

# SA WEEKEND

magazine

The Advertiser  
12:03:11

## HAPPY THOUGHTS

HOW DEANNA REWIRED HER BRAIN  
AND LEARNED TO SMILE AGAIN

&

DEATH IN THE DESERT **DANCING  
TO PUCCINI** ALL YOUR MOVIE  
AND ENTERTAINMENT LISTINGS

## DEANNA

Pallotta giggles as she swings back and forth in the sunshine at the South Terrace playground. She's wearing her best dress today and looks like any other bright and outgoing 11-year-old. Her proud mum Eva gives her a push on the swing, and looking up, she beams at her dad, Tony, pleased with all the attention. It's hard to believe that just 18 months ago this happy young girl was so gripped with anxiety that she spent every night and morning screaming in anguish. Perhaps even stranger, her parents believe this dramatic turnaround came about after Deanna started playing a very special computer game.

It was September 2009 when the Palottas first noticed something wrong. At first, Deanna's symptoms were mild – she would complain of an upset tummy and miss the odd day of school. But they quickly accelerated to the point where she was crying constantly and couldn't eat because of a gnawing pain in her stomach. "I was feeling something bad was going to happen all the time and I was so scared," she tells me vaguely, like it is some dim, half-remembered bad dream.

Deanna lost so much weight that dietitians worried she was bordering on anorexia. She couldn't face school and when visitors dropped by the family's Athelstone home, she would hide in her room, lying on her bed in the foetal position.

"It was a terrible time," says Tony. "I was on the brink of quitting my business. She'd ring me four or five times a day saying, 'Help me Dad, help me'".

The family tried everything: naturopaths and ultrasounds for the stomach pains and counselling, cognitive behaviour therapy and even hypnotherapy for the psychological problems. Nothing worked. A year ago they were told about an unconventional brain treatment called neurotherapy. It involves psychologists scanning a patient's brain activity to look for abnormalities. Then, using a specially designed computer game, they train the patient to control their own brain wave patterns in order to cure their disorder.

It sounds like the stuff of science fiction, but proponents claim a 20-week course has cured people suffering from anxiety so severe they couldn't leave the house. Epileptics have been able to reduce the number and severity of their seizures, and children with attention deficit hyperactivity disorder have been able to settle down without drugs. There are even studies that suggest it can help normal people function better. After a course of neurotherapy, surgical students have boosted their efficiency by one quarter, and music students have improved in formal assessment by an entire grade. There are pilot programs in the UK and Alaska examining if neurotherapy (or neurofeedback therapy as it's also known) should become an essential part of the school curriculum.

But Tony and Eva knew none of this and were fairly sceptical – especially when psychologist Dr Tim Hill from Adelaide's Brain Health Clinic predicted the therapy, which costs about \$4000, had a 95 per cent chance of curing their little girl. "We thought he was talking shit," says Tony, bluntly. "We were worried we'd be forking over all this money and it mightn't work."

But the payoff came surprisingly quickly. By the end of her first session Deanna said she felt "better" and asked to go play in the park across the road. "She hadn't wanted to go to the park for years," says Eva. "I burst out crying and said, 'I can't believe it.' That first day I really noticed a difference." After a few sessions Deanna began eating properly. A few more and she was no longer crying at night. She caught up on her sleep and began to put on weight. "After three months she was completely

# MIND GAMES

IT MIGHT LOOK LIKE CHILD'S PLAY, BUT SOME DOCTORS SAY THAT PLAYING A COMPUTER GAME USING ONLY YOUR BRAINWAVES CAN CURE CONDITIONS SUCH AS ANXIETY OR HYPERACTIVITY

WORDS ANDREW FENTON PICTURE MARK BRAKE

better," says Tony. "I kiss the ground Tim walks on. It's unbelievable what he did for her."

Neurotherapy is a promising – though not proven – development in the treatment of psychological disorders. Until recently, psychologists have mainly relied on lengthy "talking cures" – which don't work if there is an underlying physical cause – or tried to control disorders with drugs, which provide only temporary respite from symptoms and have side effects. But lately, scientists and doctors have gained a much more sophisticated understanding of how the brain can be retrained to work more effectively.

