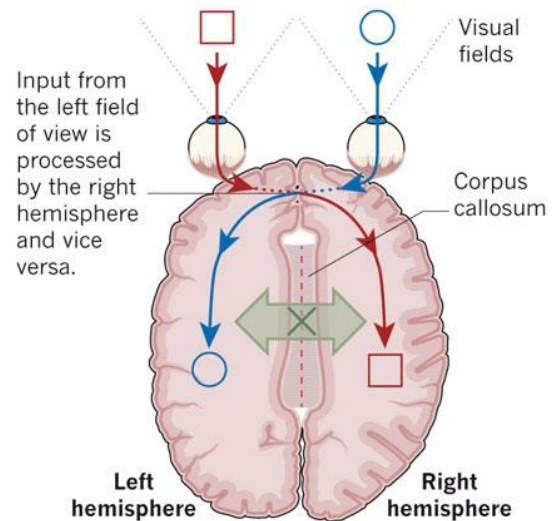


The Split Brain

The *corpus callosum* is a band of nerve fibres joining the left and right hemispheres of the brain. Whatever happens to one side of the brain is instantly communicated to the other hemisphere via these nerve fibres. Experiments examining the split brain look at animals or human patients with a severed corpus callosum, where there is blockage in the transmission of information between the two cerebral hemispheres (Figure 1). A series of tasks are performed to give insight into the function of each hemisphere in the absence of communication between the hemispheres of the brain.



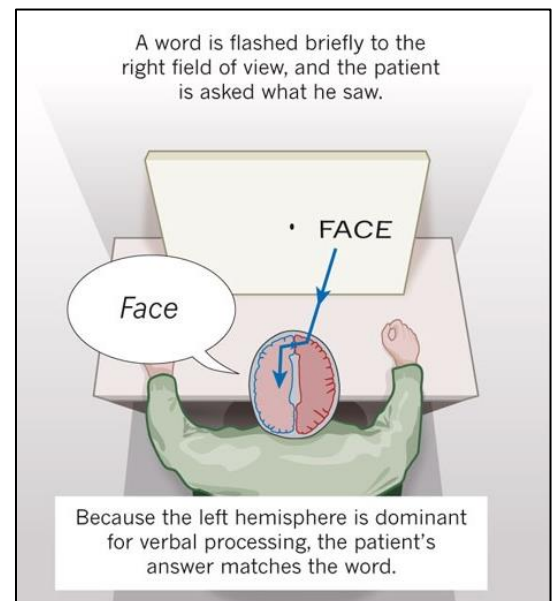
Initial split brain studies involving animals revealed that although severing the corpus callosum did not affect ordinary behaviour (eating, walking); it did affect learning, memory and perception. These results were later confirmed in human patients using a “Split Brain Study” (Sperry and Gazzaniga) involving a visual task as described below:

The Split Brain Study:

The patient is asked to focus on a central dot on the screen and a word is quickly flashed on either the right or left field of view. The patient is asked to state verbally what they see in the field of view. For images on the left field of view, the patient is asked to draw the image (or point to) using their left hand.

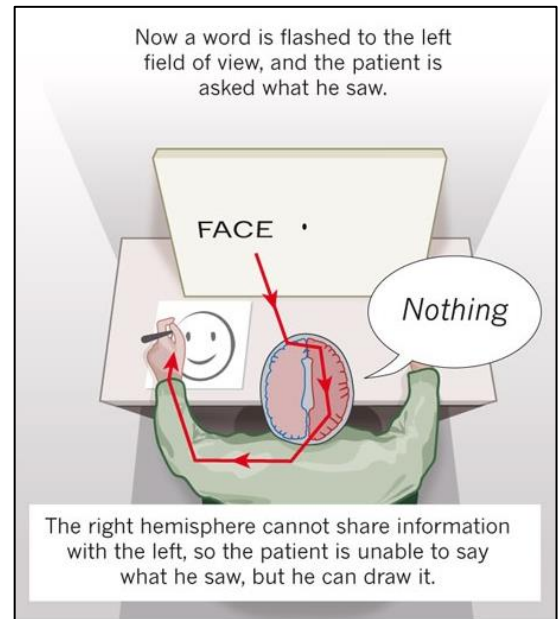
Right Field of View:

- The patient is first shown an image to the right of the dot, located on the individual’s right field of view. Because the optic nerve crosses at the optic chiasm, the image is processed on the opposite side of the brain, in the left visual cortex. Since the left hemisphere is usually specialized for verbal processing, the patient’s verbal answer matches with the image on the screen (see diagram).



Left Field of View:

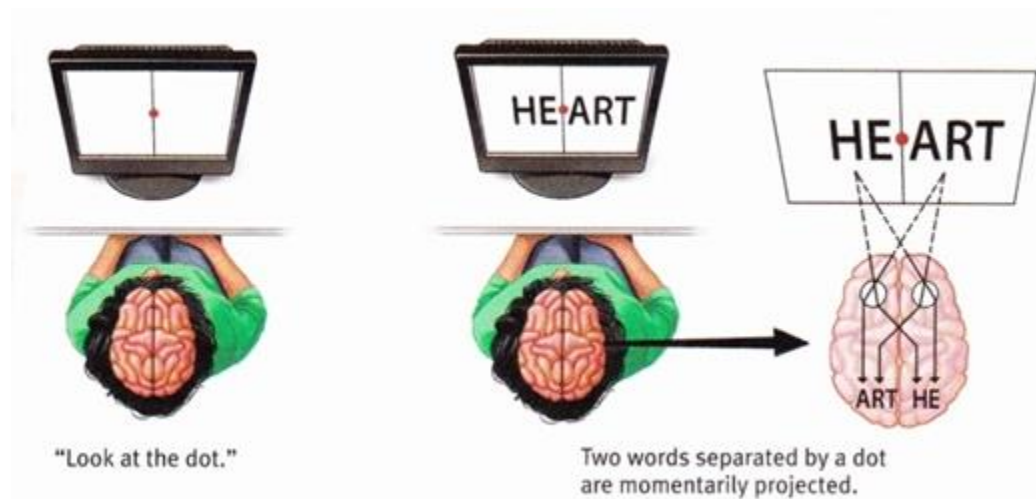
- The patient is subsequently shown an image to the left of the dot, on the individual's left field of view. The image is processed on the right visual cortex. However, since the right hemisphere cannot share information with the left, which is dominant for verbal processing, the patient is unable to verbally state what they see (they see nothing). However by using their left hand, the patient is able to draw and point to the image on the screen. This study indicates that when speech is not required, the right hemisphere will dominate for recognition because of its specialization for spatial perception tasks.
- Though the right hemisphere does have some gaps in language processing, it can read and understand numbers, letters and short statements, so long as the individual does not have to VERBALLY state them.



Practice Question:

Assume patient X below has a severed corpus callosum and is undergoing the split brain experiment.

- a) What word will patient X be able to state verbally?
- b) If patient X is asked to point with their left hand to the word they see, what will this word be?



Answer: a) ART b) HE

