

## Kaleidoscope

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**Social inclusion has to be a key aim for any mental health service, but there are specific difficulties in measuring this in several marginalised groups.** Writing in the *Lancet*, Aldridge *et al*<sup>1</sup> systematically reviewed morbidity data for four particularly vulnerable groups, from high-income countries, where the degree of social exclusion meant that they are not adequately accounted for in standard health inequity work: the homeless, individuals with substance use disorders, sex workers and imprisoned individuals. It will not surprise you that their all-cause mortality rates were significantly increased, but the figures for standardised mortality ratios were a shocking 11.86 for women and 7.88 for men, considerably exceeding those from prior studies. This excess mortality is described as ‘extreme’, and contrasted with the mortality rates for those living in the most deprived areas of England and Wales, which were 2.1–2.8 times those in the least deprived. Infectious diseases – notably hepatitis C and B – were rampant, with elevated rates of cardiorespiratory and mental illness. There was considerable heterogeneity across studies, but the enormous health inequality was clear, particularly for women.

What can be done? Michael Marmot suggests<sup>2</sup> that ‘not only is the social gradient in health appropriate to study but we have made progress both in understanding its causes and what can be done to address them’. Social causation underpins the inequity; social action, supported by evidence, is required. He quotes the words of Martin Luther King Jr.: ‘I believe that unarmed truth and unconditional love will have the final word in reality. That is why right, temporarily defeated, is stronger than evil triumphant’.

**The US opioid epidemic is truly frightening – over 33 000 deaths in 2015 – with anxieties that this may now cross the Atlantic.** Writing in the *New England Journal of Medicine*, Rutkow & Vernick<sup>3</sup> discuss potential strategies. In October, President Trump declared it a national public health emergency, but the specific choice of declaration used did not release the funding and resources for which many had hoped, and individual US states are considering additional efforts and emergency powers. Improved access to the opioid antagonist naloxone – including pharmacy dispensing without prescriptions and training police officers in its administration – is a key consideration by some, and there are calls to widen this further to include distribution to schools and other such facilities. Although there are differences between doctors’ and health services’ practices in the USA and other countries, prescribed opioid pain relievers ‘only’ account for half, and the rest are deaths from illicit drug use. The UK already has a relatively high use of heroin compared with our European neighbours; the novel opioid synthetics such as fentanyl derivatives are now on their way.

**Treating negative symptoms of psychosis is difficult and the evidence base for pharmacotherapy and psychological interventions is contradictory.** Cognitive remediation therapy (CRT) targets the cognitive deficits (for example memory and executive functioning) that significantly impact recovery, performance in employment and social functioning. CRT is an umbrella term for a group of therapies, and one specific instance is integrative neurocognitive therapy (INT), described by Mueller *et al*<sup>4</sup> as a group-therapy approach delivered in four modules addressing neuro- and social-cognitive domains. A sequence of education, coping-skills training, skills practice and then *in-vivo* exercises are used in each module. In this study, 61 out-patients with schizophrenia, all on antipsychotic

medication and with prominent negative symptoms, were randomised to either INT for 15 weeks (biweekly 90 min sessions) or treatment as usual (TAU). All participants were followed up at the end of therapy as well as 1 year after baseline assessment, including measures of cognitive performance, psychopathology and Global Assessment of Function (GAF).

For total negative symptom burden, 54.2% of patients in the INT group and 26.8% of patients in the TAU group were in remission at 3 months (i.e. the end of therapy) but this statistically significant difference diminished at 1-year follow-up. In line with the hypothesis that negative symptoms predict poorer functional outcomes, the GAF was also significantly different between the INT and TAU groups (Cohen’s  $d = 0.50$ ,  $P = 0.02$ ). However, none of the cognitive performance measures showed statistically significant differences. The authors note that the group setting may be reinforcing the effects of INT on spontaneity and GAF, and that the Positive and Negative Symptom Scale may be too blunt a tool to properly dissect severe negative symptoms in schizophrenia. They conclude by suggesting integrating INT with other psychosocial and psychological interventions that have shown promise in remitting negative symptoms.

**William Arthur Ward wrote ‘The pessimist complains about the wind. The optimist expects it to change. The realist adjusts the sails’.** By analogy, in the search for a parsimonious scientific account of schizophrenia, one could say the pessimist doubts the validity of the diagnosis, the optimist really does believe biomarkers exist (they are just hiding from view), and the realist...well, they keep adjusting where in the organism the pathology resides. Birnbaum & Weinberger<sup>5</sup> provide a new synthesis of the current literature on neurodevelopment, genetics and the pathogenesis of schizophrenia. They begin by highlighting early enthusiasm for what they describe as low-hanging fruit: a single genetic cause (chromosome 5), promising yet conflicting results from *in-vivo* neuroimaging (for example cortical volume reduction) as compared with post-mortem findings (such as lack of distinct cytopathological findings) and the continuing debate over neuroinflammatory explanations. The overarching theme of neurodevelopmental trajectory and ‘insults’ during brain maturation are given a brief treatment, noting that early evidence was, at best, circumstantial.

