Lateralization (Terry Webb)

There are no objective directions in space. The directions which we attribute to space [right, left, up, down, before, behind, etc.] are attributed to external space on the basis of activities which take place within the organism.

The first of these directions to develop appears to be that of laterality, right and left. Our body is bilaterally symmetrical. We have two eyes, two ears, two arms, two legs, etc. Neurologically, the nerve pathways innervation each sides of the body remain primarily separate. There is a minimal amount of crossing over, to permit feedback and matching, but essentially there are two relatively independent systems, one for the left and one for the right.

All the nerve systems, for example, innervating the left side of the body are kept distinct, pass up through the spinal cord, cross the brain stem, and enter the right hemisphere of the cortex. The anatomical and neurological differentiation makes of the organism an excellent device for detecting right and left.

Laterality must be learned. It is only by experimenting with two side of the body and their relationship to each other that we come to distinguish between the two systems. It is through experimenting with the movement of the two halves of the body, observing the differences between these movements, comparing the differences in sensory impressions, and so forth, that we sort out the right side from left and ascribe certain differentiating qualities to each [the concept of "reciprocal interweaving" Gesell *et al*., 1941] The primary pattern out of which this differentiation develops is that of balance. When experimenting with this balancing problem, the child must learn right and left, he must learn which side has to move, and how it has to move, in order to execute the appropriate compensatory movements as his balance varies from one side to another. Out of these and similar activities, he learns to differentiate the right from the left.

Two of these stages are of particular importance.

The first is that in which the child learns that as long as all of his responses are bilaterally symmetrical, he can avoid the problem of laterality. Thus, his movements and his responses will be organised so that both sides of the body are performing the same act at the same time. Mirror images being made by the dominant side.. Frequently converting bilateral activities into unilateral activities. Where the child must use both sides of the body, one side will definitely lead and the other side will follow without taking a positive part in the performance, hanging limply at the side. This child does not gain an adequate appreciation of right and left hand and confronted with problems of laterality in external space. The child restricts his movement patterns and restricts his learning.

The development of laterality is extremely important since it permits us to keep things straight in the world around us. The only difference between *b* and a *d* is one of laterality. If there is no right inside the organism, there can be no projection of this left and right outside the organism, and consequently the directional characteristics of *b* and *d* disappear. Lotz, 1852

pointed out many years ago that if we had only visual impressions, the words *up, down, left, right* and so on could have no meaning. The visual field would be circular, but with no position either upright or inverted. It would be lacking anything else in consciousness with which to compare it. Ascription of visual position can derive only from having each field point take its special place in tactual kinaesthetic space image. “Upper” in the visual field is what appears nearer the head, “lower” is what appears nearer the feet. After learning the variable posture of the body, we can give independent meaning to the visual “up” and “down” by reducing our posture to an erect bodily position.

When the child has developed laterality within his own organism and is aware of the left and right sides of his body, he is ready to project these directional concepts into external space. One very important factor in the development of directionality is the control of the eyes. Since a great deal of our information concerning space and location of objects in space comes to us through our eyes, it is necessary for us to develop a series of clues and matches by which visual information can give us the same directional concept which we formally received through kinaesthetic activity. This is accomplished through the eyes. When the child has learned this control, he matches the movement of his eye to a movement of the hand and thus transfers the directionality of the information from the kinaesthetic pattern in his hand and arm to the kinaesthetic pattern in his eye. This is a very precise and very complex matching procedure, and a great deal of skill and matching is required to perfect it. When this matching has been perfected, the child can use his eyes as a projection device to determine directionality in space outside the reach of his hand.

Crossing the midline:

Directionality and the midline, When the child is experimenting with basic movement patterns, he refers all movement to the centre of his body as the zero point of origin. Thus, a young infant in his crib first moves his arms in a bilateral symmetrical fashion toward the centre of his body and away in circular motions. As one arm moves in, toward the centre, the other moves in also. He therefore learns that this bilateral pattern is an “outside- in” movement. A little later, when he first moves his hand across the midline of his body, he must learn that the movement remains constant although it has crossed the midline and is now compared with the pattern on the opposite side. Thus, subjectively, the movement is first an “outside- in” pattern and, when it crosses the midline, becomes an “inside-out” pattern. He learns that the objective movement remains “right-to-left even though it may begin as an “outside-in” movement and, at the midline, become an “inside-out” movement. The subjective direction must be reversed when the midline is crossed in order maintain consistency of the objective movement.

