

Chapter One

A Functional Basis for Vision

According to Dr. Gesell, "Vision is the dominant process in man." Unfortunately, little is truly understood about the process of vision, especially as it applies to learning. Most thinking and discussion about vision has to do with visual acuity or how sharply a person sees, rather than the process of vision. Vision is a total body process which involves not only the eyes, but the entire body.

School and other life activities require children to use two eyes to probe varying distances in the world around them. The primary distances in a classroom are the chalkboard, which is a farpoint, and the desk, which is a near-point. In order to see an object that arouses his interest, such as a word on the chalkboard, a child points each eye at the same time to locate the word. Then the two eyes must focus simultaneously to clearly see that word. After the process of locating and focusing the object, signals are sent back to the brain in the form of coded electrical impulses that have been programmed by the retina (the nerve element of the eye) and the search for meaning is started. When meaning has been established, some form of action occurs in the form of an output which may be a thought, a vocalization (speech), a body action, a defensive reaction to danger, or a hold for more information. Each bit of activity takes place within the system in milliseconds before the next bit of activity takes place. Reading is the constant activity of locating, focusing, searching for meaning, relating experiences, and arriving at an appropriate action.

The location system of the body consists of the six muscles that control the movement of each eye and the musculature of the body. The voluntary, or skeletal nervous system of the body, controls the muscles of the eye, affecting eye movement and where a person looks (location). Adequate control of the body results in proper orientation in space (knowing where we are). The eyes and the body work together for properly locating objects in space. When there is a mismatch, or lack of coordination between the parts of the body as a result of improper motor control and the eyes, a person will have difficulty in orientation and location of objects outside of himself. In other words, he will have difficulty knowing where he is and because of this inadequate reference to himself, will have difficulty knowing where objects are around him.

The focusing system of the eye, an involuntary function, consists of the lens within the eye and the muscle controlling its shape. The focusing system of the eye is part of the body's involuntary, autonomic, or visceral nervous system. It is because of this interrelationship that medication given for a stomach problem or for relaxing a smooth muscle can cause difficulty in the focusing of the eyes. To see an object clearly the lens of the eye responds after an object is located. Using drops in an eye examination paralyzes the focusing system and a true assessment of visual function cannot be done.

A developmental optometric evaluation of a child's visual system will determine how the various systems of the eyes and body work together as a team at all distances in space and under various demands. This type of evaluation can only be done without drugs or "eye drops." A simple eye examination that evaluates only clear vision (a visual acuity checkup) does not satisfy the needs of a child in the classroom setting.

Central and Peripheral Vision

Unfortunately, and to the detriment of children, our culture emphasizes central vision.

Central vision has to do with seeing clearly by zeroing-in on what is seen. This concept is perpetuated by telling children to "concentrate" on whatever activity they must do, from reading to playing ball. What is really desired of children is that they pay attention to what they are doing and respond to that information or task in an appropriate manner. Children who concentrate too intensely may have trouble getting the point of what they have to learn, even though they may be able to repeat the information with extreme

accuracy. Many children who listen to their parents and teachers with intense concentration develop vision problems.

Optometrically, it is more desirable for children to look at that which interests them and to be aware of space around them at the same time. In addition to the visual awareness of the space around the task, the child should also be aware of his own physical self. When the child maintains this awareness of space and himself, he will have more effective orientation and better responses to the data he is attempting to process. Performance in sports activities will improve almost immediately with this new awareness. One of my teenage patients, an excellent runner, ran with such tremendous concentration that he was exhausted at the end of each race. He never realized that there were people in the stands. When he became peripherally aware he felt less fatigued, his body functioned with less effort, and he was delighted when he realized that people were watching him as he ran.

Proper use of peripheral awareness will aid in the improvement of handwriting, reading, and other academic activities. This concept may be difficult to accept because our culture has conditioned us in other ways. It is important to realize that peripheral awareness does not mean looking at the objects around us. It means being aware of them. This concept will be developed in each of the training activities to be described later.

Vision and Posture

As can be seen from our discussion of vision as a total body process, the eyes do not act alone. There is an interplay between the visual system and the postural system. When the eyes do not look at an object equally, while reading or writing, the rest of the body will be out of balance and perception will be distorted. Conversely, when posture is not balanced, coordination between the two eyes will be affected, making it difficult for the eyes to work together as a team and for the eyes to focus properly. Once again perception will be affected.

Proper posture for a sitting task will be described in the chapters on reading and handwriting.

Generally, while sitting it is important to sit up with the body weight being absorbed by the thighs, the buttocks pushed into the back of the chair, feet flat on the floor, arms resting on a table, and the back allowed to assume its normal slope. While standing, a person should stand with feet apart in a balanced and comfortable position, knees unlocked, and both feet flat on the floor.