In reviewing genome-wide associated studies, they note that even in the largest study of single-nucleotide polymorphisms to date, 108 identified loci are associated with an at best modest risk for schizophrenia with an odds ratio of less than 1.3, and the additive effect of these individual small effect-size risk alleles still accounts for only 7% of the variance in the studied populations. Evidence from rare copy number variation studies suggests loci for schizophrenia are shared with other of the neurodevelopmental disorders, hinting at a continuum. Most genome-wide studies reveal loci not associated with protein coding, suggesting an epigenetic mode of action in the development of the disorder. They conclude by adjusting the sails: transcriptomics – to track the ‘online activity’ of genes throughout neurodevelopment – combined with a theory that common ‘core’ genetics may underlie many neuropsychiatric syndromes but manifest differently (for example as schizophrenia, bipolar disorder, attention-deficit hyperactivity disorder) depending on the biological noise added to the trajectory during specific developmental periods (prenatal, early infancy, childhood and adolescence).

**From pessimist to optimist to realist redux: have you ever considered yourself a professional failure?** If you have, you are not alone. LaDonna and colleagues<sup>6</sup> interviewed 28 Canadian physicians about their experiences and perceptions of underperformance. Most spontaneously identified the so-called ‘imposter syndrome’ – wherein even earned scholastic and professional attainment

does not lead to a personal sense of success – and many, even those with well-developed careers, doubted the validity of their accomplishments. Career progression was caustically noted as ‘rising to the level of your incompetence’. Tellingly – and we suspect all readers will relate – participants very rarely shared their self-doubts with colleagues. November’s *British Journal of Psychiatry* reported on the high rates of burnout in medicine, and recurring feelings of inadequacy have been linked to this. Professional interventions tend to be focused on doctors whom others are deeming to be struggling or underperforming: these data highlight that such feelings are occurring in most of us, even when we are externally seemingly competent. The authors note how even positive feedback did not hugely challenge individuals’ insecurities. Every day we try so very hard to do our best in such very difficult circumstances, and no one is tougher on us than we are on ourselves.

**Troy McClure warbled ‘I hate every ape I see, from chimpan-A to chimpanzee’, but we have much to learn from *Pan troglodytes*.** An advanced theory of mind and complex communication are two of *Homo sapiens*’ most defining features, and anthropology has tried to unpick their evolution in hominins and hominds. Primate studies have shown that monkeys will call out in alarm more vigorously as threats get closer to a group, showing that they are anticipating the overall level of risk to others, but it had been less clear how well they understood the signal receiver’s mental state. Crockford *et al*<sup>7</sup> tested how wild chimpanzees, upon seeing a model snake, called to others depending on whether or not simulated responders had previously emitted ‘snake-calls’ (indicating knowledge or ignorance or a potential hazard). Those examined displayed significantly greater vocal and non-vocal signalling when they had not heard prior snake-calls, inferring that they could take the perspective of another’s state of mind and knowledge level, recognising that the receiver was not aware of the danger. As the authors note, complex signalling and social cognition show signs of emergence in hominoid lineages before more advanced aspects such as syntax.

Phobias and compulsive behaviours are sometimes explained as problematic remnants of evolutionary sensible avoidance behaviour. An example of such a behaviour is the need to avoid potential biological contaminants such as blood and faecal matter, which commonly – adaptively – evoke disgust. Testing their phylogeny, Sarabian *et al*<sup>8</sup> exposed chimpanzees to faeces, blood and semen via visual, olfactory and sensory modalities. They found that these potential biological contaminants led to increased latencies – and some outright refusals – to feeding, and behavioural attempts to maintain distance from these materials. The data are consistent with the parasite avoidance theory of disgust, although of course linking this to later psychopathology remains a speculation. As Troy realised, ‘You’ve finally made a monkey out of me’.

**Finally, have you ever seen a ghost? We suspect not, but what underpins belief in the supernatural?** So-called ‘agency detection’ has been a hot topic in cognitive science of paranormal beliefs: it had been postulated that false detection of the unearthly strengthens one’s beliefs, and indeed some have proposed this very human predisposition explains the universal emergence of religion in human cultures. In a mesmerising work, Anderson *et al*<sup>9</sup> test this with a novel virtual reality forest, with participants told to see if they could detect beings within it, though none were actually present. Both high- and low-sensory reliability visual models were used, illustrated in the paper as, respectively, the forest in clear weather and, a rather atmospheric darker misty forest. As might be expected, there was a greater false detection rate of beings in the low-sensory reliability setting, but fascinatingly the role of the sensory environment was much less important than individuals’ prior expectations. Those who anticipated seeing more beings, from prompting by the research team, indeed ‘found’ them, whereas those expecting a low probability of such encounters did not. The cognitive science of religion has primarily posited that detection of the preternatural strengthens faith; here the authors propose it is the other way around – teachings produce expectations, and expectations lead to detection. It raises an interesting question about how one might use this in doctor–patient interactions for patient benefit. As Fox Mulder attested, I want to believe.

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- 7 Crockford C, Wittig RM, Zuberbühler K. Vocalizing in chimpanzees is influenced by social-cognitive processes. *Sci Adv* 2017; **3**: e1701742.
- 8 Sarabian C, Ngoubangoye B, MacIntosh AJ. Avoidance of biological contaminants through sight, smell and touch in chimpanzees. *R Soc Open Sci* 2017; **4**: 170968.
- 9 Anderson M, Pfeiffer T, Müller S, Schjoedt U. Agency detection in predictive minds: a virtual reality study. *Religion Brain Behav* 2017; Oct 17 (Epub ahead of print).