

Scientific tales from America

CHRISTIAN JARRETT

CHRISTIAN JARRETT reports from New York, host to the 18th annual convention of the Association for Psychological Science (formerly the American Psychological Society).

CARING MEANS SHARING

ECHOING the famous words of George Miller's 1969 Presidential Address to 'that other' American psychology organisation, Ludy T. Benjamin Jr. of Texas A&M University urged scientific psychologists to once again give their discipline away to the public.

Earlier in psychological history, it was, he said, difficult to find a psychologist who did not write for a popular magazine such as the *Ladies Home Journal* – William James, Edward Thorndike, Edward Titchner, to name but a few, all wrote for magazines. Today, Benjamin Jr. argued, to communicate one's science to the public is looked down upon as popularising – a snobbery that has allowed pseudo-psychologists, like John Gray, author of *Men are from Mars, Women are from Venus*, to fill the void.

He cited Carl Sagan, the American astronomer and Pulitzer prize-winner, as a classic example of a scientist spurned by the academic community for his popularisation of science – Sagan never received the prestigious National Academy of Science award. Shades of the alleged blocking of Baroness Susan Greenfield's election to fellowship of the Royal Society – for similar reasons perhaps?

'There's an arrogance in the academic community that's abhorrent to me', Benjamin Jr. said, adding that we need a culture change, a re-defining of 'scholarship' to recognise the importance of translating science for public consumption, rather than only rewarding work intended for other specialists in the field.

The interplay that matters

WE'VE got to get past the tired, inaccurate notion that there's a particular gene 'for' this or that mental disorder, explained Sir Michael Rutter (Institute of Psychiatry) in his keynote address: 'Why the different forms of gene-environment interplay matter'.

The true picture is more complicated. A person's genes influence their behaviour, that behaviour in turn affects the environment they're in, and the effect that environment then has on them depends on their genetic make-up. In other words, our genes can affect both the likelihood that we will have a particular experience, and also what happens when we are exposed to that experience.

Viewing things this way blurs the distinction between gene and environment effects. Take the finding that adoptive mothers are more likely to assume a negative control style toward children born to a mother with behavioural problems. This is primarily an effect of the child's behaviour on their environment, but their behaviour is actually linked back to the genetic influence from their birth mother. Furthermore, the effect their adopted mother's parenting style has on them will also likely depend on their genetic make-up.

Studying how a child's genes affect their environmental experiences can also throw up some enlightening distinctions. Take corporal punishment and physical maltreatment – is the former simply a less

Smacking – genetically influenced via child's naughty behaviour

extreme version of the latter, or is there a clear difference between the two? A study by Sara Jaffee and colleagues found that whether or not a child was smacked by their parents was influenced by the child's genes, via the child's tendency to naughty behaviour. Yet this was not true for physical maltreatment. In other words, a particularly difficult child is more likely to be smacked, but whether or not a child is physically abused has more to do with the adult abuser and the family environment.

Or consider a longitudinal study by Avshalom Caspi and colleagues of 1037 boys in New Zealand. Those boys who were mistreated as a child were more likely to behave violently as adults, but only if they had a gene that led to low expression of the neurotransmitter-metabolising enzyme: monoamine oxidase A (MAOA). Those boys who, thanks to their genotype, had high levels of MAOA, seemed to be protected from the detrimental effect of being maltreated as a child. Other studies

A backward view of precociousness?

‘MASTER storyteller’ Malcolm Gladwell, best-selling author of *Blink* and *The Tipping Point*, gave the convention’s ‘Bring the family address’, and by the sounds of crying babies in the audience, that’s exactly what delegates did.

Gladwell reportedly earns around \$40,000 per public lecture, and it wasn’t long before his crowd-pleasing style kicked in as he told us to forget the scheduled title for his talk (the organisers had been on his back), he wanted to tell a different story.

Gladwell recalled how as a teenager growing up in Canada he had been identified as a potential 1500m running star, and so between the ages of 13 and 15 he was sent to training camps and nurtured as a champion-in-waiting. The trouble was, he lost his first race at age 15, and so began his transformation from elite to mediocre. The records show a similar fate befell 14 of the other top 15 runners in Gladwell’s age group. By contrast, when Gladwell was aged 23 and ought to have been at his peak, the top Canadian runner at the time had apparently been a hopeless teenage runner. ‘We assume great talent is manifested early on,’ Gladwell said. ‘But precociousness is a far slipperier subject than we think.’

