

Edging out redundant ideas

The self does not exist. Neither does common sense, repression or artificial intelligence. We can't study culture. And humans aren't innately social beings. In fact, they aren't innately anything. This is according to contributors to this year's Edge.org annual question: 'What scientific idea is ready for retirement?'

Once again, the list of Edge respondents is crowded with psychologists. Bruce Hood at the University of Bristol (winner of the Society's 2013 Public Engagement and Media Award) thinks we should retire the notion of a 'free willing self', which he believes is an illusion. 'By abandoning the free willing self, we are forced to re-examine the factors that are really behind our thoughts and behavior ... Only then will we begin to make progress in understanding how we really operate.'

The self should be joined on the scrap-heap by common sense, according to Robert Provine (University of Maryland). He believes the idea we are 'intelligent, conscious and alert' is another illusion. What about repression? 'Traumatic experiences...rarely get banished into the unconscious, like a ghost in a closet', writes David Myers (Hope College). 'Traumas more commonly get etched on the mind as persistent, haunting memories.'

The retirement of artificial intelligence is proposed by Roger Schank (Engines for Education Inc). 'I declare Artificial Intelligence dead,' he writes. 'You will never have a friendly household

robot with whom you can have deep meaningful conversations.' Ditching the study of culture seems even more extreme. Yet Pascal Boyer says 'culture' is the social science equivalent of phlogiston. '[A] belief in culture as a domain of phenomena has hindered the development of a proper science of human behavior in groups – what ought to be the domain of social sciences,' he says.

Other contributors challenged received wisdom about human nature. Adam Wyatz (Kellogg School of Management at Northwestern University) writes that 'our social capacities are largely non-automatic, ingroup-focused, and finite' contradicting the notion that we are, by nature, social. Similarly, the journalist David Berreby argues we should ditch the notion that people are sheep. Most participants in Asch's conformity research 'did not agree with the majority, most of the time', he writes. And Milgram's research – 'Exhibit A for the "people are sheep" model' – he argues was really about trust in the experimenter.

If we aren't innately social, are we innately anything? Alison Gopnik (UC, Berkeley) believes it's time for the notion of human innateness to go. Citing epigenetics, Bayesian models of human learning, and new thinking on the evolution of human cognition, she argues that 'almost everything we do is not just the result of the interaction of nature and nurture, it is both simultaneously.'

Two more surprising suggestions: Paul Bloom (Yale University) believes we should give up the idea that science can maximise our happiness. The question of which is a happier life – one characterised by modest levels of happiness or another that is a balance of joy and misery – cannot be solved experimentally, he writes. But perhaps we shouldn't worry too much about our happiness levels anyway. June Gruber (also at Yale) argues we ought to retire the idea that sadness is always bad, and happiness always good. The former focuses our thinking and alerts us to problems, while the latter can foster selfishness, distractibility and risk taking.

Influenced perhaps by recent travails in psychology and other sciences, other contributors focused their retirement suggestions on aspects of the way science itself is actually conducted. Adam Alter says we should lose the idea that replication is a safety net. Just as seatbelts risk encouraging more reckless driving, Alter says too much faith in replication can breed careless research. 'Each experiment becomes less valuable and less definitive, so instead of striving to craft the cleanest, most informative experiment, the incentives weigh in favor of running many unpolished experiments instead,' he argues.

Gary Marcus said we should stop pretending that Big Data is magic. It's great for detecting correlations, he writes, but not for identifying causal laws. 'Big Data shouldn't be our first port of call; it

APA explains interrogation decision



The APA has made various statements against torture, but continues to receive criticism

The Guardian has published a letter (see tinyurl.com/m9ju42m) written in December by the American Psychological Association's Director of Adjudications, Dr Lindsay Childress-Beatty, in which she explains why the organisation will not be taking any disciplinary action against Dr John Leso, a military psychologist who allegedly designed and participated in interrogations at Guantánamo Bay.

Addressing the complainant – Dr Trudy Bond (a member of Psychologists for Social Responsibility) – Childress-Beatty notes that the APA ethics

committee considered all the available evidence, including the fact Leso argued against the use of 'enhanced interrogation' practices and in favour of 'rapport-building approaches'.

