

## References

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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))



### *Oenophiles beware*

If you believe that the price of your wine determines its quality, think again – your brain may be tricking you into thinking it tastes better. Researchers at Michigan State University demonstrated that the higher price creates the expectation that the quality (taste) will be better and this has a neurobiological basis. They carried out a wine-tasting session during which people were asked to taste a number of wine samples while undergoing brain functional magnetic resonance imaging (fMRI). Each sample tasting was preceded by information about the wine's price. The participants rated the pricier samples as tastier but, unbeknown to them, all samples were of the same wine! Their fMRI showed higher activation of the medial prefrontal cortex and also the ventral striatum when prices were higher. The authors conclude that the medial prefrontal cortex is involved in integrating the price comparison and thus the expectation into the evaluation of the wine. The ventral striatum, which forms the reward and motivation system, is significantly more activated with higher prices and it heightens the taste experience.

Schmidt, L., Skvortsova, V., Kullen, C., *et al* (2017) How context alters value: the brain's valuation and affective regulation system link price cues to experienced taste pleasantness. *Scientific Reports*, <https://doi.org/10.1038/s41598-017-08080-0>.

### *Expressing your worries in writing cools your brain*

Many of us are chronic worriers and go to pieces when faced with a stressful task. Rather than reaching for a diazepam tablet, write down your feelings, say psychologists from Michigan. It is known that error-related negativity (ERN) immediately after errors is larger in people with anxiety. In a study of college students who were identified as chronically anxious, participants were asked to complete a computer-based task which measured their response accuracy and reaction times while undergoing electroencephalography (EEG). Half the students were asked to write down their inner thoughts and feelings about the upcoming test, for 8 minutes before the task, and the other half to write about what they did the previous day. Both groups performed at the same level for speed and accuracy but the students from the expressive writing group performed the test more efficiently,

in that they used fewer brain resources, with their ERN reduced. Expressive writing is known to help people deal with past traumas or stressful events and the authors argue that this simple technique can also help people, and particularly worriers, prepare for stressful tasks and to perform them with 'a cooler head', preventing burnout.

Schroder, H. S., Moran, T. P. & Moser, J. S. (2017) The effect of expressive writing on the error-related negativity among individuals with chronic worry. *Psychophysiology*, <https://doi.org/10.1111/psyp.12990>.

### *Eating as your biological night kicks in can make you fat*

Obesity is an increasing problem. Bad diet and sedentary lifestyles are the known main culprits but a recent study implicates circadian rhythm. Circadian rhythms govern diurnal variations in important physiological functions (body temperature, heart rate, blood pressure, some hormones) and have been linked to mood disorder.

Researchers examined the relationship between the timing of food consumption and the clock hour and endogenous circadian time, content of food intake and body composition. They recruited 110 participants with average age 20 in a 30-day cross-sectional study documenting sleep and circadian behaviours within their daily routine. They found that those with high body fat consumed more of their calories 1 hour closer to the melatonin onset (which signals the beginning of the biological night) compared with those with low body fat. The lesson is that if you want to stay lean, don't mess with your biological clock: have your meals earlier in the day but also eat less and exercise more!

McHill, A. W., Phillips, A. J. K., Czeisler, C., *et al* (2017) Later circadian timing of food intake is associated with increased body fat. *American Journal of Clinical Nutrition*, <https://doi.org/10.3945/ajcn.117.161588>.

### *The Neanderthal in us*

Before becoming extinct 40 000 years ago, Neanderthals interbred with our human ancestors during their primordial migration from Africa, leaving some of their DNA in us. The Neanderthals had highly developed visuospatial skills and relied less on social activities. The extent of inheritance of their genes influences the development of our brains. Researchers from the National Institute for Mental Health (NIMH) reported in 2012 that

in Williams syndrome, an autism-related, rare genetic condition, the genetic variation shapes the structure and function of the insula in the brain and the phenotype manifests with visuospatial impairment and excessive sociability (i.e. the opposite of what it is hypothesised would be typical of the Neanderthals).

The researchers measured the amount of Neanderthal gene variants in 221 people of European ancestry, from the NIMH Sibling Study of Schizophrenia Risk, and also skull and brain structure using MRI. As a validation of their approach they showed that a greater load of Neanderthal-derived genetic variants (higher 'NeanderScore') is associated with skull shapes resembling those of Neanderthal fossilised skulls, particularly in the occipital and parietal areas. They found a positive correlation between the NeanderScore and measurements of the grey- and white-matter volume, sulcal depth, and gyrification index) localised in the visual cortex and intraparietal sulcus. The more of the Neanderthal gene variants we have, the better our visuospatial functions are. Unfortunately, this is at the expense of the development of our social brain areas.

