



## Language and Lateralization <sup>[1]</sup>

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Language is defined as a method of human communication through organized words, either spoken or written. Lateralization is referred to as the localization of functions in the brain, commonly attributed to its left hemisphere and right hemisphere.

### Language

The area of the brain that is responsible for both spoken and written language is the Wernicke's Area in the left hemisphere. Analysis of written words is performed in the temporoparietal cortex as well as in the anterior inferior frontal cortex.

On the other hand, speech production is initiated in the Broca's Area. This area is assisted by the premotor area in selecting and sequencing speech sounds. The arcuate fasciculus makes it possible for the language information in the Wernicke's Area to be transmitted to the Broca's Area to produce speech.

### Lateralization

Human split-brain studies have helped develop knowledge about language and lateralization. In split-brain studies, the cutting of the corpus callosum (a group of nerve fibers connecting the two brain hemispheres) is cut. These studies have proven that the left and the right brain hemispheres have specific language functions.

#### Left Hemisphere

Naming objects is one of the language-related functions of the left hemisphere. Objects placed in the right visual field are easily recognized by both normal people and split-brain subjects. However, split-brain subjects cannot identify objects located in the left visual field unlike normal subjects. This proves that the only known language function of the left-hemisphere is to name identified objects. Logic, critical thinking and reasoning are also functions that are dominantly processed in the left hemisphere.

#### Right Hemisphere

Verbal identification of objects presented in the left visual field cannot be identified by people who have undergone the split-brain surgery. However, they can identify these objects by means of their sense of touch. Some words can also be comprehended through the right

hemisphere. The split-brain studies show that the figurative sides and context of language are understood via the right hemisphere. In addition, the emotional expression of language is processed in the right hemisphere. Also, music stimulates the right hemisphere more than spoken words do.

Hemispheric lateralization is important in both the parallel processing and sharing of information. While the left hemisphere is mostly concentrated on the interpretation of information through logic and analysis, it coordinates with the right hemisphere which is focused on the interpretation of experience in its totality via synthesis.

## **Handedness**

In terms of handedness <sup>[3]</sup>, most people who are right-handed reveal left hemisphere language dominance. This means that they tend to be better in logical and critical thinking than in creative and expressive thinking. Most left-handed people do not show right-handed language dominance, as common belief tells us. Rather, 70% of left-handed people still demonstrate left hemisphere language dominance.

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[2] <https://explorable.com/users/sarah>

[3] <http://www.indiana.edu/~primate/brain.html>