

Avatar therapy

Psychiatrists have documented promising results using a new form of 'avatar therapy' for patients diagnosed with schizophrenia who hear voices (*British Journal of Psychiatry*: see tinyurl.com/n85oapy). Julian Leff at Royal Free and University College Medical School and his colleagues used existing and novel software to work with the patients to create a computerised embodiment – an 'avatar' – of the voice that troubles them most.

During seven weekly therapy sessions, each patient (in a sample of 16 men and 10 women) sat opposite their chosen avatar, which was displayed on a computer screen. The avatar's words were spoken by the therapist located in another room. The male therapist's voice was altered by software to sound like the patient's hallucinated inner voice, whether male or female. As the therapist spoke, the avatar's lips were also synched so it seemed as if the avatar were speaking. Each patient was gradually encouraged to stand up to their avatar, and over the sessions, the avatar became less abusive and instead more helpful and supportive.

After conversing with their avatar over the course of therapy, the patients came to find their heard voices less distressing, and experienced them less often (the effect size was 0.8 – usually considered large). In three cases, the patients' voices stopped altogether, including in one patient who'd heard the

voice of the devil for 16 years. These gains were maintained or even improved upon three months after therapy. Suicidality was also reduced after the therapy, and depression was lower three months after therapy compared with pre-therapy. 'Reductions of this degree are clinically important considering that the patients' hallucinations had failed to respond to many years of the most effective anti-psychotic drugs available,' the researchers said.

The results are based on 14 patients who started the avatar therapy straight away, with their gains compared against a control group of 12 who began with treatment as usual (anti-psychotic medication managed by a psychiatrist). Eight members of the control group later underwent the avatar therapy and showed similar benefits.

Leff and his team think the process validates the patients' experiences and they can take risks with the avatar and learn to do the same with their persecutory voices. The researchers also gave the patients a digital recording of the therapy sessions that they could listen to at any time. Furthermore, the therapist used the therapy to draw attention to the links between the patients' low self-esteem and the abuse



A selection of the avatars – patients were gradually encouraged to stand up to them

from their voices, which the researchers say may help the patients realise the source of the voices was their own mind.

The research is exploratory and Leff's team acknowledged the limitations in their work. Above all, the nature of the control group means we can't know whether the benefits of the avatar therapy were due to the specific techniques involved or simply to the increased attention and care. Also, the therapy isn't suitable for all patients. Five patients dropped out of the initial therapy condition, and four of the control group chose not to receive avatar therapy. The same therapist also conducted all the sessions so it's not yet clear whether others can be trained. Future research is planned to address these points. CJ

POSTCARDS FROM THE EDGES

A creative project by United Response, is online now at www.postcardsfromtheedges.org.uk. Beth Bridewell, a psychology graduate working as Web Assistant for United Response, a national charity that supports people with mental and physical disabilities, told us that the project 'offers a blank space for expression to anyone affected by disability or mental health problems. It invites people to tell their stories and help the broader public get to know and understand them better.'

The website is the hub of the project, allowing people to create postcards online and upload them instantly, as well as upload premade postcards.

'In late 2013 four art galleries across the country will host Postcards from the Edges exhibitions, displaying the wide variety and range of postcards we have received,' Bridewell said, 'from drawings to poems and collages; on topics ranging from benefit cuts to beloved pets and shopping lists.' JS



New Little Albert identity theory

Canadian researchers have cast doubt on claims that Little Albert – the infant studied famously by behaviourist John Watson – was the neurologically impaired, short-lived boy Douglas Merritte (see News, February 2012, and 'Looking back', May 2011).

Presenting at the International Society for the History of the Behavioral and Social Sciences held in Texas in June, Russell Powell at Grant MacEwan University and his colleagues said they'd identified another individual – William Albert Barger (1919–2007) – who is more likely to have been Little Albert. Like Merritte, this person was also the son of a foster mother at Johns Hopkins Hospital and would have been the right age at the time of Watson and Rayner's classic 1920s research. Powell's group also claim that Mr Barger would likely have gone by the name of Albert Barger at that time, which fits with Watson and Rayner's referring to their boy as 'Albert B'. CJ

Doing their BIT for charity

Staff at HMRC in Southend were sent 'winter greeting' e-mails last December containing a message from a colleague who donates to charity, plus information on how they could start donating too. The intervention was part of a trial documented in the latest publication from the government's Behavioural Insight Team – *Applying Behavioural Insights to Charitable Giving* (pdf at tinyurl.com/kmrqfxz).

