

Mini Review

Corresponding author

Salai Dhavamathi Janarthanam, M.Optom
Department of Optometry and Vision
Science, Amity Medical School
Amity University Haryana
Gurgaon, Haryana, India
E-mail: dhavamathibalaji@gmail.com

Volume 2 : Issue 2

Article Ref. #: 10000J2113

Article History

Received: October 13th, 2017

Accepted: November 30th, 2017

Published: December 1st, 2017

Citation

Janarthanam SD. Visual processing disorder in children. *Ophthalmol Open J.* 2017; 2(2): 45-47. doi: [10.17140/OOJ-2-113](https://doi.org/10.17140/OOJ-2-113)

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Visual Processing Disorder in Children

Salai Dhavamathi Janarthanam, M.Optom*

Department of Optometry and Vision Science, Amity Medical School, Amity University Haryana, Gurgaon, Haryana, India

ABSTRACT

The minute persons think of eyesight, they generally think about accuracy, as in normal, 6/6 (or 20/20) vision. However, it is much more than that as the brain really processes the visual world, including things like symbols, pictures and distances. Faults in these brain tasks are called visual processing disorders (VPD) or visual processing issues. Many parents and teachers find it difficult to recognize the signs and symptoms of a VPD in their child or students. They also often confuse them with learning disabilities. This mini review aims to provide descriptions of visual processing issues and how to overcome through some vision, behavioral and education therapies.

KEY WORDS: Visual processing disorder (VPD); Learning disabilities; Behavioral therapies; Vision therapies.

INTRODUCTION

A visual processing disorder (VPD) is associated with the delayed capacity to perceive information received through the sense of vision. The symptoms of this medical condition are unlike the complications relating to eyesight or sharpness of vision. Problems with visual processing affects the interpretation and processing of the received visual information by the brain. For example, visual-spatial processing is the ability to define the spatial localization of objects. When a child passes the vision test during clinical examination but is unable to identify the differences between a triangle and a square, eyes are not responsible for this problem. The problem is essentially higher-processed visual skills.

Evidence suggests that the retina extends through the dorsal portion of the lateral geniculate nucleus of the thalamus to the primary visual cortex which is a tiny sheet of tissue, comparable in size to a half-dollar, situated in the occipital lobe in the posterior portion of the brain. The primary visual cortex is tightly packed with cells in several layers, just as is the retina. In its middle layer, which receives messages from the lateral geniculate nucleus, researchers have observed retorts alike to those seen in the retina and in the lateral geniculate cells.¹ Cells above and below this layer respond differently. For example, some of these cells may respond best to stimuli in the shape of bars or edges inclined at a certain angle. Further studies have suggested that different cells even prefer edges at different angles or edges moving in a particular direction. Though the visual processing mechanisms are not yet entirely implicit, current research undertaken by performing structural and physiological studies in monkeys suggest that visual signals are fed into at least three separate processing systems. One system appears to process the information mainly about shape; a second, mainly about color; and a third about the movement, location, and spatial organization.¹

Visual processing issues are multifaceted. As there are eight diverse categories, and some individuals could show advanced symptoms of the condition than one. Hence, these concerns often go unobserved because they do not show up on visual or ocular examination. The various kinds of visual processing problems that the researchers have encountered in this domain have been listed as follows:

Visual perception issues: Children experiencing this clinical condition have trouble visualizing the differences between two related letters, figures or objects. So there is a possibility that the patient may confuse between the letters, such as *d* and *b*, or *p* and *q*. We can improve the perception skills by giving hidden pictures, drawing, dot to dot, memory games and can also use developmental test for visual perception software to assess the skills in children from 4 to 12 years.

Visual figure-ground judgment issues: Children with this form of clinical concern may not be able to distinguish a contour or character from its contextual application. The patient might experience anxiety judging a detailed piece of evidence on a sheet. Activities like jigsaw puzzles, board games, find the odd one out, and sorting can be used for treatment. We also have standardized tests such as the test of visual perceptual skills (TVPS) that measure each of these skill areas based on a series of multiple choice line drawings. This test takes a bit longer to administer than some of the other occupational therapy testing because of the many sub-tests involved.

