A Neural Schematic Interpretation of How Reversals Occur

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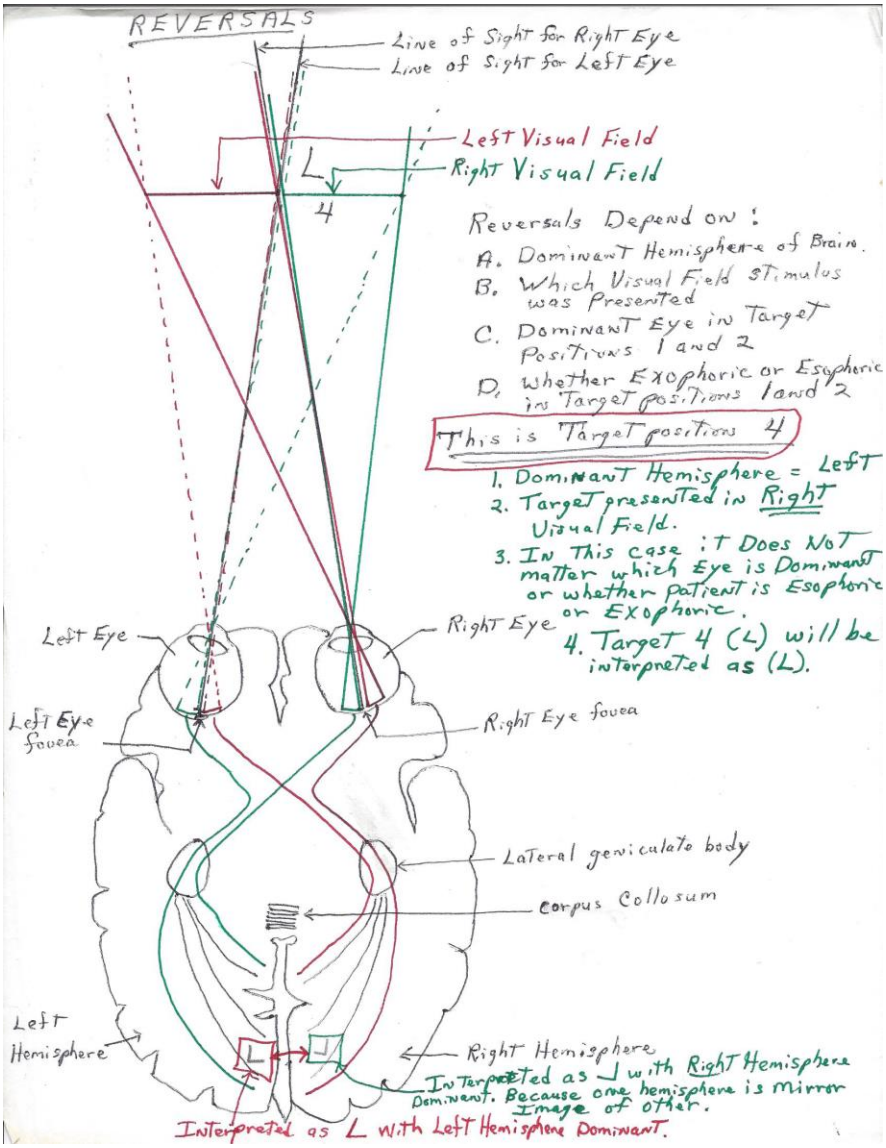
Reversals have been a very perplexing problem with individuals who have difficulties in reading. I have never really found an adequate explanation of reversals and how they occur, until I read a few Scientific American articles that have lead to the following explanation of reversals and I believe this can be proven or disproven by use of an Eye Trac and Tachistoscope to control where the eyes are fixated at a given moment of stimulus and record the interpretations of several reversible figures at different target positions.

Reversals can happen because of more than one reason and I feel this is why there is so much confusion and varying opinions on the subject.

This explanation of reversals is based on the assumption that the dominant brain hemisphere (visual cortex) represents the mirror image of the image transferred from the visual cortex of the other hemisphere via the corpus collosum as shown by the studies of Michael Corballis and Ivan L Beal, On Telling Left from Right, Scientific American March 1971 pp 96-104.

See figure 1 for Target positions and Neural diagram.



Reversals can happen with an:

1. Alternating dominant hemisphere individual in all target positions 1, 2, 3, and 4

2. Left hemisphere dominant individuals

    (a) When Left visual field is stimulated as in target position 3.
    (b) When Right Eye dominant exophoric individuals are stimulated as in target position 2.
    (c) When left Eye dominant esophoric individuals are stimulated as in target position1.

3. Right hemisphere dominant individuals
    (a) When right visual field is stimulated as in target position 4.
    (b) When left eye dominant exophoric individuals are stimulated as in target position 2.
    (c) When Right Eye dominant esophoric individuals are stimulated as in target position 1.

When a stimulus is presented at any given moment it depends primarily upon an individual's eye movement control as to whether the target will be in the Right Visual field or the Left Visual field.

With a left hemisphere dominant individual the directions will be interpreted correctly as long as the stimulus is in the right visual field of the dominant eye.

With a right hemisphere dominant individual the direction will be interpreted correctly as long as the stimulus is in the left visual field of the dominant eye.
This seems like a logical explanation of horizontal reversals and I feel confident that if a scientific study of this were made utilizing an Eye Trac and Tachistosocpe, set up so that it can be documented where the eyes were fixating at a given stimulus then one could determine if an individual with a known dominant hemisphere and dominant eye, would expect a reversal when the stimulus was presented in the 4 target positions.

Figure 2 and 3 could also help explain vertical reversals by the same technique. Although my experience has been to have patients with histories of horizontal reversals, I have only had one patient in 11 years at practice state that she had experienced times when she would walk into a room where the tables and chairs would do a flip and the legs would be pointing up to the ceiling. Now I can possibly logically explain or understand how this might be able to happen.