

BIONIC BRAINS: WE HAVE THE TECHNOLOGY TO REBUILD YOU

Therapist Sarah Graham offered up her brain for a battery of tests – and was shocked to find that her memory systems were damaged not so much by years of using cocaine, ecstasy, cannabis and LSD but by her teenage binge drinking. She describes advances in neuroscience which can support your therapy.

Dr Curtis Cripe, from the Brain Enhancement Institute, is a man used to delivering bad news to people. I hadn't really prepared myself for what he was about to say – and the fact that I was sat before him could be viewed as bad news in itself.

Last November, coming up for nine years off of all mind-altering substances, I flew to Florida and admitted myself into The Refuge/A Healing Place for three months of trauma treatment, to have my brain mapped and to undergo intensive neurofeedback brain training. Retrospectively, it was an incredible opportunity for experiential learning of new state-of-the-art tools... but being in rehab as a client had not been part of my strategic plan for the year!

Just a few months before, everything was full of promise, personally and professionally. Then my wife lost the baby. This heart-breaking trauma lit an emotional touch-paper, which sparked a chain reaction back into the many child, teen and adult traumas I experienced round my own body, infertility and medical (mis) management of an intersex condition. (see www.independent.co.uk/life-style/health-and-families/health-news/the-secret-of-my-sex-411032.html).

I didn't pick up alcohol or other drugs, but I did cause harm to others and myself by running away from the grief into work and abandoned my wife when she most needed me. The pain from the losses rapidly impacted my mental health to the point of depression and suicidal ideation. My therapist, supervisor and I decided that it would be a good idea to take some extended Time Out to heal the losses, do more work on boundaries and address emerging trauma issues.

So here I was sat in a lab before a computer screen, and from another lab – in California – Cripe pulled up the complex-looking results gleaned a few days previously from my donning a very unbecoming blue cap, which positions electrodes across the scalp to monitor the brain as the client undertakes a three-hour long fQEEG.

An f..what? Put simply it is a full battery of tests which explore 293 dimensions of brain activity as it relates to performing specific cognitive tasks such as math, reading, attention/

concentration and higher level cognitive thinking, learning, control emotions, process information, retrieve and remember.

The cognitive function and IQ tests took me back to troubled school days and invoked an all-too-familiar stress response. Add in lots of tests that are feats of auditory and/or visual memory, and I could almost hear my brain sizzling. Some tests are surreal, such as watching pictures of animals, humans and plants flash on the screen and using the computer mouse to identify when a correct sequence of animals appear while trying to ignore randomly-generated loud noises.

Cripe and his world-leading multidisciplinary team of experts at the Brain Enhancement Institute had combined their big brains to bring us this science and technology. The data collected enables them to build and interpret neuro-electric images of the "brain under task", to capture the brain's processing strengths and deficits and compile a *NeuroFunction Profile and Report of Findings*.

A GOLD MINE FOR THERAPISTS.

Cripe gave a whistle-stop tour through my report: a lot of facts, figures and graphical representation during which I was feeling pretty unintelligent again – all good ego deflation. We finally got to something instantly recognisable, the catchily-named Brain Processing Topographical Plot or, to my eyes, 20 Damien Hirst-esque images of the brain – my brain! There was also a list of 22 possible Areas of Improvement and 31 Functional Systems to Address. I ticked 14 of the latter.

This data is an absolute gold mine for addiction therapists as it includes information on genetically inherited addiction tendencies (depressive and/or compulsive) as expressed physically in the dendrites (see picture) system which is linked to thinking and impulse control.

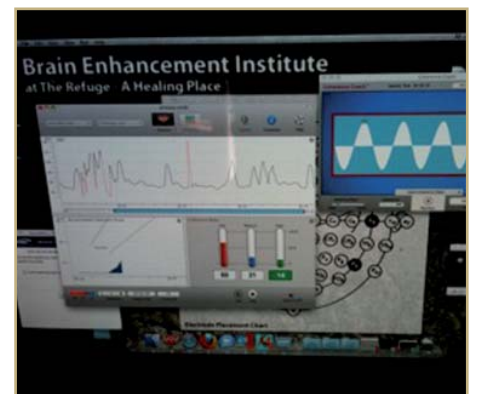
Cripe revealed that, ironically, people born with this genetic predisposition to addiction – including me, in the compulsive contingent – further diminish our already less-than-dendrites' mass by consuming neurotoxic substances which then make it even harder to execute impulse control and resist cravings to use.



Sarah Graham during her brain testing: playing the Arrows computer game



... and emWave heart-focused breathing.



Breathing in time with the wave pattern and monitoring emotional congruence – the red bar shows she was stressed this day.

Knowledge of the brain's structure and workings is powerful. These results contain a relapse indicator which is said to be over 90% accurate (if the client does not undergo treatment) as well as data on learning issues and any loss of mental faculties.

