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Kaleidoscope

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An editorial in this month's *BJPsych* by Breedvelt *et al* (pp. 679–681) looks at the dearth of women in senior academic, clinical and managerial positions, and calls convincingly for 'unleashing talent'. We move from this position statement to the science of leadership. Although still controversial, Spearman observed that an individual's performance on a set cognitive task appears to generalise to others – the 'g factor' measure of general intellectual ability. Woolley *et al* tested[1] whether a similar measure – 'collective intelligence' – could be found for teams. First, they assigned participants to 40 groups of 3 people, and, having measured each individual's intelligence, administered tasks that tapped into different group dynamic properties. Then, at the end, each person individually played checkers against a standardised computer opponent. Factor analysis of the teams' scores showed that – just as for the g factor – the first component of test performance explained 43% of the variance, which was labelled the 'c factor'. It was predictive of individuals' performance at checkers but, importantly, the average and maximum intelligence scores of individuals were not correlated with the team's c factor. A regression analysis quantified directions of these effects; using the performance of individuals on the checkers task as a response variable, only the c factor – but not average or maximum individual intelligence – was positively associated with performance on the checkers task. The authors then tried a similar experiment (but containing additional tasks), varying the group size from 3 to 5 members and including 152 groups; similar analyses confirmed the previous results. An obvious question, then, was: what makes a good team? They examined a number of properties of the people in each group and the team itself, including team cohesion, motivation and satisfaction. None of these explained the variance in the group c factors. However, a striking result was that teams with dominant members (measured by turn-taking during the tasks) had *lower* c factor scores, and teams with more women in them had *higher* c factor scores. Leadership is involving others and, the authors note, may also be mediated by those same teams having people with high social sensitivity scores.

Outcomes in the depressions are heterogeneous, reflecting complex interplays of genes and environment. Rush and Thase[2] ask how we can nevertheless improve things, sidestepping these *GxE* debates, to equally important – and modifiable – factors. The influential STAR*D study identified some disheartening figures: 10–15% of patients do not return for treatment after an initial secondary care assessment; 20–35% do not complete a first phase intervention; a further 20–50% will not complete six months of continuation treatment; and, finally, of those who do continue care, about half show poor adherence. Disappointing, but surely therein lies our great opportunity. Rush and Thase highlight how we lack a systematic and consensual framework for tackling what they label 'these four major challenges' – the problem being that much of our research focus remains upstream at the *GxE* level. They propose a model that encompasses psychoeducation, cognitive and behavioural aspects, and the interpersonal relationship with the clinician. Shared decision-making, clarifying treatment goals and expectations, and collaboratively engaging the individual in driving their care plans sit at its heart. This is all surely the art of being a psychiatrist, and not likely to shock anyone. However, the authors argue that these tend to be skills we are assumed to just identify and pick up along the path of training – perhaps it's time to apply science's lens of scrutiny to this to see how it can be optimised.

Returning to the biological, and inflammation is a hot topic (sorry). We've been aware for some time that inflammatory markers can be askew in a number of mental health conditions, and there is growing evidence that the links are causal rather than associative. In *The Lancet*, Ed Bullmore's editorial[3] gives an excellent overview of the field. Inflammatory signals can cross the blood–brain barrier through numerous mechanisms, and vagal nerve activation can produce a reciprocal anti-inflammatory signal in the body. Activation of the brain's immune system can alter neuronal functioning in numerous ways and has been shown to mimic depressive models in animal studies. An inflammatory model is also attractive in terms of mechanistically converting psychosocial stress into biological brain changes. At the clinical front end, therapeutic trial data from anti-inflammatory medications are intriguing but not yet convincing, though we're reminded that fewer than ten studies on non-steroidal anti-inflammatory drugs have so far been reported, most of which were methodologically weak. The utility of inflammatory biomarkers equally remains teasingly out of reach. Bullmore accepts that the evidential glass looks more empty than full, but one suspects he reasonably believes we have a lack of evidence rather than evidence of absence.

On to experimental testing, and the BeneMin study[4] looked at using the antibiotic minocycline in the treatment of negative symptoms of psychosis. Raised cytokine levels are a common finding in schizophrenia; minocycline has shown intriguing anti-inflammatory and neuroprotective benefits against microgliosis and apoptosis, and earlier open-label pilot work had shown promise. So the stage was set for this large double-blind randomised controlled study. Over 200 participants received either the antibiotic or placebo daily for a 12-month period. No benefits were seen either clinically or in changes to putative biomarkers. Questions persist as to whether there are sub-cohorts on a psychosis continuum who might benefit, and whether we're just targeting people too late (participants had relatively recent diagnoses, but there are data showing that cognitive symptoms may commence many years earlier). Negative data are crucial to publish and enhance our knowledge; for now, a strong novel hypothesis would be required to take minocycline out of the bin.

