

Dyslexia

The term, "dyslexia" can be translated as, 'Dys' meaning wrong or problematic and 'lexia', having to do with words and letters. So, in a literal sense the term means, a problem with words.

However, many specialists use the term, dyslexia to refer to many other symptoms including; issues with reading, spelling, numbers, writing, memory and sometimes poor motor coordination.

Dyslexia is associated with difficulties in differentiating fine visual movement and/or phonetic sound. Research indicates the disorder is due to dysfunction in the lateral and ventral geniculate nuclei of the thalamus. The affected child or adult often has difficulties with fine movement integration or may have poor nutrient uptake, which can affect the brain and its structures.

Dyslexia has been sub-divided into 5 different categories: Visual Dyslexia, Auditory Dyslexia, Phonological Dyslexia, Orthographic Dyslexia and Developmental Dyslexia.

Visual Dyslexia refers to a reduced ability to make sense of information taken in through the eyes. This is not the same as visual acuity or sharpness of vision. Visual processing affects how visual information is interpreted or processed. A person with visual processing problems may have 20/20 vision but may have difficulties discriminating foreground from background, forms, size, and position in space. The person may be unable to synthesize and analyze visually presented information accurately or fast enough. In other words, the eyes look, but its the brain that sees.

There are nerve endings at the back of the retina that relay two specialized types of cells/pathways to the thalamus. The Parvocellular pathways register color hues and contrast. Magnocellular pathways register movement detection.

Auditory Dyslexia and Visual Dyslexia are due to the magnocellular theory of dyslexia. This theory proposes that dyslexics have neurological weakness in the magnocellular cells of the thalamus. This is the area of the brain that is used for rapid processing of visual and auditory information.

Much research indicates the different cell bodies are unable to differentiate their functions. Based on this inability to differentiate, it appears there is an overlapping of functions or no function between the two pathways. There is growing evidence that dysfunction in Magnocellular pathways are responsible for Visual Motion Detection Difficulties and some forms of Learning Difficulties. These difficulties can include:

The white background on a sheet of paper or page of a book can overwhelm Parvocellular cells and activate Magnocellular cells by mistake. Some have found Irlen lenses (colored filters or lenses) to help with dyslexia by helping to differentiate the functions of the Parvocellular

pathways from the Magnocellular pathways.

- Words can seem to move or jiggle on the page
- Text can appear to be blocks of blurred black (text) with rivers of white running in between.
- The orientation of letters and text may keep changing "d and b" becoming difficult to differentiate. (reversed letters)
- Children with Dyslexia can find it difficult to visually track text on a page as this requires fine movement and very tight eye muscle control.
- The cerebellum, plans fine motor movements a fraction of a second before execution. Those with dyslexia might also exhibit dyspraxia/apraxia, which is fine and gross motor control deficits.
- Learning difficulties due to neurodevelopmental delays and brain maturation can lead to Auditory Processing issues and short-term or intermediate memory issues.

Phonological Dyslexia represents a failure to grasp the phonic nature of English. Individuals with it have great problems reading new or nonsense words because they cannot grasp the link between the individual sounds or phonemes and letters on the page.

Orthographic Dyslexia is the inability or problem with identifying and manipulating the letters in the alphabet into words. Orthography is the set of symbols or letters that make up a language. There are 26 letters of the English alphabet. Orthographic Dyslexics have problems with interpreting these symbols in reading, writing and spelling.

Developmental dyslexia is associated with deficits in the processing of visual motion stimuli, and some evidence suggests that these motion processing deficits are related to various reading sub skills deficits. Research indicates there are two motion processing deficits involved in Developmental Dyslexia. Each deficit is associated with a different type of reading sub skills deficit. A deficit in detecting coherent motion is associated with low accuracy on reading sub skills tests, and a deficit in discriminating velocities is associated with slow performance. It is believed the motion processing and reading deficits may indicate underlying neurocognitive mechanisms of developmental dyslexia."

Visual Processing Disorders and Learning Difficulties

Visual processing disorders (not visual acuity) can hinder understanding visual information such as movement, spatial relationships, form, or direction. Visual processing disorders and Auditory processing disorders can result in poor academic performance.

Visual closure

Visual closure is the inability or difficulty to draw a human face or recognize a face if facial features are missing, such as the nose, an eye or mouth.

Visual-Spatial relationships

The ability to perceive the location of objects in relationship to other objects is a critical skill in

reading, math and handwriting. It is also important in order to determine where the individual is in place and space. Visual spatial relationships allow an individual to recognize different symbols and understand the direction (d / b, p /q) or where the objects are in relationship to each other. It is important to be able to tell the difference or see the similarity between symbols. Individuals who have difficulty with spatial relationships may seem unusually clumsy or accident prone. They may have difficulty reading or do not like to read, and many have poor handwriting.

Form discrimination

Whether it is the differentiation of the shape of a circle from a square or the letter b from d, the ability to perceive the shapes of objects and pictures is an important skill. Throughout the entire academic process form discrimination is necessary. The most obvious classroom activity requiring the child to discriminate forms is that of reading. The learning of the letters of the alphabet, syllables, and words will undoubtedly be impeded if there is difficulty in perceiving the form of the letters, syllables, and words.

Visual discrimination

Visual discrimination allows us to tell the difference between similar objects, tell where one object ends and another begins, and to recognize objects and symbols when only part of it can be seen (or when it is fuzzy). Individuals who have visual discrimination disorders often mix up letters or numbers and have difficulty reading or scanning pictures for information.

Visual memory

Visual memory allows us to recognize and remember objects, letters, numbers, symbols, words, and pictures. An example would be visual information that is learned, then forgotten, and then remembered again, later.

Visual integration

Some individuals have difficulty perceiving or integrating the relationship between an object or symbol in its entirety and the component parts which make it up. Some children may only perceive the pieces, while others are only able to see the whole. Children with a visual integration disorder will have difficulty learning to read (dyslexia) and recognizing symbols.

Visual pursuit and tracking

This is the ability to track moving objects. It is part of the ocular vestibular system. Those with this disorder may have difficulty watching moving objects, reading or writing.