A technology-based therapy that promises to reshape the neural pathways and provide lasting beneficial psychological changes has understandably drawn a lot of interest. "It can treat a broad range of conditions and you get permanent, lifelong results," says Hill, who has used neurotherapy to treat more than 500 patients over the past decade. "There are no side effects, except positive ones like improved self-esteem, social skills and better sleep." The scientific evidence, though, is unclear. According to numerous studies, neurotherapy patients like Deanna do experience significant improvements in their conditions across a range of measures. What is yet to be proven is whether that's a result of the neurotherapy, or something else.

After all neurotherapy is often used alongside a range of other psychological interventions, including counselling, cognitive behaviour therapy, interpersonal therapy and relaxation strategies. Even if it was the sole therapy used sceptics might argue that Deanna's dramatic turnaround could simply be the result of Hill and the clinical technicians at Brain Health Clinics lavishing 20 weeks' worth of care and attention on the distressed child.

Martin Jackson, a senior lecturer from the School of Psychological Science at Latrobe University, is one scientist who is unconvinced. He argues that up to 40 per cent of the improvement in a person's disorder can be attributed directly to a healthy therapeutic

relationship with their doctor. In theory, a psychologist could treat you with magic stones and voodoo and as long as you liked them, you might still see a significant improvement. "This has been one of neurotherapy's big problems – they can't demonstrate any effect beyond the 'therapist placebo' effect," he says. "I don't believe they can prove a causal relationship between the therapy and the outcome. There is a long line of therapies that come out and claim all these things and then are shown not to work."

Another critic is Russell A. Barkley, Professor of Psychiatry at the Medical University of South Carolina in the US. "High technology in a medical environment has a high placebo effect," he says. "It's not the equipment. It's the exercises, the mental exercises they are telling these kids to do." But while the scientific case is inconclusive, there are enough respected clinicians and researchers convinced of its potential to suggest it's an area worthy of further investigation.

I decide to see neurotherapy in action for myself.

**INSIDE** the unprepossessing grey clinic on South Terrace, 10-year-old anxiety sufferer Matthew Postle is watching the computer screen with the single-minded focus of a cat watching a mouse hole. He's on the second level of *Space Race*, piloting a blue spaceship through the galaxy with two other craft in close pursuit. A tinny but triumphant electronic fanfare emerges from the speakers as his ship crosses through a pink diamond that's hanging in space for no apparent reason. The stars streak by as the ship blasts into hyperspace, and the corners of Matthew's mouth flicker in a tiny smile of triumph.

There are no joysticks or controllers – Matthew is playing the game using only his brainwaves. Three small electrode pads attached to the side of his head pick up tiny signals and funnel them to the computer. Whenever his brainwaves hit the right pattern, he's rewarded by "winning" the game.



Deanna Pallotta and  
her mother Eva.



Picture Calum Robertson

Matthew Postle playing the brainwave game.

Matthew is a smart and thoughtful boy who was struggling socially at school and feeling a little anxious. "I used to be scared sometimes at night," he says. "I was really stressed and worried and I just couldn't sleep." But after three weeks he had begun to relax, he was sleeping through the night, and was getting along better with his brothers. "I felt different straight away, more confident and much better about myself," he says. "And it kept on getting better and better."

The science underpinning Matthew's treatment dates back to the 1920s when a German psychiatrist, Hans Berger, began experimenting by attaching electrodes to people's scalps to measure the current their brains emitted. The measurements are recorded in an EEG. By the 1960s researchers had demonstrated it was possible for subjects to correctly identify the particular brainwave pattern they were experiencing, and some were even able to change their brain pattern on cue.

But for a long time such altering of brainwave states was written off by the establishment as so much hippie nonsense. In any case, it was difficult and expensive to research given the technology at the time. But as personal computers became ever more powerful in the 1990s, academics and clinicians once again became interested in the field.

Professor Richard Clark has been researching neuroscience for almost 30 years and was formerly the head of the psychology department at Flinders University. He began practising neurotherapy eight years ago and co-founded the Brain Health Clinic with Hill. "In terms of psychological principles it's actually pretty simple," he says. "What's happened over the past 10 or 12 years is that we've been able to accurately measure brain activity and have that hooked up to a display that's in real time."

Brainwaves come in a variety of frequencies, from the very slow "delta" waves produced during sleep through to the very fast "beta" brainwaves when we're trying to solve a complicated problem. Too much or too little activity on any of these frequencies is believed to be associated with a whole host of disorders. For example, most kids with ADHD are thought to have too many of the slow brainwaves which causes problems with concentration, memory, impulsiveness and hyperactivity.