According to the report, the UK is already a generous country. Collectively we gave nearly £12 billion to charity in 2011, and there are around 150,000 active charities here. However, the report authors Michael Sanders, David Halpern and Owain Service say that four key psychological insights could increase charitable giving even further – making giving easy; attracting attention; focusing on the social aspect of giving; and paying attention to timing.

The HMRC trial illustrates the power of social influence. Researchers found that simply including a picture of the charitable colleague in the e-mails more than doubled the number of recipients who signed up to donate, from 2.9 to 6.4

per cent. The trial also revealed which factors were irrelevant. It made no difference to recipients' generosity whether the colleague was of the same gender or from the same neighbourhood.

Other trials documented in the report involved collaborations with the Zurich Community Trust, the Home Retail Group (the owner of Argos and Homebase), Cooperative Legal Services and Deutsche Bank. This last study involved employees being asked, via an e-mail from the CEO, to donate a day of their salary to charity.

The base rate of sign-up was 5 per cent. This rose to 11 per cent if staff were also greeted that morning by charity volunteers giving out sweets. It rose to 12 per cent if the CEO e-mail included a personal greeting ('Dear David' rather than 'Dear colleague'). The combination of sweets and a personal e-mail tripled rates of giving to 17 per cent.

'Overall, Deutsche Bank staff gave more than £500,000 to charity on a single day,' the report states. 'What this trial shows is that, if all staff had received the personalised e-mail and sweets, the bank would have raised more than £1million.' CJ



MyConnectome

A neuroscientist at the University of Texas at Austin is more than half way through an ambitious programme of self-experimentation that involves scanning his own brain three times a week. Two of Russ Poldrack's scans are of his 'resting state' activity, designed to reveal functional networks. The other scan is either functional MRI, structural MRI or diffusion tensor imaging, which reveals the

brain's white matter tracts. The MyConnectome project also requires weekly analysis of Poldrack's blood and twice daily monitoring of his mood, diet, exercise and other activities.

Poldrack's research is an extension of the Human Connectome Project, which is looking at functional and structural connectivity at a single moment in time in the brains of hundreds of participants (see News,

July 2012). First findings from MyConnectome are expected early in 2014. 'It is almost certainly the most ambitious study of a single living person's brain ever attempted,' says the project website at www.myconnectome.org. 'The data will provide new insights into the dynamics of brain activity and their relationship to bodily metabolism and psychological function.' CJ

CARDIFF WINS MAJOR NEUROSCIENCE FUNDING

The Wellcome Trust has awarded £5.25 million to a team at Cardiff University's Neuroscience and Mental Health Research Institute to conduct multidisciplinary research into the genetic and neural bases of mental illness. Programme leader Professor Mike Owen said part of the research will involve looking at how previously identified genetic risk factors affect brain function and behaviour.

| www.cardiff.ac.uk/research/neuroscience

APA DIVISION 9 PRESIDENT

Chartered psychologist and BPS Fellow Professor Dominic Abrams has been elected President of APA Division 9, the Society for the Psychological Study of Social Issues (SPSSI) for 2013 to 2014 – the first psychologist outside North America to hold the position in the organisation's 76-year history. Abrams is Director of the Centre for the Study of Group Processes at the University of Kent and was joint winner of the 2009 BPS President's Award for Distinguished Contributions to Psychological Knowledge.

TAKE ONE BOOK A DAY AFTER MEALS...

A self-help book prescription service has launched across England. Known as Reading Well Books on Prescription, the programme was developed by the Reading Agency and the Society of Chief Librarians and is supported by the BPS. Thirty approved titles including *Mind over Mood: Change How You Feel by Changing the Way You Think* will now be available in libraries for recommendation to suitable patients by GPs or mental health professionals.

BLOG AWARD

Psychologist Pete Etchells, based at the School of Experimental Psychology at the University of Bristol, has won the award for 'Best blog post about peer-reviewed research' in the inaugural Science Seeker blog awards. The post on his Counterbalanced blog (tinyurl.com/mdhnwrq) critiqued press coverage of a trial looking at the effects of exercise on depression. A post from the BPS Research Digest blog was a finalist in the psychology category of the awards (tinyurl.com/9nogkqv). CJ

Knocking at the doors of perception

Jon Sutton reports from a discussion on scientific research with psychedelic drugs, at Imperial College London

...our normal waking consciousness, rational consciousness as we call it, is but one special type of consciousness, whilst all about it, parted from it by the filmiest of screens, there lie potential forms of consciousness entirely different. We may go through life without suspecting their existence; but apply the requisite stimulus, and at a touch they are there in all their completeness, definite types of mentality which probably somewhere have their field of application and adaptation. No account of the universe in its totality can be final which leaves these other forms of consciousness quite discarded.

