EDITOR'S CHOICE ARTICLE

EMOTIONAL WORD PROCESSING IN PATIENTS WITH JUVENILE MYOCLONIC EPILEPSY

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One of the important questions that arises when discussing juvenile myoclonic epilepsy (JME) is whether patients with this condition process emotions in the same way as those without it. Why is this an important question? JME is a neurological state that starts between the ages of 12 and 18 and is characterized by myoclonic seizures, generalized tonic-myoclonic seizures, and absent seizures. These types of seizures include muscle spasms, loss of consciousness with whole-body spasms and short periods of absent gaze, respectively. According to Panksepp's hierarchical emotion model, emotion processing relies on three functionally and neuroanatomically distinct levels: subcortical networks (primary level), the limbic system (secondary level), and the neocortex (tertiary level). This model suggests that discrete emotions and affective dimensions are not opposing views but rather different processes operating on distinct, neuroanatomically distinguishable levels. The aim of this study was to validate and extend previous evidence of discrete and dimensional emotion processing as two main views in patients with JME.

A total of 109 participants engaged in this study and were divided into two groups: 47 patients with JME and 67 gender-, education- and age-matched healthy controls. They were given multiple tasks, including a multiple-choice vocabulary task, a verbal fluency test, an auditory verbal learning test and a sentence learning test. A task of considerable importance was the Functional Magnetic Resonance Imaging (fMRI) paradigm done in the Magnetic Resonance Imaging (MRI) scanner. The aim of this lexical decision task was for participants to distinguish correctly spelled German nouns from non-words. Before entering the scanner, participants were given instructions to decide as quickly and accurately as possible via button press whether the presented letter string was a correct German word (left button) or a non-word (right button). The purpose of using such stimuli is to compare the brain's reaction to emotionally charged words versus neutral words, and to identify which brain regions are involved in processing fear-related emotions.

Neuroimaging results showed higher activity in several brain regions involved in word processing, including an extended cluster in the left and right occipital lobe including inferior occipitotemporal, parietal and frontal areas, a left medial temporal cluster, a right occipitoparietal cluster, a right parahippocampal cluster and a cluster located in the brainstem. The repeated measures in the right amygdala revealed higher activity in response to high fear and negative valence words. The activity of the amygdala in response to the emotional content of words supports previous findings, highlighting the amygdala's involvement in implicit emotion processing. No differences were found in the left inferior frontal gyrus.

All in all, both groups of participants exhibited similar brain activity and response times. However, patients with JME experienced higher rates of psychiatric conditions and scored significantly lower in verbal intelligence and reading speed tests compared to healthy controls. They also performed worse in phonemic and semantic fluency tasks. However, there were no differences in verbal memory functions, and patients with JME generally performed average in all subtests despite these differences.

Because it was believed that patients with JME perceive emotions differently due to neurological changes and higher rates of psychiatric disorders, this work is crucial for understanding emotional processing and not just in those patients. It may indicate that basic emotional processing is intact, but other factors contribute to psychiatric issues. The trimodal theory of emotion processing may be accurate, describing distinct neuroanatomical levels. Despite comparable emotional processing, JME patients might struggle with emotion regulation. This suggests additional influence on mental health beyond basic emotion processing is something that should be more studied.

REFERENCES:

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