

# Neurofeedback tunes key brain networks, improving subjective well-being in PTSD

December 3 2013

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Pioneering research conducted at Western University (London, Canada) points to a promising avenue for the treatment of post-traumatic stress disorder (PTSD): utilising neurofeedback training to alter the plasticity of brain networks linked to the condition.

During neurofeedback, intentional control of one's own [brain activity](#) may be learned with what's called a brain-computer interface, which is able to represent graphically a person's real-time brain activation on a computer. This can be done noninvasively with brainwave activities, for example, where the computer monitor behaves like a virtual "mirror" to real electrical oscillations produced by neurons in the cortex. These are recorded by surface sensors on the scalp, also known as an electroencephalogram (EEG).

Available online at the psychiatry journal *Acta Psychiatrica Scandinavica*, lead authors Rosemarie Kluetsch and Tomas Ros describe the details: "This is the first study to show that key brain networks involved in mediating affect and cognition in PTSD can be volitionally modulated via neurofeedback, with measurable outcomes on subjective well-being. It was achieved by harnessing multiple imaging techniques, including EEG and functional MRI (fMRI). In a nutshell, using fMRI we captured the patients' resting-state brain activity just before and after a 30-minute neurofeedback training session, which was carried out outside the scanner using EEG. We then searched for any differences in connectivity within well-known brain networks. Interestingly, we discovered significant correlations between EEG and fMRI network

activities as well as changes in self-reported calmness. This indicated that neurofeedback was able to directly modulate the brain bases of emotional processing in PTSD."

Senior author and principal investigator Dr. Ruth Lanius, a professor at the Department of Psychiatry at Western's Schulich School of Medicine & Dentistry and a scientist with Lawson Health Research Institute, adds "The last decade of neuroscience research has offered a deeper understanding of the key brain networks involved in cognitive and emotional functions. Connectivity in the salience and default mode networks, for example, has been found to be altered in PTSD. We are now on the threshold of being able to use this information to understand the neural mechanisms underlying certain disorders and their treatments. Neurofeedback offers great promise as a type of [brain training](#) that is directly based on the functional activation of these [brain networks](#). We are therefore thrilled to see the first evidence of this in action, along with significant changes in subjective well-being. Our hope and vision for the future is that this approach could improve and potentially augment PTSD treatment."

Provided by University of Western Ontario

Citation: Neurofeedback tunes key brain networks, improving subjective well-being in PTSD (2013, December 3) retrieved 19 November 2023 from <https://medicalxpress.com/news/2013-12-neurofeedback-tunes-key-brain-networks.html>

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