

Study of Brain Activity at Resting State by Functional Magnetic Resonance Imaging in People with High and Low Sensitivity

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Introduction: Sensory processing sensitivity (SPS) is an inherited personality trait that determines people to feel, think and interact with others differently from others. Several research studies have shown these differences through studies on brain processing. **Objective:** To analyse the differences in resting brain activity, as determined by functional magnetic resonance imaging, between people with high and low sensitivity, in order to test their neural processing. **Method:** Two study groups of 10 participants were selected by sensitivity condition (with a mean of 78.3 in high sensitivity and 39.3 in low sensitivity) according to their response to the Spanish version of the HSC (Highly Sensitive Child) scale developed by Pluess, where the mean age of the participants was 23.8 years, with 13 women and 7 men, in order to subsequently record the basal functional image of the brain, through fMRI, calculating the Fractional Amplitude of the Low Frequency Fluctuations signal (fALFF). **Results:** In a first analysis, the results showed a positive relationship between fALFF and PAS levels (high and low) at the level of the left parietal lobe and the left cerebellar hemisphere, corresponding to the posterior lobe, and a negative relationship at the level of the left thalamus, bilateral medial frontal lobe (including the anterior cingulum) and the left superior temporal lobe. In a second analysis, a study was conducted between each subject's fALFF and their individual score on each of the PAS factors (AES, EOE, LST). In the AES analyses, negative relationships were only observed for both hemispheres located in the right temporal lobe (medial temporal gyrus, fusiform and parahippocampal), left temporal lobe (left superior temporal gyrus) and at the level of the cuneus. In the correlation analysis between fALFF and the EOE factor, a positive relationship was observed at the level of the left parietal lobe (including the postcentral gyrus, supramarginal and inferior parietal lobe), and a negative relationship in the left thalamus and bilateral medial regions at both parietal (cuneus and precuneus) and frontal levels. Finally, correlation analysis between fALFF and LST showed a positive relationship at the left parietal level and with the posterior lobe of the left cerebellum, and a negative relationship in the left thalamus, some regions of the left temporal lobe (medial and superior temporal gyri), medial frontal and parietal regions. **Discussion:** It has been observed that most of the regions that show some kind of significant result belong to regions related to the somatosensory system, such as the regions that form part of the parietal lobe, as well as the left postcentral gyrus, which correspond to the somatosensory cortex. On the other hand, the thalamus is considered one of the most important sensory neural regions, being the main intermediary, together with the cerebral cortex, in the processing of emotional stimuli, with the exception of olfaction. Research has also shown that the prefrontal and temporal cortex and some limbic structures, such as the cingulate, play a fundamental role in the development of empathic quality.

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