Consider the fortunes of pupils who attended New York’s Hunter College Elementary School for the intellectually

gifted, as documented by the 1993 book ‘Genius Revisited’. Now grown-up, the former pupils, all of whom had an IQ of over 155 when they attended the school, were doing well – they were happy and had good jobs. But the book has a disappointed tone – after all, the school’s intention was to seek out and nurture the next generation of superstars, the Nobel Prize winners, the Pulitzer winners, yet this simply hadn’t happened.

Or look at it the other way – if you take history’s great achievers, you’ll find only a minority were considered precocious as children. Copernicus, Bach, Newton, Da Vinci or Locke: none of them would even have made it past the Hunter College’s entry requirements.

So what is going on? Why does childhood talent, or lack of it, not predict adult success or failure? Gladwell argued it’s because childhood is about learning and the consumption of knowledge. Adulthood success, by contrast, is about the production of knowledge, being a ‘doer’ not a mimic. Consistent with this, studies have shown 50 per cent of music prodigies suffer a ‘mid-life’ crisis during their teens, in which they fail to go beyond the astounding ability to mimic that characterised their early years.

Gladwell observed that for some reason, when it comes to intellectual talent, society is obsessed by speed of acquisition. It’s a

tell similar stories in relation to liability for depression, and in relation to the effect of early cannabis use and schizospectrum disorder.

But Rutter cautioned that these statistical interactions between genes and environment are of no interest in their own right – they’re only meaningful if they lead to an understanding of the biological mechanism(s) underlying the development of mental illness. Fortunately, insights into such biological mechanisms are now emerging. In particular, Rutter pointed to a new brain imaging study by Andreas Meyer-Lindenberg and colleagues, published this year, that found men who had a genotype leading to low expression of MAOA (a risk factor for violent behaviour) showed reduced functioning in their anterior cingulate cortex when they tried to inhibit a physical response, and exaggerated amygdala functioning, suggestive of heightened anxiety and fearfulness. Rutter said this showed the idea of postulated biological mechanisms underlying gene-environment interactions may be valid and suggested that genetic and environmental effects operate on the same causal pathway.

Rutter concluded that the era of simply measuring heritability is over. We’re now in an ‘exciting period’, he said, where the focus is on causal processes, and research must move beyond the search for susceptibility genes for disorders and concentrate instead on environmental risk factors and the various forms of gene-environment interplay. ‘It’s not how much is down to genes or how much is the environment’, he argued, ‘it’s both. It’s in the interdependence and co-action of the two that answers lie.’

HISTORY LESSONS

FANCY seeing Stanley Milgram’s infamous shock generator? Attendees at the symposium on ‘research apparatus from psychology’s history’ were treated to a video taken inside the Archives of the History of American Psychology at the University of Akron, which now houses more than 1000 pieces of apparatus, from nineteenth century olfactometers and chronoscopes to Milgram’s generator. Most can be viewed online – keep checking tinyurl.com/mb37b, because the archives team, headed by David Baker, has just submitted a grant proposal to create an online lab, allowing people to conduct virtual experiments using the old apparatus.

Further talks on laboratory mazes, reaction time testing and Skinner boxes revealed that the prodigious Wilhelm Wundt always worked on manuscripts standing up; that Skinner believed the lever inside his boxes should be called an ‘operandum’, rather than a ‘manipulandum’, indeed he wrote to a journal to make his point (see tinyurl.com/m4jlc); and that whereas, in the good old days, psychologists had to concoct their own recipes for rat pellets, today you can simply order some direct from ResearchDiets.com

ludicrous perspective. We don't think that way about other aspects of development like walking – we realise we're all going to end up walking anyway, what does it matter that little Johnny started walking at such a young age? Or take reading – research shows there's no correlation between the age of acquisition and later reading ability or enjoyment. In fact, the opposite may be true – there's evidence in Switzerland that the policy to push kids into reading hard and early could be harmful. By contrast, there is high literacy in Denmark where reading is taught late.

