Exploring psychology

Linking processes in the brain

Narrator
Studies of how in general the brain is involved in imaginative thought are few, but the availability of technologies ranging from EEG, electro-encephalography, for recording the brain's electrical activity, to FMRI, for scanning the brain, suggest possible lines for investigation. What might we expect to find?

Woman
It's unlikely that studies using techniques like FMRI or EEG are going to reveal a particular part of the brain which lights up when we're engaged in imaginative thought, but it might for instance reveal something about the circuits of the brain that are involved or it might say something about particular types of brain activity.

Narrator
Research at the Royal College of Music has shed possible light on the brain rhythms associated with imagination and creativity. These insights come from an EEG based technique designed in part to help outstanding musicians enhance their performance via neuro feedback. The research team is led by John Gruzelier

John Gruzelier
Well what we're doing in neuro feedback is we're measuring the electrical activity of the brain by placing the electrodes on the scalp and that activity is amplified on a screen so that we can see what are the ongoing rhythms. We played back to the participant on another screen some symbolic representation of particular rhythms that we're interested in. So for example you might see a boat on a screen, an horizon, and the task for the participant is to get that boat to the horizon. Meanwhile in the corners of the screen are blocks of colour which get bigger and smaller as other rhythms get bigger or smaller.

Narrator
During neuro feedback training the participating musicians gradually learn to put themselves in the state of mind accompanied by the right kinds of brain rhythms. The more the participant evokes these desired rhythms, the more positive the feedback from the symbolic visual images on the screen. In part of the training students are helped to enhance brain rhythms known to be associated with focussed concentration. The researchers also selected a characteristic slow wave known as Theta, which they believe to be associated with creative or imaginative thought. Participants learned to enhance this rhythm over others. The researchers reasoned that the musician's success in controlling their own Theta rhythms would be reflected in enhancements to creative and expressive aspects of their performance. The performance of all participants was evaluated blind at both the beginning and end of the training period.

John Gruzelier
Now what is very exciting is which aspects of the music performance improved and we were delighted to see that ratings of imaginative interpretation in performance improved, emotional expression and conviction in performance, expressive range, so these are very, very high level, you know, abilities, such that will make all the difference to their future careers. The same time technical abilities also improved and these also associated with the ability to learn the neuro feedback. There does seem to be quite a strong inter-relationship between the fact that the musical performance has improved, also the brain has actually changed and so has the behaviour, all in ways that we say are very relevant to musical performance.

Narrator
This research draws theoretical insights about brain activity in imagination from a practical application of EEG.