Although the APA has made various statements against torture, it continues to receive criticism for failing to prohibit psychologists' involvement in interrogation (see News, January 2014). The complaint by Bond against Leso is just the latest attempt by individuals and campaign groups to bring to justice those psychologists allegedly involved in torture (see www.psysr.org). CJ

should be where we go once we know what are looking for,' he said.

Meanwhile, Charles Seife, a journalism professor at New York University, takes aim at statistical significance. 'It was designed to help researchers distinguish a real effect from a statistical fluke,' he says, 'but it has become a quantitative justification for dressing nonsense up in the mantle of respectability.'

And we shouldn't assume that science is self-correcting, warns Alex Holcombe (University of Sydney). It's too easy to publish statistical flukes, he says, and too difficult to publish negative results. There is cause for optimism, he believes, with the introduction of registered reports (papers accepted based on their methods, not their results) and the rise of post-publication peer-review via online commenting and blogging. 'But hiring, promotion, and grant committees typically don't value the contributions made by individual researchers using these tools,' he says. 'As long as this continues, progress may be slow... New reforms and innovations need our active support – only then can science live up to its self-correcting tagline.' CJ

I Read all 175 answers at:

www.edge.org/responses/what-scientific-idea-is-ready-for-retirement
What did you think of their suggestions, and what scientific idea do you think should be retired? Send your thoughts to psychologist@bps.org.uk



New smartphone apps

Researchers are continuing to exploit new smartphone technology in new ways for good causes. Grand Challenges Canada, funded by the Canadian government, has just announced seed funding for a \$300 device and app that turns a smartphone into a portable EEG tool.

It's hoped the technology will allow the routine diagnosis of epilepsy in developing countries. Researchers at the University of Ottawa are to trial the device in Bhutan, a country with not a single neurologist (see www.bhutanbrain.com). Project leader Farrah Mateen said: 'We particularly look forward to introducing

the device in settings where children suffering seizures and related disorders are subjected to discrimination, and to study whether better diagnosis reduces stigma and increases social integration.'

Meanwhile *New Scientist* reports that researchers in South Korea have designed an app to aid children's language development. TalkBetter listens to parent-child exchanges and gives the parent real-time advice on how to speak in a more helpful way for the child, for example by speaking more slowly. Pilot testing with 13 parents has been promising, and a full trial is now underway. CJ

FRITH PRIZE WINNER

Dr Jennifer Cook at City University London has been awarded the 2014 Experimental Psychology Society's Frith Prize for her doctoral research into action observation and imitation in autism. The Frith Prize, inaugurated in 2011 thanks to a gift from Chris and Uta Frith, recognises experimental psychologists at the start of their career who have produced an exceptional body of work in their PhD thesis.

FORCE FOR HAPPINESS

Senior officers in the British military are to receive lessons in mindfulness, according to *The Sunday Times*. The newspaper reports that a day-long session was due to be held in Whitehall in February, with the morning hosted by Action for Happiness, and the afternoon by the Oxford Mindfulness Centre, part of the University of Oxford Department of Psychiatry. The MoD is quoted saying they are 'always looking for new ways we can ensure that military personnel get the support and assistance to deal with extreme pressures in their careers'.

GOOGLE BUYS AI COMPANY

Google has purchased DeepMind Technologies, a British artificial intelligence company founded by cognitive neuroscientist Demis Hassabis in 2011. Before leaving academia, Hassabis worked alongside Chartered Psychologist Professor Eleanor Maguire at UCL, and others, investigating memory and amnesia, and the decoding of brain scan images. Google has not revealed why it purchased the company, although there is speculation the move will benefit Google's image search tool.

COMIC PSYCHOSIS FINDINGS

A survey of hundreds of comedians in the UK, USA and Australia has found that they scored above average on all four psychotic traits that were measured in a questionnaire: unusual experiences, cognitive disorganisation, introvertive anhedonia, and impulsive non-conformity (*British Journal of Psychiatry*: tinyurl.com/ocs2ynz). Co-author Gordon Claridge said: 'The creative elements needed to produce humour are strikingly similar to those characterising the cognitive style of people with psychosis – both schizophrenia and bipolar disorder.' CJ

The next big thing in psychology

Josephine Perry reports from the Science Museum's Dana Centre – an event supported by the British Psychological Society as part of a five-year sponsorship agreement

Covering the evolution of language, sixth sense, cognitive prosthetics, worrying perfectionists, implicit associations, addiction recovery and kidney transplants in 90 minutes is a tall order. It is like a whistlestop tour through neighbourhoods of psychology that many of us have never considered. Yet this is exactly what the Dana Centre achieved when they brought together seven up and coming psychologists to explain how their current research could be 'The Next Big Thing in Psychology'.