Young children show hesitancy and reluctance to move the hand across the midline and display confusion when it is on the opposite side. Many slow learning children will be seen to show the same hesitancy and confusion at a later age.

Since the child follows the moving visual stimulus with his eyes, the movement of the eyes follows the same pattern as that previously followed by the hand. When the line of sight

passes the midline, a reversal of visual-kinaesthetic matching must be accomplished. Hence, the child must learn three procedures with extreme precision:
He must learn where his midline is;

He must learn how to reverse the translation at the midline without interrupting the continuous external movement, and

He must learn to always reverse when the midline is crossed.

This is not always easy for all children. It can be frequently seen in eye movements where the child loses control, and his following movements are rough and jerky as the target crosses the midline. This can be aided by the use of the "Lazy eight" board. Ask the child to trace over and over this figure with one continuous line without taking the pencil from the board When he has achieved a smooth free movement which is reasonable accurate ask him to reverse the directions.

Benefits of using the lazy 8 board:

The eyes are often considered to be an extension of the brain and play an important role in a child's development and learning.

By using the "Lazy 8 Board" this is considered to be an excellent exercise for some important integration in the classroom. It will assist in the following areas namely:

Eye and hand coordination,

Letter recognition for decoding,

Tracking left and right,

Relief of eye strain,

Written language,

Coordination **of both eyes** to enable them to work together – referred to as binocular vision, and
Close **focusing skills**, so important for reading, writing and learning
Because the **Cerebellum** is such an important area for smooth muscle pursuit and in particular setting our rhythmic patterns, the movements of the hand speed will direct this innately in the student or person using the board.

My recommendation:

The "Lazy8" board should be introduced to the child, student or other before asking them to do the drawing of the 8 on paper.

All of the above will also support the development of new neural networks as well as brain myelination. [Myelination is when a layer of a white fatty substance that supports rapid

transportation of information between the brain, Cerebral cortex which is the upper brain and the Spinal cord is not fully developed].

This is one of the most integrative exercises available to learners, as it involves the whole brain-and- body system. The hands crossing the midline of the body supports the transmission of messages from the left and right hemispheres through an area called the Corpus Callosum [a bundle of nerve fibres that connect the hemispheres].

Other areas of improvement:

Hand / eye coordination, following directions

ADD/ADHD, by supporting the RAS for attention [RAS = Reticular activating system – system of nerve pathways in the brainstem responsible for our alertness] Writing, math and spelling

Left and right awareness, improved peripheral vision, improved movement and sporting skills.

Introduce them to the Elephant Exercise.

We also have a second part to the drawing and using the "Lazy 8 "board. To be as effective as the drawing of the 8 and using the "8" board, we do this exercise standing up to gain even more whole-body integration. By doing it standing up, the movement attached to this activates and balances all areas of the brain body system.

We are in fact drawing the pattern of a figure 8 lying sideways with the arms. We should always start with the arms at the centre of the body and the centre of the "8" and move upward to the left while the eyes are following the thumbs.

Show movement of the body including hips

Due to this movement, the sensory cortices of the cerebrum and frontal lobes, together with the stimulation of the *right brain limbic system* – emotional brain, support the development of hand and eye coordination.

The use of the core muscles stimulates the vestibular system, which is essential for attention span, concentration, hearing, and other sensory input.

Input from the visual field activates the occipital lobe, where eyesight is organised. Persons doing the Elephant will improve tremendously both in academic performance as well as sharpened memory.

Parts of this article have been researched from *"The Slow Learner in the Classroom* – Newell C. Kephart 1954

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Ceres, South Africa (2023)