During his time at Flinders, Clark contributed to the development of a 20,000-strong database of EEGs which allows doctors to assess how much a patient's brainwave

### BRAINWAVES

Brainwaves come in a variety of frequencies, which are measured in cycles per second or hertz (hz). Too much or too little activity on any of these frequencies is believed to be associated with a range of disorders.

**Delta waves** are the slowest (0 to 3.5 hz) and produced by the brain during deep sleep.

**Theta waves** (4 to 8Hz) are associated with creative and unconscious thought.

**Alpha waves** (8 to 13 Hz) signify our brain is "idling" and alert but relaxed.

**Beta waves** (above 13hz) occur when we're bright eyed and bushy tailed, and focused on solving a problem.

patterns deviate from the norm. (Comparing the EEG to the database using mathematical and statistical analysis is called a quantitative EEG or QEEG). Having identified what's wrong, the patient's EEG is displayed on a computer screen in real time but converted into something that's meaningful to them.

"So instead of an EEG full of squiggly lines, we have a spaceship moving backwards and forwards," he says. "If the problem is one of attention, their task is to make their spaceship beat the computer by paying more attention – modifying their brainwaves. We're tricking the brain and exploiting its own learning mechanism by giving it information about its own activity."

The interesting bit is that no one seems precisely sure what's going on in deep recesses of the brain to get the brainwaves to change to the right pattern. A learning process involving operant conditioning is believed to be how we get there. Essentially, it's a bit like learning to ride a bike. You know what the goal is (to not fall off) but you learn by trial and error. Any action that leads to you falling off a bike is negatively reinforced (it hurts so you try to avoid it) and any action that leads

you to balance properly is positively reinforced (because you temporarily achieve your goal). In the end, although you don't consciously understand how you shift your weight around according to signals from your inner ear, all of a sudden you've instinctively learnt how to ride.

So when Matthew accidentally stumbles on the right brain pattern, he's rewarded by getting a high score or going into hyperspace with a burst of triumphant music. And he's subconsciously learning how to get his brainwave working correctly without even thinking about it. The ultimate goal is to modify the neural pathways leading to permanent improvements. Proponents argue that just like riding a bike, once you've learned to get your brain in order, you don't forget that either.

As technician Sharon Lambert picks the electrodes off Matthew's head, she explains anxiety problems like his aren't the mainstay of the practice. The vast majority of young patients are actually treated for attention disorders. "Mostly it's because they can't concentrate at school," she says. "Their brains are sleepy, even when they're hyperactive. They need to be woken up. They call this consciousness training. Kids who were off with the pixies, after a while, start relating to the world around them in a more aware way."

The treatment of ADHD is certainly the area in which the scientific evidence appears the strongest – and the American Academy of Paediatricians has endorsed it for this use. A 2005 review of the scientific literature found three quarters of kids with ADHD treated with neurotherapy improved. A German study in 2007 found that not only did behaviour improve, but the kids' IQs also jumped 10 points.

There are also various studies demonstrating neurotherapy is effective for anxiety conditions, sleep disorders, autism and epilepsy. Clinicians report benefits for sufferers of post traumatic stress, learning disabilities and OCD. Clark says that about 70 to 80 per cent of patients experience a significant improvement in their condition. That's not bad for a computer game that offers a level of graphics and game play last popular on the antique Commodore 64.

**DESPITE** such studies, neurotherapy is a long way from being accepted by the mainstream. Much of the research is of poor quality and design which makes a systematic review difficult. Any individual study might be positive (like those mentioned above), while another might be negative, but until you put them all together it's difficult to evaluate the overall weight of evidence. Medicare and the Motor Accident Commission won't pay for the therapy at present, which suggests government organisations are yet to be convinced. Clark believes that's about to change and he's on a committee about to present a position paper on the scientific evidence to the Australian Psychological Society. "Then hopefully we'll persuade the government and Medicare," he says.

There is at least one large government organisation that will pay for neurotherapy – the Australian Army. "John" (not his real name) served with the military in Iraq and Afghanistan where he encountered horrific incidents and blood chilling scenes. Six months after returning to ordinary life in Adelaide, John began to realise he wasn't dealing with things very well. Whenever a truck passed him on the street his pulse quickened as he was instinctively worried that it was filled with explosives or insurgents. When he went out for a meal with friends, he'd feel anxious if he had his back to the door. "When a car backfired I'd jump," he says. "It wasn't quite a panic attack and I wasn't diving under the table but it was an exaggerated, startled response. I wasn't sleeping. I was

having nightmares and a high degree of anxiety.”