In keeping with their vision to find new ways to look at key scientific issues, the Centre bypassed the traditional podium and speeches format and instead went for 'speed geeking'. This saw each researcher given five minutes to engage successive small groups about their subject of specialisation. While there was the potential for this to have felt contrived it actually gave a great opportunity to hear about research close up and interactively, and allow groups to quiz researchers directly. With the audience of 70 spanning those with just a passing interest in psychology right through to expert practitioners, this format worked well.

The first researcher our group met was Johanna Spiers from Birkbeck, looking to persuade us that qualitative health research was the next big thing. Her work aims to give a voice to the recipients of kidneys from living donors, believing that while donors get support and counselling, recipients of organs can feel lost in the system. She uses qualitative methods to understand the decisions recipients go through to help them feel heard and engaged in the process. Spiers believes her work will provide clinical teams with a better understanding of their patients' needs.

Katie Slocombe from the University of York is an evolutionary psychologist. In aiming to understand how language developed, she studies chimps to track and document the differences between the way they and humans communicate. Slocombe detailed how chimps use tactical calls politically but still have very functional survival communications, highlighting that it is the social elements of communication which make humans



Daniel Frings' studies focus on conflicting social identities held by addicts and their impact on potential success in recovery

stand out and differ from our evolutionary ancestors.

Implicit association research was put forward as the next big thing by Goldsmith's Keon West. He believes it is not only the closest technique we have to reading someone's mind but will also enable us to improve relations between different social groups. This tool, he argued, allows researchers to test views and opinions on sensitive subjects, bypassing interference from individuals focused on giving a socially acceptable answer. West suggested that implicit association research can be used widely, from predicting gender pay discriminating employers through to helping clinicians predict whether interventions will fail due to ingrained bias.

Clinical neuropsychology was next with Tom Manly of the Cognition and Brain Sciences Unit at Cambridge out to persuade us that the next big thing will be cognitive prosthetics (for example the use of 'SenseCam' for people with dementia to get an automatic photographic record of their daily events: see 'Big Picture', February 2011). In looking at how cognitive prosthetics are used in everyday life, Manly is working to understand how the brain will respond to them. Working from the standpoint that first language and then reading forced our brains to develop in new ways, he believes technology will be next to force this. (This

presentation ended up with my vote).

A popular presentation, from an Eastern perspective, came from Vivien Ainley at Royal Holloway. She advocated that the way brain and body speak and listen to each other will be the next big thing. Her focus is on interoception and how it impacts on the self. Ainley is researching how to teach individuals to recognise this information coming from inside the body so the brain is able to respond to it more effectively.

With a more traditional focus Sonja Carmichael, an occupational psychologist at City University, was out to persuade of the importance of understanding perfectionism in the workplace. She works to dissipate worry and rumination through better workplace interventions and focuses on perfectionists as they are particularly prone to this. She designs acceptance and commitment therapy interventions for perfectionists, asserting that if the interventions will work for them, they will work for everyone.

Finally, Daniel Frings, a social psychologist at London South Bank University, chose studying social identities (both known and subconscious) as his next big thing. He argued that not only do they influence the way we behave, but that they can also help us to predict outcomes. In his speciality, focusing on conflicting social identities held by addicts and the impact of these on their potential success in recovery, he is able to use implicit association tests to identify potential clashes and build prediction models for recovery.

When the whistle blew at the end a vote was taken, which clearly saw Daniel Frings and his studies of social identities crowned: The Next Big Thing.

I Josephine Perry is an MSc student at Kingston University. She got a place at this event by following @psychmag on Twitter.

