**Areas involved in the processing language**

The research about language processing is an issue very investigated but it still have a lot of questions without answer. Thanks to basic research on neuroscience. It is possible to know what areas are activated during the linguistic processing. For this, it is used high-technology systems like the functional Magnetic Resonance Imaging (fMRI), in which we can see the different activations on the brain regions.

We have to understand that the brain works connected to all areas, it means, an area are activating with a task doesn’t mean that the rest of regions are turning off. To identify an area of activation before a specific stimulus, different linguistic activities (list of words with and without meaning, sentences with or without subordinate-clauses, discourse...) are carried on and they are presented to the subjects. The area with high activation could be associated to this stimulus.

But, what is the study of language processing in healthy subjects for? The results of the investigation are necessary to know the different functions of each brain area. This is helpful to detection, diagnostic and rehabilitation to patients who are suffered a brain damage and they have aftermath. In the same way, the studies are made patients with brain injury to know how the structures of a brain impaired are working. However, this process is not always possible because the patients have to confront their limitations.

The processing language has a large activations and coactivations on different areas. Furthermore, here we are showing some of them which we are considering more important. In the basic level of the linguistic comprehension is the speech perception which starts on the temporal lobe and where the other lobes are barely involved, although they are activated when the complexity of the task is increasing. In this post, we are distinguishing four kind of level: **speech perception, word, sentence and discourse.**

The sound recognition starts on the primary cortex where it is realized the pure frequencies processing. On the other hand, the areas with high activation in the **speech perception** are superior temporal gyrus (STG) and superior temporal sulcus (STS) on the temporal of both hemispheres. Nowadays, there is a **controversy** for a fully left-lateralized for speech perception. Nevertheless, several studies have concluded that the STG and STS works bilaterally during this process.

At the **word level**, the processing is made both phonologic and semantic. A study signed the left posterior middle temporal gyrus (MTG) of temporal lobe is associated to the semantic processing, whereas left thalamus had more activations during the phonologic processing. This study also showed the dorso-lateral of the prefrontal area and the cingulum had connexions throughout phonologic and semantic processing. Some studies suggest that frontal lobe areas play a role very important to the language. Specifically, the left inferior frontal gyrus (IFG) which it has a high activation when the linguistic tasks are increasing their complexity. By contrast, the activations on MTG and IFG decreasing throughout the repetition of words.

Like in the word level, the **sentence processing** is made phonologically and semantically. In the phonological aspect, the IFG is one of the main areas which it is activated during sentence processing with different syntactic form, substitution of words and semantic ambiguity. Another one is the STG that are showing more activation during tasks with blocks of sentences with different syntactic structure than with the same one. These areas are also activated during the presentation of sentences with syntactic and semantics violations. However, this is different when it is being analyzed the meaning processing with sentences which have semantics violations. In this case, IFG, MFG and Insula are involved and they are showing high activations.

Finally, we have the **language processing throughout the discourse** which has the brain activity more complex. In this level, the activations include regions broader than a portion of area. A study showed that the temporal lobe and medial prefrontal were activated with tasks of comprehension of the discourse against sentences without a narrative link. Another study suggested that the right medial temporal increase its activity during transitions of events in the reading of narrative text. As for activations showed on each hemisphere, a study signed that the right temporal regions were activated before the reading of texts without titles, whereas the left temporal regions increased their activations with texts with titles.

In addition to the activations on the cortical zones, a meta-analysis about **the role of putamen in the language** signed coactivations of putamen with the different areas of the language, although it did not show any coactivations with the STS. According to the authors, the left putamen had more activation with the semantic tasks, while the right putamen had a secondary role in the language.

Thus, the comprehension of the language involves several brain areas which they are activated and coactivated both cortical and subcortical level. It is a well-known fact that the auditory processing is a complex and unknown process, and it is necessary research more to be able to answer the questions. Nonetheless, we do know that the temporal and frontal lobes play a role very important during the language processing.