

*Airbags*



*Bags of fun*

What



### MAKING MEN A LAUGHING STOCK

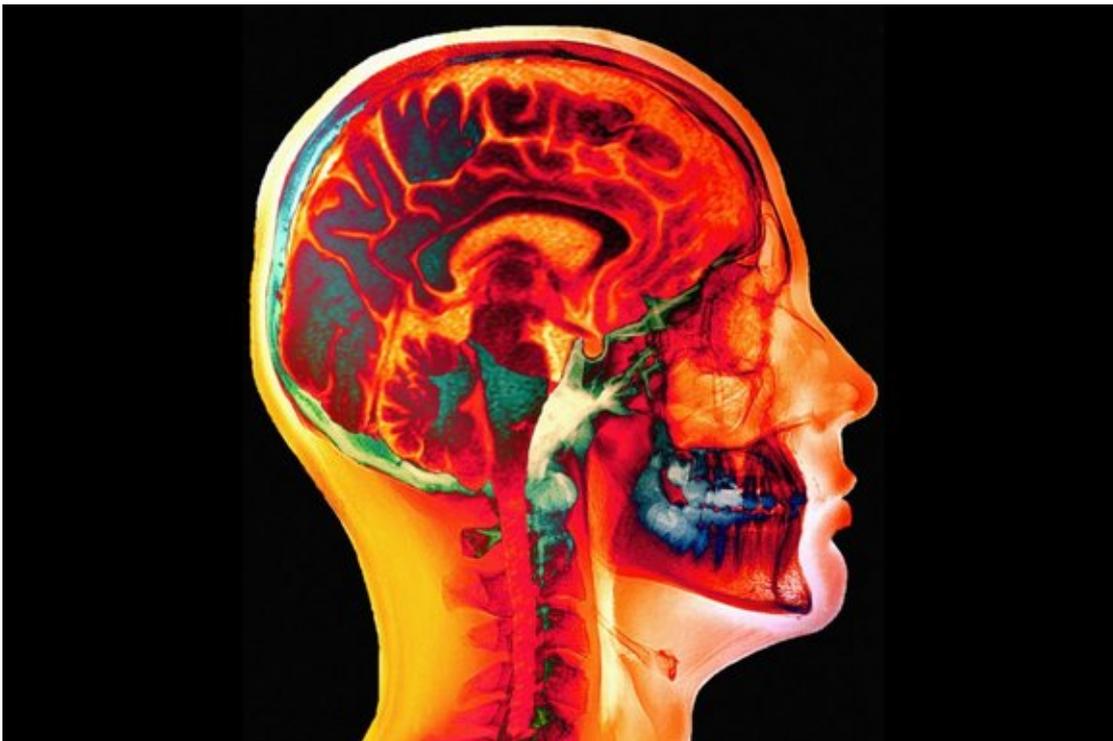
► Chaps used to be in charge of the jokes, but now it's women, says Stephen Armstrong

THE SUNDAY TIMES

## Is this the code to joy?

It sounds like science fiction, but music made via MRI scans of our heads is here

*Andrew Smith* Published: 19 May 2013



(Science Photo Library)

I suspected a day would come when music writers did their jobs wearing rubber helmets, with electrodes stuck to their skulls — I just didn't know it was already here. Welcome to the world of Dr Eduardo Miranda, director of the Interdisciplinary Centre for Computer Music Research at the University of Plymouth.

I'm understating the weirdness of the situation. The electrodes, one at the front and one at the rear of my head, read electrical activity as I stare at

a computer screen showing red and green "buttons" that pulse at different rates. As I look at the individual buttons, the differing pulse rates are fed from the back of my brain to a synthesizer, in which they trigger different notes. In this way, I can "play" the synthesizer by looking at the different buttons on the screen. If I were paralysed, I would have access to a musical instrument — as it is, I have to be all but dragged away from the thing.

There is much more to Miranda's work, though. Recent news reports described a project, jointly led with Dr Slawomir Nasuto, of the Cybernetics Research Group at the University of Reading, in which three subjects listened to the second movement of Beethoven's Seventh Symphony while lying in an MRI scanner. Data on their responses to the music, as indicated by neurological activity in different areas of the brain, was then fed into a computer program that rewrote the movement in ways designed to appeal to each listener. Miranda finessed the results where necessary, but they were real reflections of individual predilections, holding out the prospect of a computer program that could compose bespoke music to alter mood on demand.

So, a possible replacement for antidepressants somewhere down the line? Or a first step towards making human - composition redundant? The singer Jessie Ware was quoted as saying: "I hope it doesn't wipe every musician out of a job." You can see her point.

Miranda couldn't be less Frankenstein-like in the flesh. He is Brazilian by birth, and his parents forced him to learn piano as a hedge against his youthful football obsession, then encouraged him to forsake music for computer engineering at university. He moved freely between the two spheres until he heard Stockhausen and the Greek composer Iannis Xenakis, who pioneered the integration of music with architecture and maths, and was an early experimenter in electronic music. Just as important, a ban on the import of computer equipment into Brazil, as the country tried to develop its own industry, forced him to build his own synthesizers and computer interfaces, and to write his own programming language. He regards himself as a composer, rather than a scientist.

The results of what became Symphony of Minds Listening are fascinating. None of the three Beethoven analogues rivals the original, to my ears, but then they weren't designed to — for that, I would need an MRI scan. Taken together, they offer significant clues as to how we listen to music. "Music happens up here," Miranda reminds me, tapping his forehead. "We don't usually think of it this way, but it is a construction of the mind."

One of his Symphony subjects was a ballerina; another a philosopher. The first was found to be listening with the active involvement of areas of the brain governing motion, and her bespoke Beethoven movement was more rhythmic than the others. The philosopher listened with increased involvement from areas of the brain associated with abstract thought, producing a bracing, arrhythmic piece that made me think of the composer Luciano Berio. Unsurprisingly, brain scans from the third subject, Miranda himself, elicited a more melodic result.

You can watch the scans and listen to the music they inspired at [symphony-of-minds-listening.webs.com/listen-watch](http://symphony-of-minds-listening.webs.com/listen-watch). What you see amounts to a forceful demonstration of how unique is the process of listening to each individual.

Does Miranda fear the programmer Jekyll putting his artistic Hyde out of business, though? "I don't think so," he smiles wearily, having heard this question many times before. "It's like the calculator, which mathematicians thought would make them redundant. These things are useful tools, but they don't replace us, because our perceptions of the world are changing all the time, and computers can't keep up with that. Culture changes, and our perceptions change with it."

The difference is experience, in other words, which computers don't have. Yet.

"I think the wonder of art is a human thing. The question is always 'What is this communicating to me subliminally — what wasn't the artist aware of, and why don't I understand the effect it has on me?' I think computer-composed music will be appreciated as a piece of music that will do something to you, as a utilitarian device, not in an aesthetic way."

"Rather like The X Factor," I find myself thinking. And suddenly I'm very, very scared...

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