Investigating HM's brain

In life, the amnesiac Henry G. Molaison (known in the literature as 'HM') was probably the most studied individual in neuroscience. More than five years after his death, he remains a fertile source of evidence for researchers. Jacapo Annese at the Brain Observatory in San Diego and his colleagues have now completed a 3-D reconstruction of Henry's brain, and they've described their new discoveries about his precise brain lesions (*Nature Communications*: tinyurl.com/q43xm4h).

It's long been known that Henry's memory problems began after he underwent brain surgery for severe epilepsy in his twenties. However, our understanding of the precise lesions Henry suffered has changed over time. His neurosurgeon William Scoville claimed to have removed the entire hippocampus on both sides of Henry's brain. Yet scans of Henry's brain taken in the 1990s and 2000s suggested that parts of the hippocampus had in fact been left intact.

The new 3-D reconstruction is the culmination of a painstaking process that began in 2009 when Annese and his colleagues sliced and digitised Henry's brain into 2401 layers. This initial preservation procedure took more than 53 continuous hours and was watched online by over 400,000 viewers.

'Our goal was to create this 3-D model so we could revisit, by virtual dissection,

the original surgical procedure and support retrospective studies by providing clear anatomical verification of the original brain lesion and the pathological state of the surrounding areas of H.M.'s brain,' Annese said. As well as the 3-D model, Annese's team have also created a searchable digital atlas of Henry's brain available for other researchers to explore (see tinyurl.com/pg9y53).

Using their data to conduct a thorough digital post-mortem, Annese and his colleagues have now confirmed that large parts of Henry's hippocampus were left intact. Specifically, the anterior portion of the hippocampus was removed by suction, but the posterior portion was left behind and the tissue was healthy. The researchers also discovered that the entorhinal cortex was almost entirely missing – this is the 'gateway' to the hippocampus from the cerebral cortex and subcortical sites.

Removing the entorhinal cortex 'would have made a more significant contribution to H.M.'s declarative memory impairment than the ablation of the anterior hippocampus,' Annese and his colleagues wrote. They added that preservation of the posterior parts of the hippocampus may have supported Henry's ability to learn new skills. The new results also confirm the almost total removal of the amygdala bilaterally by scalpel, which

may have contributed to Henry's insensitivity to pain and his dampened emotions.

A surprising discovery from the new examination was a scar in the left prefrontal cortex, which Annese and his team speculate was likely to be unintentional damage caused during Scoville's brain surgery. The researchers also found evidence of white matter lesions in deep parts of the brain, which may be a sign of strokes.

BPS Fellow Professor John Aggleton at Cardiff University, who wasn't involved in this new research, wrote an article about Henry Molaison for *The Psychologist* last year (August issue). He told us the new images were fascinating, but that they provide only a 'preliminary report'. In particular, the extent to which the hippocampus was disconnected remains unclear. The possibility that the posterior hippocampus remained connected via spared parahippocampal tissue 'leads the reader to want to know the amount of white matter damage made by the surgeon Scoville,' he said. Aggleton added that another outstanding issue is the functional consequences of the brain pathologies – such as the cardiovascular illness – that Henry developed later in life. 'In some respects, these data add to the mystery of HM, without solving it,' he said. **CJ**

UCLAN 'at risk' of redundancies

Several senior psychologists at the University of Central Lancashire are at risk of compulsory redundancy, according to a protest blog that has appeared online (see www.psychprotest.blogspot.co.uk). It states 'no convincing rationale or financial driver exists', and claims the plans are 'aimed at sacking relatively well-paid, experienced lecturing staff and replacing them with cheap inexperienced staff.' There are currently 934 signatories to an online student petition, led by Aleesha Begum, opposing the planned redundancies (tinyurl.com/qjq88j2).

A spokesman for the University of Central Lancashire told *The Psychologist*: 'We are reviewing the balance of staff across the University to ensure students have access to the full range of staffing expertise, be it those with world-leading research credentials, those who are inspirational teachers, those who have close contacts with relevant industries or professions, and those who bring new and fresh insights into a variety of subject areas. Maintaining and enhancing the student experience is at the heart of our thinking and remains our priority.' **CJ**

Keith Laws, Professor of Cognitive Neuropsychology at the University of Hertfordshire, has been elected Fellow of the Royal Society of Arts (RSA) in recognition of his



RICHARD STANLEY

outstanding contribution to research in the field of cognitive neuropsychology.

