Language processing

Language processing refers to the way humans use words to communicate ideas and feelings, and how such communications are processed and understood. Thus it is how the brain creates and understands language. Most recent theories consider that this process is carried out entirely by and inside the brain; however, environmental factors play a role in the development of language processing as well.

This is considered one of the most characteristic abilities of the human species. However very little is known about it and there is huge scope for research on it.

Most of the knowledge acquired to date on the subject has come from patients who have suffered some type of significant head injury, whether external (wounds, bullets) or internal (strokes, tumors, degenerative diseases).

Studies have shown that most of the language processing functions are carried out in the cerebral cortex. The essential function of the cortical language areas is symbolic representation. Even though language exists in different forms, all of them are based on symbolic representation.

Unlike stroke, neurosurgical removal of left hemisphere gliomas acts upon a reorganized language network and involves brain areas rarely damaged by stroke. Zyryanov et al. addressed whether this causes the profiles of neurosurgery- and stroke-induced language disorders to be distinct. K-means clustering of language assessment data (neurosurgery cohort: N = 88, stroke cohort: N = 95) identified similar profiles in both cohorts. But critically, a cluster of individuals with specific phonological deficits was only evident in the stroke but not in the neurosurgery cohort. Thus, phonological deficits are less clearly distinguished from other language production and comprehension scores at different linguistic levels were more extensive in the neurosurgery than in the stroke cohort. The findings suggest that neurosurgery-induced language disorders do not correspond to those caused by stroke, but rather manifest as a 'moderate global aphasia' - a generalized decline of language processing abilities ¹⁾.

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Zyryanov A, Stupina E, Gordeyeva E, Buivolova O, Novozhilova E, Akinina Y, Bronov O, Gronskaya N, Gunenko G, Iskra E, Ivanova E, Kalinovskiy A, Kliuev E, Kopachev D, Kremneva E, Kryuchkova O, Medyanik I, Pedyash N, Pozdniakova V, Pronin I, Rainich K, Reutov A, Samoukina A, Shlyakhova A, Sitnikov A, Soloukhina O, Yashin K, Zelenkova V, Zuev A, Ivanova MV, Dragoy O. 'Moderate global aphasia': A generalized decline of language processing caused by glioma surgery but not stroke. Brain Lang. 2021 Dec 6;224:105057. doi: 10.1016/j.bandl.2021.105057. Epub ahead of print. PMID: 34883333.

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