

Pandora searches the world literature for evidence, news and other sources on matters of interest (doesn't shy away from controversy) to bring to the reader. She welcomes comments and suggestions (via [ip@rcpsych.ac.uk](mailto:ip@rcpsych.ac.uk))

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### Our Neanderthal genes

Pandora remains fascinated with our Neanderthal ancestors and, fortunately, so are the scientists! Although contact with humans didn't help their survival, evidence that some of the Neanderthal DNA has survived in us is increasing. These Neanderthal genes have not only contributed to our visuospatial ability, as discussed in the last issue of *Pandora's Box*, they also have a role in many other human characteristics.

Using baseline phenotypes collected for 112 000 individuals by the UK Biobank, researchers from the Max Planck Institute found that Neanderthal DNA affects our skin tone, hair colour and height. Some of the Neanderthal alleles contribute to lighter and others to darker skin and hair in modern Europeans, which suggests that the Neanderthals also had variable hair and skin tone. But their influence on us doesn't stop there. Neanderthal DNA can also influence our sleep patterns and our mood. All these traits are attributed to adaptation to lower and variable sun exposure over the thousands of years the Neanderthals lived in Eurasia prior to the arrival of humans from Africa 100 000 years ago.

Dannemann M. & Kelso J. (2017) The contribution of Neanderthals to phenotypic variation in modern humans. *American Journal of Human Genetics*, 101(4), 578–589.

### Can we stop ourselves growing old?

Growing old is a natural process, yet we humans try so hard to stop the clock ticking. We change our appearance with aesthetic surgery, improve our health with good nutrition and exercise (well a few of us do!), and treat with increasing success a number of illnesses that can kill us; but can we really stop or reverse the physiological process of ageing?

### Yes, we can say scientists!

Researchers from New South Wales claim a discovery that could actually reverse the ageing process. Our cells' ability to repair themselves is slowed down by increasing age and radiation. Experimenting on mice, which they exposed to radiation, they discovered a critical step in the molecular process that allows cells to repair damaged DNA. This concerns the metabolite  $NAD^+$ , which is present normally in every cell of our body, where its key role is to regulate protein interactions that control DNA repair.

Treating mice with this agent, 'the cells of the old mice were indistinguishable from those of the young mice, after just one week of treatment', claim the researchers. A clinical trial is to start shortly, and apparently NASA is interested in these findings as part of their plans to send humans to Mars! In case you didn't know, cosmic radiation accelerates ageing in astronauts.

Li J., Bonkowski M. S., Moniot S., et al (2017) A conserved NAD binding pocket that regulates protein-protein interactions during aging. *Science*, 355(6331), 1312–1317.

### Oh no we cannot, say other scientists!

Stopping ourselves growing old is impossible, claim scientists from Arizona. They dispute theories that attribute ageing to a failure of selection, which allow for the possibility that if senescence-causing alleles are identified we may be able to delay the process of growing old.

Focusing on the role of intercellular competition within an organism, selection between somatic cells may delay ageing by getting rid of non-functioning cells. However, they claim, ageing does not depend only on the functional capacity of individual cells, but also on how well cells work together. So, while intercellular competition selects to get rid of non-functional cells, it may also select to keep cells that do not cooperate. Does that sound like our selection of politicians? Well, back to science. Researchers conclude that intercellular competition creates an 'inescapable double bind that makes ageing inevitable in multicellular organisms'. We continue to grow old and weak because our cells, like us, cannot work together to the common good!

Nelson P. & Masei J. (2017) Intercellular competition and the inevitability of multicellular aging. *PNAS*, 114(49), 12982–12987.

If the previous chat didn't depress you enough, here is some more! Is it worth striving for longevity for our progeny and ourselves if our world, as we know it, is to become extinct in just over 80 years?

### The sixth mass world extinction due in 2100

Our world has been witness to five 'mass extinction events' in the past 550 million years, each one taking millions of years to occur. Scientists believe these to be due to the 'cycling of carbon'. All of the mass extinction events happened after an upheaval of the carbon cycling between the atmosphere and the oceans.

Analysing the significant changes over the millions of years, researchers were able to determine a threshold of catastrophe to the carbon cycle. Beyond this limit, enough instability can occur to lead to mass extinction. It is estimated that 310 gigatons of carbon need to be added for a mass catastrophe to occur. Should we worry? Scientists have worked out, based on the current carbon emission rates, that the year 2100 may mark the demise of our global community!

The tragedy is that it will be our fault. The ecologists have been warning us for years, but do we believe the evidence?

Rothman D. H. (2017) Thresholds of catastrophe in the Earth system. *Science Advances*, 3(9), e1700906.

### How dogmatic can you be?

We have already talked in previous issues of the journal about some of the science behind why so many of us are so sure of our beliefs and cannot change our minds despite irrefutable evidence to the contrary.