Professor Laws is a Chartered Psychologist and Associate Fellow of the British Psychological Society. He said: 'It is a great honour and privilege to be invited to become a Fellow of the Royal Society of Arts. The Society has a long and prestigious history and

I look forward to working with the Fellowship Community on a range of issues where my experience and skills may be helpful to others.'

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Imagining success

A group of experts led by Chartered Psychologist Dr Tadhg MacIntyre (University of Limerick) has published an expert statement on the use of mental imagery in sport, exercise and rehabilitation: tinyurl.com/ouuqwbp.

Produced on behalf of the British Association of Sport and Exercise Sciences, the statement explains that a significant evidence-base shows that imagery is multimodal (i.e. involving many senses), and that there is a high degree of overlap between the neural structures and mechanisms involved in imagery, perception and motor control.

The statement makes 12 recommendations for how practitioners can optimise the use of mental imagery with their clients. This includes encouraging clients to ensure 'temporal congruence' between their imagined and real actions; using multimodal imagery where possible, especially incorporating the sensory modalities relevant to the skill in question; testing clients' imagery abilities; recognising that experts are more likely to benefit from imagery than novices, but not assuming that experts will be proficient at imagery; and producing individualised imagery scripts

for clients and agreement on desired outcomes at the outset.

'This statement was developed with a backdrop of almost 70 years of mental practice research and three decades of neuroscientific investigations into mental imagery,' Dr MacIntyre told us. 'Our research team comprised practitioners, neuroscientists and applied psychologists, and in developing this statement we sought the views of our peer networks in both research and applied domains. Our combined efforts should influence the training and practice of practitioners, coaches, and performers alike.'

In other sports psychology news, a study has uncovered widespread use of cognitive-enhancing drugs by amateur triathletes (*PLoS One*: tinyurl.com/qbz5oyn). Pavel Dietz at Johannes Gutenberg University and his colleagues surveyed nearly three thousand athletes in Germany and found that just over 15 per cent admitted using pharmacy products to give themselves a mental edge, including beta-blockers and modafinil. Use of 'cognitive doping' was higher in athletes who also admitted to physical doping, suggesting a general propensity for enhancement. **CJ**

Youth mental health concerns

The charity YoungMinds has launched a new campaign to improve young people's mental health called Young Minds Vs. Backed by Labour leader Ed Miliband, the campaign follows a poll by Young Minds of over 2000 children and young people, which found over half have been bullied, and one third don't know where to turn to for help when they are depressed or anxious.

'We are sitting on a mental health time-bomb, and that's why we have launched YoungMinds Vs which is creating a mass movement of children and young people campaigning online and in their communities for better mental health and emotional well-being,' said Lucie Russell, Director of Campaigns at YoungMinds.

The launch of the YoungMinds campaign follows a recent report from the Children and Young People's Mental Health Coalition that claimed local authorities in England are failing to prioritise children and young people's mental health (see News, February 2014). Another charity, the Prince's Trust, has also issued a new warning about young people's mental health, especially those dealing with long-term unemployment. Among a sample of 2000 16- to 25-year-olds, the Trust identified 166 people who had been unemployed and not in education for more than six months; 40 per cent of this group faced serious symptoms of mental illness, including suicidal thoughts.

Meanwhile the Royal College of General Practitioners (RCGP) has announced that it is to make youth mental health a priority. Dr Maureen Baker, RCGP Chair, said her organisation is proposing changes in GPs' training to better equip them to deal with common mental health problems among young people. 'The College is...recommending that in future, as part of an enhanced four-year training programme, all GP trainees should receive specialist-led training in both child health and mental health'. **CJ**

FUNDING NEWS

The Department for International Development (DFID) and the ESRC have a research programme on **Education and Development: raising learning outcomes in education systems in developing countries**.