When I managed to park my anxiety about numbers, and tune-in to Cripe's eloquent science-speak, I started to relax and enjoy his virtual consultation. Then he turned bad cop, directing my attention, via his cursor, to the bottom line of brain pictures. It was not good news.

My brain was seriously underperforming – in many areas, and by at least 15-30 IQ points.

It was really not coping with stress, another genetically inherited factor.

And my information retention was appalling (my, not very NLP, chosen word). The graph stated that I was in the red "challenging zone".

Looking at the pictures (see facing page), it was clear why. The pretty sky-blue colour lighting up the back of my brain – in the Delta and Theta Coherence images – looks nice but is really bad news. It indicates "hypo" functioning, ie, too little activity. Cripe calmly stated that this memory systems area had been affected "pretty radically" by alcohol.

KILLING OFF TEENAGE BRAIN CELLS.

Research by Bauer (1993) and many others suggests that alcoholics and their children have lower levels of alpha and theta brainwaves and an excess of fast beta waves. Being thus "hardwired" differently makes it difficult for us to relax and might explain why we use alcohol to self-medicate our own brain pathology.

Despite knowing a little of this, I was surprised by Cripe pointing the finger at my alcohol use. What about all the years of cocaine, ecstasy, cannabis and a fair few tabs of LSD, doctor? He was unequivocal. My brain was showing the classic effects of teenage binge drinking.

People who drink and take drugs often joke about "killing brain cells". The denial process

around alcohol is so entrenched in UK society that even severe hangovers – an obvious brain-centred set of symptoms which is evidence of excessively unsafe consumption and of causing real harm to self – are reduced to the jokey phrase "giving the grey matter a 'really good hammering'".

I had not done a written assessment with Cripe or his BEI colleagues. They work with, but are not part of, The Refuge's clinical team and are an optional part of The Refuge's trauma-focused treatment programme. So he did not know anything about my using history of drinking regularly from the age of 12 years old: stealing spirits from parents' drinks cabinets, a regular in pubs by 13. But he was right. Excessive binge drinking had been a completely 'normal' part of being a teenager in my peer group.

Sat in rehab, so many years on from my teenage self and after being in recovery for some considerable time, I felt shocked to see these results. Of course, I knew that my memory had been badly affected by my 20 years of drinking and drugging. My first job after eight months of rehab (2001-02) had been as a post woman and each day sorting the mail was like groundhog day: "Now where does this letter go?". But in that year on the Royal Mail's bike, my memory improved and I thought that I was a lot better. Yet the testing process and now the results showed all too clearly and in full technicolour that addiction has caused serious, long-lasting, harm to my most precious organ.

As if scales fell from my eyes, a big wall of denial lifted as I looked at those images of the seat of my consciousness. Sharing afterwards with my fellow clients, this strong emotional response is a common experience for those who have been lucky enough to experience this technology.

Seeing this evidence is a powerful tool for clients and therapists alike, especially for those who work with younger clients and those teflon-coated individuals who believe that they are invincible and still have "years of using ahead" before they need to worry about damages.

BIONIC BRAIN REBUILDER.

Knowing the bad news is one thing and that on its own could fuel a relapse from the "oh well, I'm f***ed anyway" school of thinking. But Cripe is much better cast as the good guy. As he puts it, "the nice thing about the brain is – providing you still have neuroplasticity and the potential for neurogenesis (that is, as long as the brain is still teachable), with neurofeedback brain training, it usually can come back". As a child of the 1970s, I find myself humming, "Na-na-na-na, Na, na, na, na..." and visualising the bionic woman.

If anyone fits the Bionic Brain Rebuilder Bill, it is Dr Cripe: ex-NASA scientist and with a PhD, ABD in psychology with emphasis in health psychology and behavioural medicine.

I might not understand everything he says. But I trust him. And I want to be rebuilt, to get to grips with the red-zone "challenges" and do everything possible to use the neurocognitive developmental tools to stimulate my brain to heal itself. If that is possible? Dr Cripe and the team formulate a bespoke cognitive package for every client. So, only a few days later, I began my own personalised version of neurofeedback brain training.

This consisted of visiting the lab two or three times a week for one-hour sessions in front of a computer. I listened to gentle classical music whilst "playing" Digits: ever-increasing number sequences which must be remembered, from either visual or auditory sources, then re-entered, either forwards or backwards. At the start, this was impossible for my brain.

Then there was Arrows: a simple-looking computer game (clever, eh! Entice people to show up for sessions with things they enjoy doing!) where you must match the arrow symbols, as they appear on screen, in time to a metronome. The catch? It gets faster and faster. You cannot let your attention wander if you want to beat your high score which, of course, you do.

EmWave was my personal nemesis. You must match your slow, deep breaths to a wave

form – in for 5, out for 5 – while focusing on "heart-focused" breathing and thinking happy thoughts. There are three coloured bars – green is good, blue OK and red (oh dear!) – revealing how emotionally congruent you are being. And if that is not bad enough, it monitors your heart beat so you can watch it rising, in tandem with your frustration level. This was my experience; some people relax in the green zone.

