

Differences in the brain anatomy predisposed to anxiety disorders

A study undertaken by researchers of the Universitat Jaume I of Castellón (UJI), the Universitat Autònoma of Barcelona (UAB) and the company Eresa reveals the existence of a different anatomy in small areas of the brain which could help explain why one same stimulus triggers anxiety in some people and not in others.

According to the authors of this research work, which was recently published in the scientific journal *NeuroImage*, certain brains act via a mechanism which makes them more prone to suffer and not control anxiety than other brains when faced with identical situations. In patients with anxiety disorders, an excessive activation in the face of certain stimuli exists, which activates a disproportionate response to experiences subjectively understood to be tense, stressful or dangerous. Their anxiety would be determined by their excessive activation of fear or their incapacity to fulfil the needs that they consider important. Therefore it would be difficult for them to react to a situation of tension or stress, and this situation would consequently trigger a feeling of frustration; thus the frequent relation of complaints of a depressive nature arises.

A disproportionate feeling of lack of reward, or even punishment, is produced during anxiety disorders. What these Spanish scientists have discovered through functional magnetic resonance is that an excessive activation of the so-called BIS (behavioural inhibition system) exists in this type of patients in the face of adverse stimuli.

The basis of the neuropsychological model of anxiety proposed by the present-day psychology thought is that the natural existence of BIS is activated by stimuli in the form of punishment or lack of reward; innate stimuli of fear in which certain stimuli are experienced as a threat without the need for learning, for example, a train approaching and the risk of being hit; or new fear stimuli acquired through experience or familiarity, such as phobias and post-traumatic stress.

The brain regions involved in the anatomic substrate of BIS are the cerebral amygdala and the septohippocampal system. Therefore, this altered response of anxiety and hyperactivity in patients who are predisposed to suffer anxiety in the face of such stimuli (punishment or lack of reward) can be measured with its incidence on these encephalic areas while patients undergo a test of sensitivity to mechanisms of reward or punishment.

A team of researchers at UJI and UAB in collaboration with Eresa, an image diagnosis company, has carried out a study with 63 individuals who were subjected to the sensitivity test and a magnetic resonance study which quantified the volume of grey matter in the different encephalic structures.

This research work reveals that a greater volume of grey encephalic matter exists in the brain areas of the right parahippocampus, the right cerebral amygdala and the left anterior parahippocampus of some individuals who went on to obtain higher scores in the test. This coincides with some anatomical regions which are triggered in the face of punishment or reward stimuli.

According to Vicente Belloch, the scientific director at Eresa and part-time lecturer at UJI, the combined research of both universities along with Eresa “reveals the existence of a different anatomy in small areas of the brain which could, in part, help explain why a stimulus triggers anxiety in some people but not in others”. However, the researchers recognise that unknown quantities remain to be solved. Belloch reminds us that “the mechanism by which this increased volume of grey matter leads patients to obtain higher scores in the questionnaire remains unknown”.