William James, 1902

‘There are so many old friends in the audience,’ began Professor David Nutt. ‘I would like the enemies to stand up now. By the end, there almost certainly will be some.’ Professor Nutt’s combative mood was understandable: his piece in *Nature Reviews Neuroscience* on the effects of drug laws on neuroscience research and treatment innovation had been published that morning (see tinyurl.com/pjquuyt), and he had high hopes for this one-day event as a means of enticing mainstream scientists through the doors of perception into psychedelic drug research.

With the ‘prophet of psychopharmacology’ Aldous Huxley a regular supportive presence on screen (Nutt was taught by his stepbrother), Nutt argued that science has missed a trick or two since LSD was banned in 1964. Two of the most important discoveries of our time – Francis Crick on the double helix structure of DNA and Kary Mullis on the polymerase chain reaction that allowed DNA sequencing – were reputed to have been made under the influence. Nutt is with Einstein when he says that ‘no problem can be solved from the same level of consciousness that created it’, and Stan Grof when he says ‘psychedelics, used responsibly and with proper caution, would be for psychiatry what the microscope is for biology and medicine or the telescope is for astronomy’.

For Nutt, rather publicly dismissed as Chairman of the government’s Advisory Council on the Misuse of Drugs in 2009, the Schedule 1 drug laws are the worst

ensorship of research since the Catholic Church banned all books advocating the Copernican system of planetary motion in 1616. ‘We create the drug laws and then they control us’ he said, or in Huxley’s words: ‘All gods are homemade, and it is we who pull their strings, and so give them the power to pull ours’.

It wasn’t always this way. In the 1950s and 1960s, clinical interest in LSD was producing promising results: effect sizes



Knocking – but we can’t come in?

in treating alcoholism that were greater than all other therapies, pioneering work on depression and anxiety in cancer. Nutt says the push to ban LSD came from the CIA, and that not all were convinced. Bobby Kennedy questioned the US Drug Enforcement Administration, saying, ‘if [clinical LSD projects] were worthwhile six months ago, why aren’t they worthwhile now?’

Nutt and his colleagues at Imperial College believe they are, and they regularly pick their way through regulations and ethics committees in order to conduct research on how these drugs work, the role of 5-HT_{2A} receptors in brain function, and the potential applications. These receptors, part of the serotonin family, are highly localised in the part of the brain that’s the most evolutionarily recent, and the complexity of the interaction between inhibitory and excitatory neurons clearly fascinates Nutt and his colleagues. Finding an unexpected decrease in cerebral blood flow after the administration of psilocybin, a naturally occurring psychedelic compound produced by more

than 200 species of mushrooms, Nutt said: ‘A few times in my career I’ve seen things as completely paradoxical as this and you know they must be right, because there’s no bias’.

A follow-up with magnetoencephalography (MEG) proved it was an effect on layer V pyramidal neurons, ‘the first time in humans we’ve been able to show an effect of a particular neural subclass on human experience’. Yet journals turned the findings away as too specialised for their readers. You get the feeling Nutt gets used to rejection: the UK support group for cluster headaches – described as ‘worse than childbirth’ by some sufferers – refused to countenance research with mushrooms or LSD because they’re illegal, and Nutt doesn’t know whether he can use a non-psychedelic version – 2-Bromo-LSD – because no one knows whether it’s legal or not!

Most frustratingly, Nutt says, ‘drug laws have stopped people even thinking there are questions to be asked’. Or again, in the words of Huxley: ‘By simply not mentioning certain subjects... totalitarian propagandists have influenced opinion much more effectively than they could have by the most eloquent denunciations.’

Next up, Dr Robin Carhart-Harris gave us a quick tour of fMRI and MEG studies with psilocybin. Its components are strikingly similar to serotonin, and Carhart-Harris pointed to parallels with both the effects of meditation and treatments for depression, which also suppress activity in the medial prefrontal cortex. Pioneering psychologist William James viewed his own depression as ‘a positive and active anguish’, and to Carhart-Harris it is significant that psilocybin leads to a localised decrease in functional connectivity in the brain’s so-called ‘default mode network’. This usually works in tandem with the attention network, but the normal ‘Yin and Yang’ relationship seems to collapse under psilocybin. Carhart-Harris says this may map onto some aspects of the phenomenology of the experience, for example when people report ‘I only existed as a concept, as an idea’. This

'disintegration of ego boundaries' is specifically correlated with a decrease in alpha waves post psilocybin, i.e. the oscillatory activity of the brain. Carhart-Harris points to similar patterns in early psychosis and the 'at-risk' mental state, and he put forward a model of 'entropy' and disorder in the brain that is mediated by 5-HT_{2A} receptors.