The current call is focused on the theme 'effective teaching'. Three different types of grant can be applied for; small grants/pilot projects (up to £150,000 for one year), medium grants (between £200,000 and £500,000 for two to three year) and large grants (up to £1 million for up to five years). Full details of the thematic and geographical focus of the programme are given in the call specification. The closing date for applications is 25 March 2014.

tinyurl.com/qdjnun6

The National Institute for Health Research invites application for research into:

- ▮ **Relapse prevention interventions for smoking cessation:** interventions to prevent relapse and enhance quit rates, including enhanced behavioural support and pharmacotherapy
- ▮ **Early warning signs of relapse in schizophrenia:** how feasible is a study to investigate the clinical and cost-effectiveness of an intervention to recognise and promptly manage the early warning signs of recurrence in schizophrenia with the aim of preventing relapse

Both research topics have been identified as opportunities for collaboration between Australia's National Health and Medical Research Council and the UK NIHR, and joint applications can be made. The closing date for applications for both topics is 8 May 2014.

tinyurl.com/mtuvd7w

The Waterloo Foundation, under its Child Development Fund, has funding of up to £50,000 for research into **child development factors under parents' influence, such diet, sleep and parenting behaviours**. The Foundation is particularly interested in research that explores the co-occurrence of different developmental deficits and that finds ways to assist parents to alleviate these. There is also an expectation that researchers will plan to widely disseminate their research findings. The closing date for applications is 4 July 2014.

tinyurl.com/pcpz4ea

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

Queens under threat from Kings

An analysis of girls' performances in 12 US school chess tournaments has found they tend to underperform when playing against boys. The researchers Hank Rothgerber and Katie Wolsiefer believe this is the first real-life demonstration in children of a phenomenon known as 'stereotype threat'. This is when a person fears their performance will be used to bolster stereotypes about their social group. This fear then undermines their performance.

Most examples of stereotype threat have been demonstrated in social psychology labs. This has led to concerns that the phenomenon may not be so relevant in real life, especially since some studies of real exam grades have failed to reveal any evidence of the effect.

Rothgerber and Wolsiefer first surveyed 77 female school chess players and found they were familiar with the stereotype that men are better at chess than women (a stereotype reflected in the fact that there is only one woman, Judit Polgár, in the world's top 100 chess players). Next, the researchers analysed the outcomes of chess matches played by 219 girls (aged 5 to 15) in 12 tournaments rated by the United States Chess Federation. These official tournaments provide a pre-rating for each player based on their past performances, and a post-rating adjusted in line with their tournament performance. For comparison, the outcomes of tournament matches played by 195 boys were analysed.

The girls lost more often to boys than they should have done given their and their opponents' prior skill ratings. Overall, they performed at 83 per cent of their expected success rate when playing boys. 'Evidence of stereotype threat among young children, then, cannot be dismissed merely as an artefact of, or limited to experimental paradigms', the researchers said.

Girls particularly underperformed (relative to their skill rating) when playing a male opponent with a higher rating than them (in this case they performed at 56 per cent of what was expected of them, on average); and when playing an older boy (managing an average of 73 per cent of their expected success). Younger girls were more susceptible than older girls to underperformance against boys. In contrast, there was no evidence of underperformance among the boys; in fact they often exceeded expectations.

'This reinforces our interpretation that there is something specific to the interaction between female and male competitors that produced these performance deficits in females,' said Rothgerber and Wolsiefer.

The researchers' interpretation was supported by their further analysis of the girls' participation in future tournaments. Those who underperformed more against boys in the initial analysis tended to participate in fewer future tournaments during the ensuing year, consistent with the idea that stereotype threat can encourage people to disengage from an activity when they feel threatened. This argument is made stronger by the fact that for the most part, males who did worse when playing other males did not disengage from chess any more than males whose performance exceeded expectations.

Rothgerber and Wolsiefer said their results suggest interventions to combat stereotype threat are needed at an early age. In the context of girls playing chess, they said possible remedies include providing female role models and reframing the game as a problem-solving activity.

'Whatever the method of intervention, the findings indicate that for females to fully experience the cognitive and emotional benefits of chess, the earlier the intervention, the better', they concluded.



In Group Processes and Intergroup Relations



How being happy changes your personality

In the Journal of Personality

Outgoing, conscientious, friendly people who are open to new experiences tend to be happier than those who are more shy, unadventurous, neurotic and unfriendly. It's easy to imagine why this might be so. Barely studied before now, however, is the possibility that being happy could also alter your future personality.

Christopher Soto has conducted the first thorough study of this question. He analysed personality and well-being results for 16,367 Australians surveyed repeatedly between 2005 and 2009. He was curious to see whether personality measures at the study start were associated with particular patterns of well-being later on, and vice versa.

