

Emotions in Parkinson's disease

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Credit: David Hodgson

Is it the disease itself or the treatment that impairs the perception of emotions?

A study conducted with the collaboration of the International School for Advanced Studies (SISSA) of Trieste investigates the origins of the

difficulty recognizing certain emotions that affects patients with Parkinson's disease. Is this impairment caused by the disease itself or is it in part the consequence of a widely used treatment ([deep brain stimulation](#))?

Patients affected by Parkinson's disease may experience, in addition to the more obvious [motor symptoms](#) (such as tremors and stiffness), difficulties recognizing emotions in the [facial expressions](#) and speech prosody (intonation) of other people. A number of investigations have shown that even deep brain stimulation, a treatment that has become widely used in recent years, may cause similar disorders. SISSA and the University Hospital "Santa Maria della Misericordia" in Udine collaborated in a study that looked into this possibility, finding that the [surgical procedure](#) is linked to only a few transient symptoms, and has a very mild effect on impaired recognition of pre-existing emotions.

Although relatively new as a technique, deep brain stimulation has already become very widely used. It consists in electrically stimulating, by means of implanted microelectrodes, the neurons of specific areas in the brain. In Parkinson's disease, the areas to be stimulated are some nuclei making up the basal ganglia. These brain structures are impaired in the disease and produce less dopamine than the body needs, leading to the development of motor symptoms. Electrical stimulation blocks the signals causing the motor symptoms, thereby improving the patient's quality of life.

According to several studies, the deficits in emotional perception experienced by patients with Parkinson's disease could be a consequence of the treatment or of the microlesions produced when the electrode is surgically implanted. "In our study we tried to get to the bottom of the matter", explains Marilena Aiello, from SISSA, the first author of the study. "We compared the performance of twelve patients with that of healthy individuals, in four conditions: before surgery, both on and off

medication, and after surgery, a few days or a few months after the operation".

The subjects were asked to respond tests on the recognition of emotions conveyed by facial expressions (visual mode) or speech prosody (auditory mode).

"The patients never exhibited any difficulty in the auditory mode, whereas they were impaired in visual recognition even before they underwent the operation", continues Aiello. "However, the impairment was present for one emotion in particular, that is, for disgust."

After surgery, in addition to still having difficulties in visually recognizing disgust, the patients also performed poorly in discriminating facial expressions conveying sadness. "This kind of impairment was only transient, being detected only a few days after surgery but not months later" explains Aiello. "We therefore believe that this disorder is related to the microlesions produced by electrode implantation, which are largely reabsorbed within a few months, and to the drastic reduction in medication just after the surgical procedure".

The study investigators include Luca De Simone from SISSA who works, together with Aiello, at the Neuroscience and Society Lab directed by Raffaella Rumiati (also involved in this study). The study lends support to the hypothesis that this type of impairment is present before [electrical stimulation](#) therapy, even though transient disturbances may develop that are related to the operation. The research has been published in the journal *Cortex*.

More information: Marilena Aiello, Roberto Eleopra, Christian Lettieri, Massimo Mondani, Stanislao D'Auria, Enrico Belgrado, Antonella Piani, Luca De Simone, Sara Rinaldo, Raffaella I. Rumiati
"Emotion recognition in Parkinson's disease after subthalamic deep

brain stimulation: Differential effects of microlesion and STN stimulation." *Cortex*, [dx.doi.org/10.1016/j.cortex.2013.11.003](https://doi.org/10.1016/j.cortex.2013.11.003).

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