Visual sequencing issues: Children with related medical conditions struggle expressing the direction of signs, words or metaphors. They may tussle to inscribe responses on a single pane or miss lines during interpretation. They also may reverse or misinterpret letters, figures and words.

Visual-motor handling issues: Children with these problems have trouble expending a visual response to harmonize with a measure of the further parts of the body. Writing within the lines or margins can be tough. Children also may bump into things and have trouble copying from a book.

Long- or short-term visual memory issues: Children with either one form of visual memory concerns experience difficulty in recalling information they initially perceive. For this reason, they might have a problem with reading and spelling.

Visual-spatial issues: Children with these issues have trouble identifying the spatial localization of objects. This includes a misperception of the distance objects are from the observer and from each other. Also, identifying items and letters on paper or in a verbal description may be affected. These children may also have a difficult time reading charts and judging time.

Visual closure issues: Children with these issues have trouble detecting or recognizing an object when only portions of it are observable. For example, they cannot distinguish a car if its wheels are missing or an animal in a drawing that is missing a facial feature. Children may also perhaps experience great trouble with predicting context as they fail to identify a word if a letter is missing.

Letter and symbol reversal issues: Children with these issues tend to shift letters or numbers when writing or replace letters when reading after the age of seven years. Until approximately

the age of seven years, reversals are normal. They also have a difficulty with letter or symbol construction that interrupts reading, writing and math abilities.

It is not clear as to how many children experience visual processing difficulties, but the symptoms often occur among children with learning disabilities.² Experts cannot state accurately the causes of these clinical issues, and they are often unaware that these effects are a consequence of the brain's inability to intercept and deliver visual signals received by the eyes. Certain studies recommend that low birth weight or extreme preterm birth can play a role.³ It is also believed that minor traumatic brain injury could lead to visual processing issues, but then again there is no adequate evidences to completely support that concept.⁴

It is also very difficult to identify visual processing issues in children. Some of the symptoms aren't paying attention to visual tasks, getting easily distracted by too much visual information, being restless or inattentive during video or visual presentations, lacking interest in movies or television, etc.⁵ Children may perhaps not express the signs of visual processing issues until they start school. However, the greater the length they drive lacking support, the better the influence may be on an extensive choice of abilities. When one observes a child facing difficulties in school, they should first send them for an eye exam and then consult to other specialists like pediatricians or neuropsychologists if there is no refractive or ocular disease concern.

What circumstances are associated with visual processing issues?

Visual processing problems do not constitute a learning disability in itself, but the symptoms often appear in children with reading, writing and math issues. Some specialists regard visual processing issues as threatening causes for learning issues such as dyslexia, but a comprehensive report from the American Academy of Pediatrics (AAP) states that visual processing issues are a result of that clinical condition, and not the cause.⁵

Treatment for visual processing issues

There are no medicines that can treat visual processing issues. However, if you think your child is also dealing with learning disabilities or other challenges like depression or anxiety, talk with the child's pediatrician and together, you can come up with a management plan for any co-occurring issues.

There are three kinds of therapies that are significant to be aware of as considering ways to help the child with visual processing issues: optometric vision therapy, behavioral vision therapy and educational therapy.⁷

Optometric vision therapy: It has been proven to help with vision problems that consist of eye movements or eye alignment. These

eye coordination concerns are dissimilar from visual processing issues. Optometric vision therapy doesn't "cure" learning and attention issues. But if the child has vision problems in addition to dyslexia and other issues, solving vision problems can help him give more energy to result strategies that can help with the way the brain processes information.

Behavioral vision therapy: It is different from optometric vision therapy. Behavioral vision therapy involves eye exercises that are designed to improve visual perception. These eye exercises are also designed to improve visual processing skills. But there is no scientific study that shows this kind of therapy helps the brain process visual information.

Educational therapy: Teaches children strategies for working around their weaknesses. Learning how to approach problems can reduce frustration, increase self-confidence and lead to greater success in school. There are many non-medical ways parents and schools can help with visual processing issues in school and at home. Think of that learning can be multisensory. Children who have concern taking in visual information can be helped by hands-on activities as well as by listening.

Finally, this mini review concludes that with the right kind of strategies and support, children with visual processing issues can learn to read and write well. It is also a good idea to learn about assistive technology and adaptive tools as the more you comprehend about the child's problems, the easier it will be for them to find strategies that can help.

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