

Lateralization of functions: left and right hemispheres



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Brain is the most complex structure ever evolved in Universe such that it contains billions and billions of neurons that act and react in interconnected ways leading to the emergence of thought, consciousness, feelings, emotions and creative thinking, all subsumed under the enigmatic term mind. The brain is a multilayered structure that is folded into many folds, the surface of which is known as the gray matter and the inner areas deep within the cortex is known as the white matter (the color is because of the fatty substance).

The cerebral cortex is the area of associative functions of the brain that is divided into many fissures such as lateral fissure and central fissure. The four lobes formed based on these fissures are the frontal lobes, parietal lobes, temporal lobes and occipital lobes. The cerebral hemisphere is divided into two halves: the left hemisphere and the right hemispheres with asymmetric functions.

Corpus callosum is the structure that joints the two hemispheres so that the brain functions according to the Lashley principle of mass action, that is, it is the integrative functions of the two hemispheres that result in the coordinated activities of individuals, that is behavior. Lateralization of Functions: Left and Right Hemispheres Lateralization of brain function means that each hemisphere, that is the right or the left, specializes in certain functions so that the inactivity of a hemisphere result in the damage to that function or that function totally disappears from the behavior repertoire.

Left hemisphere or right hemisphere dominances are responsible for the controlling of those respective functions. Lateralisation of functions may be studied using different methods like the ancient method of inserting an <https://assignbuster.com/lateralization-of-functions-left-and-right-hemispheres/>

electrode in the brain and the modern methods of imaging, scanning and intravenous injections. The Wada Test introduces an anesthetic to one hemisphere of the brain, that is intravenous injection, following which, that is after anesthetized, neuropsychological tests are conducted to determine the effect of hemispheric paralysis or inactivity.

Less invasive techniques such as Magnetic Resonance Imaging, Computerized Axial Tomography, SQUID and Positron Emission Tomography are used to study dominance. Brain function lateralization is also determined in the phenomena of right or left handedness and of right or left ear preference (Lateralization of brain functions, 2009). However it is to be stated that preferences are not always a clear indication of hemispheric specialization. Ninety five percent of the right handed people have left hemisphere dominance for language and only eighteen point eight per cent of left handed people have right hemisphere dominance for language functions.

Sodium amytal tests indicate that 95 percent of right handed people are specialized in left hemisphere for language functions (Milner, 1974). Left hemisphere is specialized for language functions (Corina, et al, 1992). Left hemisphere strokes that leads to right sided paralysis (the left side of the brain controls the right side of the body and right side of the hemisphere controls the left side of the body known as ipsilateral control) result in serious language problems .

The left hemisphere temporal lobe region known as the Wernicke's area is involved in the understanding of spoken and written language. The language region in the lower frontal lobe is known as Broca's area, the area involved in <https://assignbuster.com/lateralization-of-functions-left-and-right-hemispheres/>

speech production The damage to the Broca's area leads to the slow and infrequent speech thereby the fluency is impaired. The left brain does all the functions related to analysis, logical, mathematical thinking, cause-effect relations and scientific thinking. In figurative language, the left brain is said to be, the Western brain whereas the right brain is the Eastern brain.

The sequential nature of processing of information carried out by the left hemisphere is contrasted with the global processing of right hemisphere (Springer and Deutsch, 1989). Right hemisphere specializes in "soft" functions characterized as appreciation of music, art, production of relaxation, quietness, peace, spatial relations, recognition and memory patterns of stimulation (Morgan, et al. 1993) and the patterns are visual, tactile or spatial. Damage to these areas prevents these functions so that the person may fail to recognize the face of other people, fail to appreciate music and fail to relax.

People practicing meditation is said to show changes in the electrical activity of the brain which means that electrical waves called alpha dominate in their lives. Significant changes in the electrical activity of people practicing meditation and not practicing meditation are located in studies. Emotional expression is another function that dominates the right hemisphere (Zaidel, 1994). In short, identification of faces, facial expressions of emotions, line slopes or dot locations occur more quickly when these are 'shown' to the right hemisphere. The distinct functions are explained in Table 1.

Split Brain Studies Different functional specialization of the hemispheres are observed in the studies of split brain patients, who are characterized by the severing of corpus callosum so that there is no anatomical connection
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between the two halves and the two hemispheres act independently. Roger S. Sperry has conducted many studies with split brain patients whose brain functioned independently without transferring message between the two halves. With split brain patients visual input can be restricted to the left or right hemisphere because of the anatomical connections between the eyes and the brain.

From the right visual field, stimuli go to the left hemisphere and the input from the left visual field goes to the right hemisphere. In this way the visual image of the word 'ring' reaches the left hemisphere, while the word 'key' reaches the right hemisphere in a form of experiment. It is found that split brain patients report the word 'ring' and they do not report the word 'key' sent to the right hemisphere, implying that there is no connection between the two halves of the brain. Moreover the left hemisphere specializes in the language function. And it is also found that the patients can recognize the word "key" by non-verbal language.