Last, but by no means least, came most people's favourite, Neuro Coach: watching a DVD of your choice while your brain is wired up to the computer. Watching movies while training your brain – the catch is? If you are not in the correct state of relaxed, focused-consciousness and your attention becomes either too focused on something – isn't Keanu Reeves ageing well! – or your mind wanders off, the film stops. No matter how much you will it to start again, it won't until you are channelling the right, elusive, brain-waves. My success rate at watching DVDs went from an annoying "you are succeeding 10% of the time" to the great achievement and feeling from "you are succeeding 90% of the time".

It is no accident that the neurofeedback brain training has adapted so well from treating other conditions such as ADHD, brain injuries, OCD *et al* to treating addictions. Psychotherapist Steven Orenstein brings 30 years of clinical experience to the BEI team and he has spent a considerable amount of time developing neuro-cognitive rehabilitation programmes that target the specific needs of the addiction population.

He acknowledges that, for some clients, traditional treatment models do not work well. "When you understand addiction as a brain-based disease, we start to understand why people relapse," he explains.

He is all too aware that, with crystal-meth-using clients, "all the drug and behavioural therapy in the world will not change meth's physical impact". Meth physically harms the brain, hampering how a person functions, much like a stroke, epilepsy or Alzheimer's disease. He

has found that neurocognitive training tools can alter outcomes. Clients are remapped every few months and, he says, it motivates them to see changes in their brain maps.

I can testify that, with committed treatment, attendant change happens quickly. 12-20 sessions replenish dendrites and create a rebalancing that feels very noticeable to the client. I felt smarter, more alert and switched on – and yet calmer and more in control in a healthy way.

Combined with the excellent trauma work at The Refuge, I felt like a new woman and, yet, more like the bright, quick teenager I used to be before I nuked the developing grey matter.

Cripe is delighted with my progress. The latest pictures of my brain show a massive improvement, with hardly any light blue. I have good neurogenesis and my memory systems "have turned back on". I have shot up from 1 to 98 in the very important information-retention column.

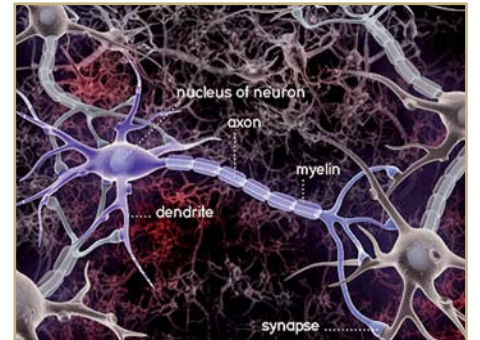
He says that I have still got room for growth in my scores because "your brain wants to be a good smart brain". I am proud of our progress and have brought the equipment and software back to the UK to continue the work.

BEI has found that new growth is stabilised between 40-60 sessions and, providing you lead a healthy lifestyle, these gains are for life.

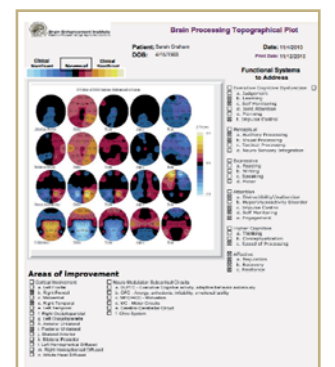
I intend to continue my own brain's training for as long as I see improvements and plan a trip to California this summer to meet the whole BEI team and learn how to conduct the tests and deliver these incredible tools in the UK.

SARAH GRAHAM is a therapist & director of Sarah Graham Solutions and is newly appointed to the ACMD with responsibility for drugs education for young people and families (www.sarahgrahamsolutions.com and www.youtube.com/sarahgdirects).

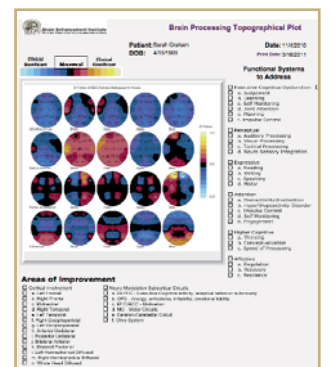
Meet the author and Judy Crane, CEO of The Refuge-A Healing Place at UKESAD in May; details at: www.ukesad.org.



"Not a great look! Wired up to electrodes to have my brain function monitored while conducting the initial three hours of cognitive functioning tests – to create my first brainmap, seen below."



"Above is the first map, before treatment. Note the light blue areas. This is damage caused not by the cocaine and E but by my teenaged binge drinking. It accounts for why my memory was still so impaired after nine years of sobriety."



"Finally, above is my brain after 24 sessions. Note how much improvement there is: delta/theta on bottom row shows no light blue now!"