His QEEG revealed patterns consistent with post traumatic stress and a treatment was designed to get him back on track. Highly intelligent, John wanted to know more. “I asked Richard: ‘Is it proven? Does it work?’ The first couple of sessions were him explaining what the therapy does. A key factor is you have to be properly relaxed and go deep in your subconscious so you can rewire the way in which your brain works. Richard gave me the confidence that it’s a valid and successful treatment and it’s not crystals or anything silly.”

John still has no idea how he learnt to “win” the computer game. “It’s not like you can scrunch your face up and think,” he says. “You have to let the work do itself, but you sort of stumble on it and you get a little sense of triumph.” For the first six to eight sessions, John didn’t get any relief at all. “I was like, I can’t feel anything. And then all of a sudden there was quite a dramatic improvement. I was less irritable, much calmer and I had a greater sense of perspective. Everything just felt easier and I was less troubled. My nightmares disappeared.”

To get a better idea what is going on, I decide to get my own brain assessed with a QEEG. “I’m sure we’ll find something wrong,” Clark says. “You’re a journalist.” And so a week later, on a boiling hot day, technician Vikki Wise – a neuroscience PhD student – straps a black cap with 36 electrodes in it to my head. It’s used for the baseline EEG and looks like a cross between a World War I flying helmet and a prop from *Clockwork Orange*. I watch in horror as Wise pulls out a large syringe and begins to fill it. Fortunately, it’s only used to deliver some salty



Professor Richard Clark  
co-founded the Brain  
Health Clinic.

Picture: Tait Schmaal

goop to the inside of the cap, to better conduct the faint electrical signals from my brain.

The image on the monitor looks like a polygraph – a series of wavy lines that become bigger or smaller depending on what is going on inside my head. It’s hard to tell what’s going on, but whenever I clench my teeth or blink my eyes the graph goes nuts. This means you

have to sit completely still. I’ve always been terrible at that. The baseline reading is pretty painless – you sit in silence for three minutes as the computer records the activity. Then you do it again with your eyes closed.

One of the reasons I’m so interested in getting a QEEG done is because of the amazing benefits in “peak performance” claimed by researcher Professor John Gruzelier from Goldsmiths at the University of London. In 2003 he conducted a study on the effect on neurofeedback therapy on students at the Royal College of Music – one of the top music conservatories in the world. Ninety seven students were randomly assessed by an expert panel on their ability to play two pieces of music, before and after treatment. Their marks improved by an average of 17 per cent after treatment – the equivalent of an entire grade. Some improved by as much as 50 per cent.

“These students are already brilliant and we discovered we could enhance their abilities significantly,” he says. Gruzelier says the performance boost couldn’t be attributed simply to the students being less nervous in their exams. “It’s something beyond that,” he says. “It’s more enhancing the interconnectivity of the brain so that when you’re performing the brain is working as a whole more efficiently.”

He’s demonstrated similar improvement in the abilities of ballroom dancers and actors – and it’s not just creative people who get a boost. Gruzelier’s 2009 study with trainee eye surgeons showed their evaluation scores improved by an average of 26 per cent. He says the greatest improvement was seen in the most complicated parts of the operation. “In other words, ▶



**SAVE \$100**  
ON SELECTED PRESCRIPTION GLASSES



Every BIG W Vision has a fully qualified optometrist who can test your eyes on site. All eye tests are bulk billed to Medicare and health fund rebates are processed on the spot. So if you’re looking for quality eyecare for less, come and see us at BIG W Vision.

OFFER ENDS APRIL 2 2011. SELECTED STYLES ONLY. STYLES MAY VARY FROM STORE TO STORE. ADDITIONAL LENS UPGRADES AVAILABLE.

Colonnades **8186 7273** Cumberland Park **8271 0082** Elizabeth **8252 8499** Marion **8296 7546**



DKNY ELIZABETH ARDEN RAY BAN DEBORAH HUTTON VERA WANG D&G CONVERSE DIESEL

16 cover story

the harder things are, the greater the improvement." Gruzelier says the field of neurotherapy is progressing in leaps and bounds in research and practise in Europe thanks to the Society of Applied Neuroscience he set up. But in the US, universities looking at the technique are few and far between, and most of the 6000 practitioners have been trained by equipment manufacturers rather than universities. "The next step is to create a university course and accreditation for people who want to practise it," he says.