What we usually mean by precocity is that a child is showing an unusual intellectual ability for their age. But success as an adult is based on more than that kind of raw intellectual power. And if we're being accurate, when we describe a child as naturally gifted, what we really mean is that the ability to practice a lot comes easily to them. An analysis of national music examination results showed that the strongest predictor of success was practice. The top performing children practised 800 per cent more than the lower ranking kids.

Mozart is held up as the classic example of a child prodigy – apparently he was composing at aged four. But look closely, Gladwell said, and you realise that the music he composed at four was 'rubbish', and somewhat suspiciously, it was written down by his father. His first good piece was his piano concerto number nine written when he was 21. It took him 12 years to produce his first major work. So if anything, Gladwell noted, Mozart was actually 'a little bit slow'. Mozart's real skill lay in mimicry. His precociousness was his ability to work hard and to have had a pushy father.

So, Gladwell argued, we need to rethink what we mean by precociousness and to consider the effect on children of not being labelled as precocious – by selecting children early (for example as a future runner), we're putting other children off and we'll never know how good they might have been. Gladwell said this was not necessarily to argue against academic streaming, which is a separate issue, but that it is wrong to start predicting adult success based on childhood performance. Many of the things that matter to adult success, such as motivation, aren't fixed at all. 'In real estate, we care about the finished building, not the building schedule,' Gladwell concluded. 'We should have the same attitude toward kids.'

DR ANTHONY A. WALSH

Blame the brain

YOU may remember the case of Phineas Gage, the nineteenth century railway worker whose personality turned nasty after an accident blasted a damping iron through his head, destroying most of the left side of his frontal lobe. Well, if he was alive today, surely no-one would hold him responsible for his unpleasant behaviour – it would be understood in the context of the brain damage he'd sustained. But now, as Adrian Raine (University of Southern California) outlined in his talk, research is uncovering neural correlates of violent and anti-social behaviour that aren't the result of a dramatic injury – findings that raise uncomfortable questions about criminal responsibility.

Take the example of a study that found prefrontal cortex grey matter was 11 per cent reduced in a community sample of people with antisocial personality disorder (53 per cent of whom admitted having attacked a stranger) compared with healthy controls. Or another that found lower orbital and middle frontal gyrus volume in people who self-confessed to more crime. Should these brain differences be taken into account when such individuals are brought to justice?

Indeed, Raine described how brain imaging shows the orbital and middle frontal gyrus is significantly smaller in men. He said that when this sex difference in brain volume is controlled for, it actually reverses the usual difference between men

and women in rates of antisocial behaviour and self-reported crime.

Raine also described another neuro-biological marker for antisocial behaviour: the cavum septum pellucidum. This area of tissue between the two lateral ventricles is enlarged in people diagnosed with antisocial personality disorder, and in non-clinical controls who have a record of more arrests and convictions.

The ethical implications of these findings are not just theoretical. Raine said he'd acted as a defence witness for a murderer who was spared the death penalty after Raine presented brain imaging data showing the defendant had reduced prefrontal cortex activity. 'This is a slippery slope', Raine warned. 'After all, all behaviours have a biological basis'.

Raine was also careful to highlight the way social factors interact with biological factors in predicting antisocial behaviour. For example, among 4269 boys, it was those who had had birth complications and who experienced maternal rejection who showed the highest rates of violent behaviour as adults. On a positive note, this kind of research has led to the development of psycho-educational interventions targeting at-risk children, incorporating nutrition, physical exercise, and cognitive stimulation. One outcome study reported a 35 per cent reduction in self-reported crime at age 23 among those given the intervention, and a 64 per cent reduction in officially recorded crime.

A second abuse?

IT'S upsetting to think that by asking them to testify in court, child abuse victims might be subjected to yet more trauma after they've already suffered so much. The official position of the US legal system is that they expect it to be stressful, although this is only really recognised in the short-term. Sadly, research presented by Gail Goodman (University of California) suggests the traumatic effect of testifying could be long-lasting, especially if a child has to testify multiple times, if they were particularly young when they testified, and the abuse was severe.