These ideas found support from the next speaker, Dr Enzo Tagliazucchi (Frankfurt). Again we saw the localised reduction in blood flow and fMRI signal after drug intake, with the signals oscillating around the decreased mean. Are these fluctuations meaningful? Tagliazucchi looked at the relationship between structural and functional connections: parts of the brain that are physically connected aren't always connected in terms of what they do, but it appears that after psilocybin the links between functions in the brain more closely resembles the underlying anatomy.

Following an array of short presentations from researchers working with psychedelics at Imperial, Bristol, Oxford and Barcelona, Professor Jack Cowan (University of Chicago) took the audience on a mind-bending trip from cave art to the architecture of the visual cortex. Based on a lifetime's work dealing with intrinsic noise in neural networks mathematically, Cowan attempted to show how geometric visual hallucinations are produced. Press hard on your eyeballs for a 'pseudo-hallucination', an entopic image that Cowan argues is directly correlated with the structure of the visual cortex. Seeing a hallucination as dynamic, with an instability reflecting an instability in its conditions of origin, has big implications. Take cave art, which many feel produced modern forms of religion. Was its often hallucinogenic form inspired by being in deep caves with flickering light?

Cowan says he now has a theory for

not just how the contours of hallucinations are produced, but the colour, depth and motion. These 'stage 1' hallucinations occur in the primary visual cortex, show topological correspondence to the primary visual field, and mirror exactly those patterns generated in the visual cortex when it becomes unstable. Beyond that, hallucinations become more cognitive and conceptual, involving memory and context. 'You're on your own there,' says Cowan, 'I just do the math.'

Finally, Dr Charles Grob (UCLA) reported a pilot study for psilocybin-assisted psychotherapy in end-stage cancer. Grob feels that LSD allows you to really 'hit that deep existential level', noting that the best treatment outcomes when the drug is used in alcoholism are in those who have 'psychospiritual level experiences'. As William James said, perhaps the best treatment for dipsomania is religio-mania. In Grob's study, 12 subjects with advanced-stage cancer used a moderate dose of psilocybin and demonstrated significant reductions in anxiety and depression several months later.

Grob closed proceedings with an impassioned plea. 'This area is ripe for development, it's been neglected for half a century. It's time to leave the 60s behind us – to quote the Moody Blues, Timothy Leary is dead. We need to speak the truth and do so in an open manner. Be tenacious. Do your research impeccably. Keep moving the field forward.'

To end with another quote, from the poet William Blake: 'If the doors of perception were cleansed every thing would appear to man as it is, Infinite. For man has closed himself up, till he sees all things thro' narrow chinks of his cavern.' I'm glad these researchers are knocking at those doors: will regulators let them in?

I Look out for a special issue of *The Psychologist* on hallucinogens

Registered reports

Numerous psychologists are among more than 70 signatories to an open letter in the *Guardian* calling for a new approach to publishing across the life sciences – the registered report (tinyurl.com/kta8qle). Already instigated by BPS Fellow Dr Chris Chambers at the journal *Cortex*, the idea is that registered reports are reviewed prior to data collection and accepted 'in principle' based on soundness of the study question and methods. Publication is then virtually guaranteed regardless of the actual results. '[P]re-registration overcomes the publication bias that blocks negative findings from the literature,' wrote Chambers and his co-correspondents. 'And by conducting peer review both before and after a study is completed, questionable practices to increase "publishability" are greatly reduced.'

Not everyone welcomed the proposal. Professor Sophie Scott at UCL tweeted: 'we run the risk of throwing baby, bath, towels, shampoo, soap, razors, exfoliators flannels & all the toys out with the bathwater.' **CJ**

FUNDING NEWS

The Wellcome Trust's Society and Ethics programme seeks to support **research that explores the social and ethical aspects of biomedical research**. Several of the Wellcome Trust's grants can be applied for under this programme including the New Investigator Awards and Senior Investigator Awards. Both have a closing date for application of 19 July 2013. Small grants of up to £5000 can be applied for at any time. tinyurl.com/ktmer4c

The International Social Science Council is inviting outstanding early career social and other scientists to become World Social Science Fellows, and to participate in a World Social Science Seminar on **Risk Interpretation and Action: Decision-making under conditions of uncertainty**. Following the earthquakes in New Zealand and other recent disasters the key issue under discussion will be the ways in which people interpret risks and how they respond based on these interpretations. The seminar will be held in New Zealand in December 2013. The closing date for the submission of applications is 15 July 2013. tinyurl.com/ou2tyuc

The **Dunhill Medical Trust** offers grants for research that focuses on:

- I the care of older people, including rehabilitation and palliative care
- I the causes and treatments of disease, disability and frailty related to ageing.

