



**THINKING DEEP** Christina Izura of Swansea University takes part in research by Dr Soren Anderson, below, that looks at reducing anxiety by controlling brain waves

# Scientists develop brain scanner to help patients tackle their own stress

It sounds like something out of a horror movie – a brainwave scanner linking people to machines through an electrode-studded skullcap.

But the system being developed at Swansea University – called neurofeedback – is in fact the latest treatment for stress and anxiety. The technique has been used to treat epilepsy, Tourette's syndrome, alcoholism, heroin addiction, attention deficit hyperactivity disorder and post-traumatic stress disorders.

Scientists in Swansea now want to use the system to help people overcome anxiety and stress.



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Neurofeedback monitors brain activity through sensors attached to the scalp which home in on the brainwaves (electrical fluctuations in the cerebral cortex).

These brainwaves are then fed back to the patient in the form of a video game displayed on a screen. The participant learns to control the game by altering particular aspects of their brain activity.

The feedback to patients can also take the form of a differing tone, giving an indication of how much patients are affecting their own brain activity by the power of thought and self-control.

It is thought the system could be used to manage a range of anxiety conditions including stage fright for actors, stress for sports stars or sports managers and for people suffering stress at work.

The Swansea research, in collaboration with the University of Portsmouth, has been made possible

thanks to funding from the Economic and Social Research Council.

A university spokeswoman said, "Experience of anxiety can be extremely debilitating, preventing people from living fulfilling lives, but through neurofeedback people can reduce their anxiety and get rid of intrusive and ruminative thoughts."

"Neurofeedback is also known as EEG Biofeedback, as it is based on the brain's electrical activity, the electroencephalogram (EEG).

"It is a painless, non-invasive method, which helps people to modify their brainwave activity to improve attention, concentration, reduce impulsivity, and to control hyperactive behaviours. Essentially, the technique trains the brain to regulate and adjust itself to function more efficiently."

Psychologists apply a series of electrodes to the patient's scalp, which picks up their brainwave activity.

The monitored brain activity is processed by a computer, which extracts information

from the brain signals about certain brainwave frequencies.

Changes in the brain signals are fed back to the patient by the computer, either visually to a monitor in front of them or as sounds through a headset.

Dr Soren Andersen, of Swansea University's School of Human Sciences, said, "Ultimately, we are trying to develop a neurofeedback treatment for anxiety which has its roots in over 40 years of theory and research – the end result will be a non-drug-based intervention, which has a sound, scientific basis."

Professor Philip Corr, also based at Swansea University's School of Human Sciences, said, "This is an exciting new application of recent advances in our understanding of how the brain controls emotional experiences. And it shows how knowledge of fundamental brain systems can have very real benefits in terms of reducing distressing psychological states of worry and anxiety."

"This is likely to be only the start of a whole new technology that allows individuals to learn to regulate their own brain states and, thereby, control the emotions controlled by these brain states."