While the Applied Neuroscience Society of Australasia is about to introduce accreditation for practitioners, neurotherapy is a long way from being embraced by the mainstream here. I rang the industry's peak body, the Australian Psychological Society, to find out the official position on the therapy. There isn't one. Their communications manager said no one was "available with the APS and well versed enough in neurotherapy to comment".

Hill raises his eyebrows when I mention this. "It's interesting isn't it?" he says. "Even though it's evidence-based the APS doesn't know much about it. Not many psychologists do. It's a big shift in their thinking away from tablets and talking."

But the APS referred us to Jackson, who conducted his own systematic analysis of the evidence in relation to ADHD in 2006. He paints a very different picture. "The problem with these tools is that no one is really able to demonstrate they teach you much more than how to play a computer game," he says. "If you talk to proponents of EEG (based therapies) they will say there are thousands of papers saying it's valid. But that isn't



Picture: Tait Schmaai

actually supported in the research if you do a systematic review." He says he discovered that the quality of the body of research was so poor that only a tiny percentage of studies were of high enough standard to even include in his analysis.

Clark argues the weight of evidence has changed substantially in the past five years and sends through a 2009 review of numerous studies, published in the *Clinical EEG and Neuroscience* journal. It found that children with ADHD treated with the therapy showed significant improvements on all measures, and the effects

were long lasting and could even improve with time. It doesn't convince Jackson.

He says the analysis was written by a proponent of the therapy. It only includes 15 of the 90 papers published in the past decade, none of which include the subject's EEG results before and after the therapy. "That suggest to me they've looked at this and didn't find a correlation between EEG changes, and changes in (brain) function," he says. "I'm happy to accept there are cognitive and behavioural changes," but he adds the evidence doesn't prove neurotherapy was responsible.

Gruzelier agrees the quality and amount of scientific evidence needs to be improved. But he says it's "early days yet" and each year the case for neurotherapy becomes stronger. He says there have been promising trials in regard to autism and sleep disorders.

A fortnight after my QEEG, Clark calls me in to give me the results. He says my resting alpha rhythm is extremely low and when it does occur it's about 20 per cent too fast. "Your brain cycle time is the rate at which your brain samples and processes information and it's running too fast for the other parts of the brain to keep up," he says. "Your brain doesn't know how to switch off. It's overactive which can result in an anxiety condition."

The news my brain never shuts up and I'm prone to the odd attack of anxiety doesn't come as a surprise. But a few weeks earlier Clark had shown me the QEEG of an autistic girl with attention problems and pointed out her alpha rhythm acted in a similar way to my own. I'm left to wonder if the correlation between a disorder and the QEEG results is as clear cut as some proponents suggest. ■

PUB: SA WEEKEND

12/3/11 W-16

COL: CMYK

NATIONAL PHARMACIES OPTICAL

LIMITED TIME ONLY

**\*\$75 OFF**  
**DESIGNER**  
**SUNGLASSES**  
**PLUS MEMBERS SAVE**  
**A FURTHER 20%**



National Pharmacies are taking \$75 off designer and fashion sunglasses such as Bolle, Dior, Jag, Timberland, Gucci, Ray Ban, Versace, Vogue, Prada, Emporio Armani, Hugo Boss and many more.\*

For your nearest National Pharmacies Optical store call **1300 667 676** or visit [nationalpharmacies.com.au](http://nationalpharmacies.com.au)

JAG Ray-Ban EMPORIO ARMANI VOGUE eyewear bolle



Members First Provider

\*While stocks last. Not all brands are available at all stores. Sunglasses valued over \$175 retail. Not available with any other voucher, discount or health fund promotion and BUPA associated offers. Not available on SASS or DVA jobs. Only available on full priced sunglasses not clearance. Brands excluded from promotion are Maui Jim, Tiffany, Bvlgari and Tom Ford. Tracking ipn x2 (plano #45796 and Rx #45797) Valid from 28th Feb to 3rd April 2011. Models shown for illustration purposes only. Not available on special customer orders.

JM11 FBM 0314