The previous study focused on the rigidity with which some of us hold political views, while this one examines religious and non-religious dogmatism. Examining the personality characteristics which are thought to drive religious and non-religious dogmatism, in 900 individuals, researchers found similarities as well as important differences between the two groups. Higher critical reasoning was associated with less dogmatism in both religious and non-religious groups. The more dogmatic they were, whether religious or non-religious, the less likely they were to consider the perspectives of others. However, the religious people differed in how moral concern influenced the rigidity of their thinking. The religious, say the authors 'may cling to certain beliefs, especially those at odds with analytical thinking, because those beliefs resonate with their moral sentiments and this affirms their beliefs'.

In previous work, they identified two brain networks, one for empathy and one for analytic thinking, which are in tension with each other. Our thought processes move between the two, choosing the appropriate network for the issue under consideration. In the religious dogmatist's mind the empathetic network dominates, while in the non-religious dogmatist's mind the analytic network takes over.

Dogmatism is not restricted to religion. In healthy people, it applies to beliefs and opinions about politics, diet (vegan, vegetarian or carnivorous), climate and other ecological matters, and more.

Friedman J. P. & Jack A. I. (2017) What makes you so sure? Dogmatism, fundamentalism, analytic thinking, perspective taking and moral concern in the religious and nonreligious. *Journal of Religion and Health*, DOI: 10.1007/s10943-017-0433-x.

### ***Nationalism, populism and feeling disadvantaged***

Nationalism and populism appear to be on the increase but what does this mean? Three studies in different parts of the world (Warsaw, Poland; Kent, UK; and Maryland, USA) found that 'national collective narcissism', which is an unrealistic belief in the greatness of the nation, is linked to support for populism. In the UK study, collective narcissism predicted support for Brexit; in the US study, it predicted support for Donald Trump; and in the Polish study, it predicted support for the populist Law and Justice Party.

These associations were present even when controlling for conventional national identification. Importantly, the researchers also found that collective narcissism was increased in groups that felt disadvantaged in their country. The researchers suggest that narcissistic beliefs in the nation's greatness are a way to compensate for feeling worse off than other groups. Populist politicians fuel the narrative of relative disadvantage, and this reinforces national narcissistic beliefs and prejudices against other groups such as immigrants.

Marchlewska M., Cichocka A., Panayiotou O., et al (2017) Populism as identity politics: perceived in-group disadvantage, collective narcissism, and support for populism. *Social Psychological and Personality Science*, DOI:10.1177/1948550617732393.

### ***If all this has upset you, talk to yourself – but make sure you do it in the third person***

Some of you may do this already. If so, you'll be pleased to know that there is scientific evidence it works! Researchers asked participants in two studies to reflect on feelings, using 'I' or their name, while viewing aversive images and having their neural activity measured with ERPs (event-related potentials) in study 1, and recalling negative personal memories while undergoing brain neuroimaging (functional magnetic resonance imaging; fMRI) in study 2.

The researchers demonstrated that, when talking to themselves in the third person, subjects reduced their emotional reactivity as measured by ERP on viewing aversive images, while those who reflected on negative memories showed no increase in brain activity on fMRI markers of cognitive control. Furthermore, measurements of participants' effort-related brain activity showed that talking to themselves in the third person required no more effort than talking to themselves in the first person.

This is what one would call self-therapy: effective, free of charge, practical and discreet (as long as you talk to yourself in private or quietly!)

Moser J. S., Dougherty A., Mattson W. I., et al (2017) Third-person self-talk facilitates emotion regulation without engaging cognitive control: converging evidence from ERP and fMRI. *Scientific Reports*, 7 (1), 4519.

### ***Are we really as politically correct as we claim? Our brains say no!***

You are shown a film where one sister refuses to donate an organ to the other who has been diagnosed with cancer. How would you react? A study examined the reactions of women who were told either that the sisters were biological siblings or that the younger sister was adopted to the family as an infant. They were asked how they felt about the sister's refusal to be a donor, while they were undergoing neuroimaging of their brains.

Ninety per cent of the participants responded that there should not be any difference in the decision to donate an organ to the sick sister, irrespective of whether the sisters were genetically related. However, their brains responded differently to this moral question. There were significantly stronger correlations in areas of the brain associated with emotional conflict regulation, decision-making and mentalising (insula, cingulate, medial and lateral prefrontal, superior temporal and superior parietal cortices) when the participants believed that the sisters were genetically related. It suggests that we do put those like us first!

Bacha-Trams M., Glerean E., Dunbar R., et al (2017) Differential inter-subject correlation of brain activity when kinship is a variable in moral dilemma. *Scientific Reports*, 7(1), 14244.