Gregory, M. D., Kippenhan, J. S., Eisenberg, D. P., *et al* (2017) Neanderthal-derived genetic variation shapes modern human cranium and brain. *Scientific Reports*, <https://doi.org/10.1038/s41598-017-06587-0>.

### **Can we choose between spreading our genes and living longer, healthier lives?**

As we grow old our brains progressively undergo neurodegenerative changes and our bodies waste away with progressive sarcopenia. The mechanism responsible for these processes remains unclear. The most plausible explanation of ageing, given by George C. Williams in 1953, is the 'antagonistic pleiotropy theory'. He proposed that the Darwinian natural selection process favours genes that promote reproductive success, even at the expense of longevity; the premise is that a gene mutation that results in more offspring but shortens life is nonetheless good. Such gene mutations are indeed actively selected.

This explanation had remained theoretical but now researchers from Gutenberg University Mainz have found evidence to support it. They investigated genes mediating autophagy, a catabolic process which causes cellular degradation of cytoplasmic components and is crucial for survival, promoting health and fitness in the young, but also ageing in later life. It is a form of active recycling of our cells, which unfortunately slows down with ageing. The authors of the study were able to identify 30 novel gene regulators of post-reproductive longevity and they showed that shutting these down led to a 50% increase in longevity! Very importantly, they were able to identify the neurons as the source of pro-longevity signals. Inactivating autophagy in the neurons of old worms (yes, all this work was done in worms!) not only prolonged life but also dramatically improved their total health.

We already live long enough, you may quite rightly argue. The possible benefit of this research

is in the treatment of devastating degenerative disorders such as Alzheimer's and Parkinson's disease.

Wilhelm, T., Byrne, J., Medina, R., *et al* (2017) Neuronal inhibition of the autophagy nucleation complex extends life span in post-reproductive *C. elegans*. *Genes and Development*, <https://doi.org/10.1101/gad.301648.117>.

### **'Strictly dancing' into health**

As we grow old our balance and cognitive functions get worse. But all is not lost! Despite ageing, our brains retain the capacity for neuroplasticity and some areas of the brain are better at this than others. The hippocampus, a brain region responsible for memory consolidation, learning and navigation in space, increases in volume with improvements in aerobic fitness. In addition, there is a positive correlation between the volume of the left hippocampus and balance performance.

A recent study compared the effects of dancing with those of standard health fitness training on the volume of the hippocampus (mainly the left hippocampus, CA1, CA2 and subiculum, measured using MRI) and balance ability (using the Sensory Organisation Test) in people with an average age of 68 years. Over 18 months both interventions produced increases in the volume of the brain areas studied but only those in the dancing group achieved an improvement in balancing ability.

Being able to shut down our autophagy genes may be a long way away but it is never too late to start dancing!

Rehfeld, K., Müller, P., Aye, N., *et al* (2017) Dancing or fitness sport? The effects of two training programs on hippocampal plasticity and balance abilities in healthy seniors. *Frontiers in Human Neuroscience*, <https://doi.org/10.3389/fnhum.2017.00305>.

### **Drink coffee, live longer**

Pandora has previously exalted the merits of coffee but there is more to come! Researchers analysed data from over half a million people in ten member states of the European Union participating in the European Prospective Investigation into Cancer and Nutrition Study and found that drinking coffee was associated with better liver function and immune response. The risk of death from all causes, particularly digestive and circulatory diseases, was reduced in coffee drinkers. The health benefits of moderate coffee drinking is in keeping with previous research findings. Coffee drinkers and coffee growers rejoice!

Gunter, M. J., Murphy, N., Cross, A. J., *et al* (2017) Coffee drinking and mortality in 10 European countries. *Annals of Internal Medicine*, <https://doi.org/10.7326/M16-2945>.

### **Erratum**

For the article 'Listening to silence – trauma and recovery in post-golpe Chile' in the May 2017 issue of *BJPsych International* (vol. 14, no. 2) the affiliation for the author, Lindsey Kent, was wrongly given on page 46. It should read 'Academic path foundation doctor, Salford Royal NHS Foundation Trust, Salford, UK'.