The grants give are normally of between £10K to £500K and are given for smaller-scale projects that may not attract funding from the major research councils. Applications can be made at any time. tinyurl.com/c4nyrhm

The National Institute on Drug Abuse (USA) has announced a call for **research into Prescription Drug Abuse** (R01). Prescription drug abuse is a major public health concern, and the NIDA is seeking to support basic preclinical and clinical research, epidemiology and prevention research, and treatment and health systems research. Details of the research questions they wish to explore are given on the website. The next closing date for applications is 5 October and the funding stream will be open until January 2016. tinyurl.com/a6m5cq5

info

For more, see www.bps.org.uk/funds
Funding bodies should e-mail news to Elizabeth Beech on elibee@bps.org.uk for possible inclusion

The mindbus technique for resisting chocolate

If someone gave you a bag of 14 chocolates to carry around for five days, would you be able to resist eating them and any other chocolate? That was the challenge faced by 135 undergrads in a new study that compared the effectiveness of two different 'mindfulness' resistance techniques.

Kim Jenkins and Katy Tapper taught 45 of their participants 'cognitive defusion', the essence being that 'you are not your thoughts'. The students were told to imagine that they are the driver of a mindbus and any difficult thoughts about chocolate are to be seen as awkward passengers. The students chose a specific method for dealing with these difficult thoughts/passengers and practised it for five minutes – either describing them, letting them know who is in charge, making them talk with a different accent, or singing what they are saying.

Another group of students were taught an acceptance technique known as 'urge surfing'. They were instructed to ride the wave of their chocolate cravings, rather than to sink them or give in to them. A final group of students acted as controls and were taught a relaxation technique. As well

as trying to resist the bag of chocolates, the students in all conditions were asked to avoid eating any other chocolate as far as possible, and to keep a diary of any chocolate they did eat over the five days.

The key finding is that the mindbus group ate fewer chocolates from their bag as compared with students in the control group. By contrast, the urge surfing group ate just as many of their chocolates as the controls. Diary records showed the differences between groups in their other chocolate consumption were not statistically significant, although there was a trend for the mindbus group to eat less (13g vs. 52g in the urge surfing group and 44g in the control condition). Another way of describing the results is to say that 27 per cent of the mindbus group ate some chocolate over the five-day period, compared with 45 per cent of the urge surfers and 45 per cent of controls.

A habits questionnaire suggested the mindbus technique was more effective because it reduced the students' mindless, automatic consumption of chocolate more than the other interventions. Jenkins and Tapper said their results show the mindbus 'cognitive defusion' technique is a 'promising brief intervention strategy' for boosting self-control over an extended time period.

The serious chocaholics among you may not be so convinced. Although the students were recruited

on the basis that they wanted to reduce their chocolate consumption, they appeared to show saintly levels of abstinence. On average, even the control group participants ate just 0.69 chocolates from their bag over the five-day period (compared with an average of 0.02 chocolates in the mindbus condition; 0.27 in the urge surfing condition).

The controls' other chocolate consumption amounted to the equivalent of little more than four individual chocolates over five days. You've got to wonder – how serious were these participants about chocolate and just how tasty were the chocolates in that bag?*

Another thing – the researchers included a measure of 'behavioural rebound'. After the students returned to the lab on day five, they were presented with a bowl of chocolates and invited to eat as many as they liked. The groups didn't differ in the amount of chocolates they consumed, which the researchers interpreted as a good sign – after all, the mindbus group hadn't compensated for their restricted intake during the week. But hang on, they also showed no evidence of greater resistance to the chocolate. Sounds to me like the passengers had taken over the bus.

* Co-author Katy Tapper got in touch on Twitter to tell us: 'The chocolates were very tempting Cadbury's Celebrations!'