Back in the 1980s, Goodman and her colleagues collected data on 218 child abuse victims aged between three to seventeen who were due to testify in court. At the time, they found the psychological adjustment of most children improved over the course of the prosecution. However, there was a subset who deteriorated. To examine the long-term effects of testifying, between 10 and 16 years later, most of the original sample were contacted again, and their mental health was compared with a control group of child abuse victims who never testified.

They found that the children who had testified multiple times, and/or were younger at the time of testifying, tended to have worse psychological outcomes, in terms of depression, sexual problems, and avoiding thinking about the past, especially if the abuse they had suffered was more serious (e.g. rape rather than fondling). Unfortunately, this was true even among

the children who had been seen to improve over the course of the trial. Those children who cried when they were testifying also experienced more psychological problems as adults.

But the story isn't all straightforward – among the children who were abused by someone outside of the family, or whose abuse was less severe, those who didn't have the opportunity to testify experienced more psychological problems later compared with those children who had testified. They also had a poorer opinion of the legal system.

In a related line of research with the same sample, Goodman's team looked at the issue of whether trauma enhances or impairs memory. They found that memory for the abuse they had suffered was more

PAUL DOYLE/PHOTOFUSION

accurate among those victims who said the abuse was the worse thing that ever happened to them. Among those who said something else worse had happened to them, memory was more accurate if they had worse post-traumatic stress symptoms.

DON'T BLAME THE GUARDS

TO the audience's whooping delight, Philip Zimbardo (Stanford University) argued we shouldn't blame the guards of Abu Ghraib, like Sergeant Ivan 'Chip' Frederick, for the atrocities that occurred there. Rather it's all down to President Bush, Secretary of State Rumsfeld and CIA protocols. Zimbardo made the case during a flashy multi-media promotion of his forthcoming book, featuring 'never-before-seen' images from Abu Ghraib. He argued it isn't disposition that turns good people bad, but the situation they find themselves in, combined with wider political and systemic influences. To support his case, as well as retelling the story of his 1971 Stanford prison experiment and Stanley Milgram's 1963 obedience experiment, Zimbardo also pointed to the nine medals 'Chip' Frederick – to whom he has acted as expert defence witness – had previously won as a reservist, and to the way the CIA sanctioned guards to prep prisoners for interrogation. Zimbardo concluded with a description of what he thinks constitutes true heroism – it's when someone stays true to themselves in spite of prevailing circumstances that would ordinarily turn a good person bad. He highlighted Joe Darby, the Abu Ghraib guard who exposed the abuse photos, as a classic example.

IN BRIEF

Having plenty of healthy, fulfilling relationships isn't always good for you. Toni Antonucci of the University of Michigan described research showing that among people with a serious illness, those who had better relationships were found to die sooner – perhaps, Antonucci surmised, because they were ready to 'let go', whereas those with poor relationships still had bones to pick.

As he gave advice on writing psychology textbooks, Dave Myers, the social psychologist and leading author, warned that a thick skin is needed (he once received eight rejections in one day) and that writing can take over your life – he calculated one book of his had taken 3550 hours of writing time over four years. However, he said there are fantastic resources to help you, like the British Psychological Society's very own Research Digest (www.researchdigest.org.uk to subscribe).

Research into the efficacy of psychotherapy is being undermined by a widespread failure to ensure that treatment is given as it should be, according to Franchesca Perepletchikova at Yale. Of 131 randomly-controlled trials, only three per cent adequately assessed the delivery of the intervention that was being tested. Fifty-nine per cent failed to report treatment integrity, 51 per cent lacked a treatment adherence procedure, and 86.3 per cent lacked a procedure for ensuring therapist competence.

Our quality of sleep is a better predictor of how happy we feel than our income, according to Nobel Prize winner Daniel Kahneman, who was describing his 'day reconstruction method', in which participants are asked to break down the previous day into episodes and to recall their mood during each one.

To help teach statistics, use vivid real-life examples – like advertised second-hand car prices to look at the effect of vehicle age; or compare numbers of belongings, piercings or tattoos between students. Friendly competition also helps spark interest, with a prize for the team that finishes a stats test first. Janie Wilson of Georgia Southern University who has won prizes for her teaching, provided the advice.