Soto replicated past findings for the influence of personality on well-being. But more exciting is that he found higher well-being at the study start was associated with various changes to personality. Happy people tended to become more agreeable, conscientious, emotionally stable and introverted over time. This last finding – higher well-being leading to more introversion – was opposite to what was expected, given that higher extraversion usually leads to future happiness. Soto isn't sure of the reason happier people appear to become more introverted, but he speculated it may be because they no longer need to seek out new relationships.

Looking at the size of the



You can't tickle yourself, even if you swap bodies

In *Consciousness and Cognition*

relationships between well-being and personality and vice versa over time, Soto said that both were pervasive and important but the influence of personality on well-being was 'somewhat stronger'. In both cases, the associations were modest, but Soto said we shouldn't assume they are unimportant. Any observed links are likely to be underestimated and will accumulate over time. 'Even small changes to an individual's personality traits or subjective well-being can have important consequences for the course of his or her life', Soto said.

The study has some limitations – it relied on participants' reports of their own personality and well-being (this included measures of life satisfaction; positive and negative affect). Despite the longitudinal design, it's also possible that unknown factors played a causal role, and that the mutual links between personality and well-being are correlational rather than causal. Assuming that well-being really does cause changes in personality, future research is needed to explore what the underlying mechanisms might be.

'These findings challenge the common assumption that associations of personality traits with subjective well-being are entirely, or almost entirely, due to trait influences on well-being' said Soto. 'They support the alternative hypothesis that personality traits and well-being aspects reciprocally influence each other over time.'

A popular, long-standing theory to explain the simple fact that we can't tickle ourselves is that it results from the way the brain cancels out sensations caused by its own movements. To do this, the theory states, the brain uses the motor command underlying a given action to make a prediction of the likely sensory consequences of that action. When incoming sensory information matches the prediction, it's recognised as self-generated and cancelled.

If this explanation is true, then any situations that confuse the brain's ability to predict the sensory consequences of its own actions should scupper the sensory cancellation process, thereby making self-tickling a possibility. George Van Doorn and his colleagues put this principle to the test. They measured the potential for self-tickling in 23 participants who underwent a body-swap illusion.

The experimental setup involved each participant sitting opposite the experimenter. The participant wore a pair of goggles that displayed a video feed from a camera that was either placed forward-facing on the participant's own head or forward-facing on the experimenter's head, the latter giving a view from the experimenter's perspective and provoking a body-swap illusion.

During both of these camera arrangements, the participant and experimenter each held one end of a wooden rod with foam at each end. The participant either moved the rod with their right hand, causing the foam to rub against their own left palm

(potentially causing self-tickling), and the experimenter's left palm. Or, the experimenter moved the rod, causing the foam to rub against the participant's left palm (i.e. potential for tickling by another person) and his own left palm.

During the body-swap illusion, the participants said they felt the sensation of the foam, not where their real hand was, but at the position of the experimenter's hand. Given the illusion, they perceived this to be their own hand, even though it looked like someone else's.

Crucially, even in this strange situation, participants were still unable to tickle themselves if they were the ones moving the rod (they felt the foam, but it didn't tickle). They felt much more of tickling sensation when it was the experimenter moving the rod.

The classic theory for why we can't tickle ourselves is unable to explain why tickling is still not possible in such

contexts when the brain's ability to predict the sensory outcomes of its actions is thrown into disarray. Moreover, self-tickling was still not experienced even in variations of the experimental setup, in which the body-swap illusion was combined with the 'rubber hand illusion' and the movement of the foam was felt in a baseball bat viewed from the experimenter's perspective!

Van Doorn and colleagues said their findings are consistent with an alternative neuroscience theory that's gaining currency. This 'active inference' theory states that self-generated movements cause non-specific suppression of sensory input, regardless of the accuracy of predictions of the consequences of the movements.

The researchers concluded: 'We asked "can you tickle yourself if you swap bodies with someone else?" The short answer is "no".'

I For more on body illusions, see p.176



The material in this section is taken from the Society's **Research Digest** blog at www.researchdigest.org.uk/blog, and is written by its editor **Dr Christian Jarrett**. Visit the blog for full coverage including references and links, additional current reports, an archive, comment and more.



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