used their right brain skills to achieve success, despite their left brain disabilityy. In addition,creativityy inspires futuristic thinking which, in turn, sets the stage for inventions and discoveries, such as those of DaVinci, Edison, and Einstein. Dyslexics have much to offer the world, if given the chance.

Helping the Dyslexic

One of the greatest problems associated with dyslexic children is low self-esteem. Having failed at the tasks of reading, writing, spelling, and sometimes math, these children develop a negative self image. Parents of children who have not yet been identified as dyslexic can unknowingly exacerbate the problem by telling their child to try harder. Given the limitations associated with the condition of dyslexia, the child is doing the best he/she can, and to expect more without appropriate remediation is both unfair and frustrating to the child. This is why early identification and intervention are important.

Asking the child's teacher to look into the problem is the first step a parent should take. Most schools lack the funds to provide the one-on-one tutoring needed by the dyslexic student. Consequently, the child often needs to be referred to a hospital clinic or a learning center which specializes in dyslexia. The 32° Masonic Learning Centers for Children, Inc. have trained staff member who are competent in administering and interpreting psychological tests and educational assessments. In addition, these professionals are intimately aware of the relationship of these test results to the language function.

A consistently valid form of educating dyslexic children is through the use of the Orton-Gillingham approach. This approach is multisensory, in that children use visual, auditory, and kinesthetic modalities in learning to read, write, and spell. The approach is also structured, sequential, and organized. According to past president of the New York Branch of the Orton Dyslexia Society, Amy Bailin, M.S.Ed., P.D., and Board of Directors member Arica Mann Marcia., C.C.C.: “Letters and sounds are taught first in isolation, through auditory, visual and kinesthetic linkages, then blended together to form works for reading and spelling. These words are often then put together into meaningful units. Not only must the student learn the phonetic elements, he or she must also understand and apply the rule structure of the language.”

The tutors employed by the 32° Masonic Learning Centers for Children, Inc. are trained in the Orton-Gillingham approach, and the center supervisors are certified by the Academy of Orton-Gillingham Practitioners and Educators. Tutors are equipped to adapt the Orton-Gillingham method to the individual child and to modify therapy accordingly.

Through personalized, one-on-one lessons with a professional tutor, children gain both skill and confidence in their ability to succeed in reading, spelling and writing. The Orton-Gillingham approach requires mastery of the first level of the program before proceeding to the next level. As a result, children show great gains in reading skills over a relatively short period of time. Records show evidence of 2-3 years of progress in read-ability level in less than a year of remediation.

Because Freemasonry believes that every dyslexic child should have the opportunity to experience success in life, free admission to the program is offered to children regardless of socioeconomic status. The learning centers are financially supported through 32° Masonic funding efforts, and members' donations.

Considering the fact that 15 percent of children attending school in the United States today are dyslexic, the Supreme Council, Northern Masonic Jurisdiction, has embarked on a mission to respond to a vital humanitarian need. Dyslexic children left unchecked suffer needless emotional, social, and academic frustration. By the time they reach adulthood, their self esteem is dashed and their potentiality is never realized. Early and correct intervention, such as that offered through the 32° Masonic Learning Centers for Children, Inc., is sound, both educationally and philanthropically.

The Mission

The Mission of the 32° Masonic Learning Center for Children, Inc., is to provide quality, state-of-the-art, remedial education to children diagnosed as having dyslexia. In keeping with the commitment of the 32° Masons to children in the community, this service is provided free-of-charge.

This report on dyslexia was prepared for the 32° Masonic Learning Centers for Children, Inc., by Carolyn E. Gramling, M.S.Ed., Reading Specialist, Professor of Reading, Suffolk Community College, Selden, New York. - January, 1999

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