In the *British Journal of Health Psychology*



Engaging lecturers can breed overconfidence

In the May issue of *Psychonomic Bulletin and Review*

Eloquent and engaging scientific communicators in the mould of physicist Brian Cox make learning seem fun and easy. So much so that a new study says they risk breeding overconfidence. When a presenter is seen to handle complicated information effortlessly, students sense wrongly that they too have acquired a firm grasp of the material.

Shana Carpenter and her colleagues showed 42 undergraduate students a one-minute video of a science lecture about calico cats. Half of them saw a version in which the female lecturer was confident, eloquent, made eye-contact and gestured with her hands. The other students saw a version in which the same lecturer communicated the same facts, but did so in a fumbling style, frequently checking her notes, making little eye contact and few gestures.

After watching the video, the students rated how well they thought they'd do on a test of its content 10 minutes later. The students who'd seen the smooth lecturer thought they would do much better than did the students who saw the awkward lecturer, consistent with the idea that a fluent speaker breeds confidence. In fact, the two groups of students fared equally well in the test. In the case of the students in the fluent lecturer condition, this wasn't as good as they'd



Scanning a brain that believes it is dead

In *Cortex*

predicted. Their greater confidence was misplaced.

A second study was similar – 70 students watched either a fluent or fumbling lecturer, but this time the students had a chance afterwards to spend as long as they wanted reviewing the script. On average, both groups of students devoted the same amount of time (perhaps out of habit). But only among the students who'd watched the fumbling lecturer was there a link between time spent on the script and subsequent performance on the test. This suggests only they used the time with the script to fill in blanks in their knowledge.

'Learning from someone else – whether it is a teacher, a peer, a tutor, or a parent – may create a kind of "social metacognition", the researchers said, "in which judgments are made based on the fluency with which someone else seems to be processing information. The question students should ask themselves is not whether it seemed clear when someone else explained it. The question is, "can I explain it clearly?"'

An obvious limitation of the study is the brevity of the science lecture and the fact it was on video. It remains to be seen whether this result would replicate in a more realistic situation after a longer lecture.

Also, in real life, there may be costs to a fumbling lecture style that weren't picked up in this study, such as students mind wandering and skipping class.

What is going on in the brain of someone who has the deluded belief that they are brain dead? A team of researchers led by neuropsychologist Vanessa Charland-Varville at CHU Sart-Tilman Hospital and the University of Liege has attempted to find out by scanning the brain of a depressed patient who held this very belief.

The researchers used a positron emission tomography (PET) scanner, which is the first time this scanning technology has been used on a patient with this kind of delusion – known as Cotard's syndrome after the French neurologist Jules Cotard. The 48-year-old patient had developed Cotard's after attempting to take his own life by electrocution. Eight months later he arrived at his general practitioner complaining that his brain was dead, and that he therefore no longer needed to eat or sleep. He acknowledged that he still had a mind, but (in the words of the researchers) he said he was 'condemned to a kind of half-life, with a dead brain in a living body'.

The researchers used the PET scanner to monitor levels of metabolic activity across the patient's brain as he rested. Compared with 39 healthy, age-matched controls, he showed substantially reduced activity across a swathe of frontal and temporal brain regions incorporating many key parts of what's known as the 'default mode network'. This is a hub of brain regions that shows increased activity when people's brains are at rest, disengaged

from the outside world. It's been proposed that activity in this network is crucial for our sense of self.

'Our data suggest that the profound disturbance of thought and experience, revealed by Cotard's delusion, reflects a profound disturbance in the brain regions responsible for "core consciousness" and our abiding sense of self,' the researchers concluded.

Unfortunately the study has a number of serious limitations beyond the fact that it is of course a single-case study. It's unclear whether the patient's distinctive brain activity was due to Cotard's, depression or his intense drug regimen to treat the depression, although the researchers counter that such an extreme reduction in brain metabolism is not normally seen in patients with depression or on those drugs.

Another issue is with the lack of detail on the scanning procedure. It's not clear for how

long the patient and controls were scanned, nor what they were instructed to do in the scanner. For example, did they have their eyes open or closed? What did they think about?

But perhaps most problematic is the issue of how to interpret the findings. Does the patient have Cotard's delusion because of his abnormal brain activity, or does he have that unusual pattern of brain activity because of his deluded beliefs? Relevant here, but not mentioned by the researchers, are studies showing that trained meditators also show reduced activity in the default mode network. This provides a graphic illustration of the limits to a purely biological approach to mental disorder. It seems diminished activity in the default mode network can be associated both with feelings of being brain dead or feelings of tranquil oneness with the world, it depends on who is doing the feeling.



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