Sick notes: we all write them, have intermittent anxieties about them, but seldom talk about them. They can assist individuals who rightfully need time off work or need to claim for benefits or assistance, yet can place lots of challenges and pressures upon doctors. This is perhaps amplified in psychiatry, where we aspire to parity of esteem and yet many of us have at times just scribbled 'stress' upon a sick note to minimise stigma or awkward questions. Aarseth *et al*[5] label such certificates 'social actors' as they produce change (including releasing critical public resources and funds), and report on an analysis of sick notes written by general practitioners in Norway, exploring values, attitudes and language. Interestingly, in the evaluated sample, arguments based on factual medical information and effects on functioning were not to the fore. Instead, they tended to adopt a position that the reader would be sceptical and challenging, and implemented a technique to work around this. Tonally, doctors drew attention to patients' positive attributes of character, such as their motivation and 'worthiness'; stylistically, they varied from indicating the doctor's diagnostic uncertainty or limitations to pushing some responsibility to the benefit agency. The authors found that the doctors typically saw themselves as advocates for their patients, but that they were often conflicted about this. We think it's time for a parallel piece of work and discussion in the UK on this underexplored but

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important topic; current debates on the merit of 'universal credit' make it opportune.

Moving to 'well-being', a phrase almost as contemporaneously popular as 'resilience'. Does it causally improve cardiometabolic health? Wootton *et al*[6] investigated utilising subjective well-being and eleven measures of cardiometabolic health in an enormous sample of over 300 000 individuals from the UK Biobank. The availability of follow-up data allowed bidirectional causality to be tested (and avoided the observational study challenges of reverse causality and residual confounding). Increasing body mass index caused a reduction in well-being and satisfaction with health. However, no changes were seen the other way: subjectively feeling well does not have any effect on cardiovascular health. This latter negative finding is fascinating: a positive psychological outlook is good of itself, and may be associated with better health for other reasons, but it does not appear to be driving any benefits for your heart.

Meta-analyses as 'gold standard' assays of the literature have been increasingly challenged. A quick scan of the heat following Cipriani's 2018 work on antidepressants' effectiveness will give a flavour of the accusations of bias and intellectual conflict of interest skewing results. More recently, many newspapers latched on to a separate work on withdrawal effects from these medications, which was rapidly scientifically deconstructed as considerably error-laden. While publication bias in the source data can at least be quantified, intellectual conflicts of interest are harder to pin down. For example, selective inclusion/exclusion of studies and choices made during analyses can be opaque, with John Ioannidis claiming that meta-analyses can be not much more than a marketing tool in the wrong hands. So meta-analyses are no freer from bias than any other scientific work, pervading many areas of medicine, as de Vrieze[7] discusses, highlighting deworming programmes for Indian children and treatment of hepatitis C. In the case of antiviral hepatitis C treatment, a Cochrane review concluded that it was not effective because the primary outcome was reduction of mortality – elimination of the virus was considered a secondary, surrogate outcome – but the studies meta-analysed did not last long enough for the death outcome to be robustly evaluated. One solution becomes self-evident: protocols should be published in advance, data should be open for others to re-analyse, and teams with conflicting opinions should collaborate on the same work.

There's something in the air with cannabis. Rescheduled with far greater ease for prescribing and researching, ongoing development of guidelines for perplexed medics, calls for a Canadian-style decriminalisation: time for some science. The full roles of the endocannabinoid (ECB) system have yet to be fully elucidated, but it has been linked with stress processing, and the cannabinoid receptor CB1 is abundant in the amygdala, hippocampus and prefrontal cortex. Moving on from earlier rodent models, Wirz *et al*[8] put 139 human participants through a stress manipulation task before showing them pictures of varying emotional valence. Neuroimaging data showed significant differences in activity between the ventromedial prefrontal cortex – a key modulator of limbic emotional processing – and the amygdala in those with two common variants of the gene coding for the CB1 receptor, and this correlated with memory performance a day later. The ECB appears to have a role in how exogenous stress affects cognition and emotion, with some polymorphisms appearing to be more protective than others. Clinically, one of the primary proposals for cannabis-derived medicinal products is in chronic pain. There are certainly plenty of anecdotal reports from individuals that smoking cannabis has had an enormous positive effect on their lives, and of course it's hard not to be enormously sympathetic to those with such conditions. De Vira *et al*[9] systematically reviewed the evidence, identifying 18 placebo-controlled trials covering 442 participants. Cannabinoid administration was *not* reliably associated with a decrease in experimental pain intensity or mechanical hyperalgesia, but it was associated with modest increases in pain tolerance and reduction in its unpleasantness. Consistent with the work by Wirz *et al*, the drivers of benefit may actually be affective rather than through pain pathways.

Cannabis-induced improvements to mental functioning feel anathematic to orthodox psychiatric stances – though we note the College is currently formally reviewing its position on the drug – are we forgetting about potential harms? Morin and colleagues[10] undertook a longitudinal analysis of almost 4000 adolescents, with annual assessments of their use of cannabis and alcohol, alongside a cognitive test battery. Cannabis showed enduring neurotoxic effects on a range of measures, which were more severe than, and independent of, those of alcohol use. Consumption levels were relatively low and infrequent, though it remains problematic to assay this more quantitatively. The study's design allowed causality to be ascribed to cannabis. So a potential treatment or harm? For cannabis, the answer appears to be 'yes' to both.

Finally, 'love bites, love bleeds, it's bringing me to my knees' was a refrain from a 1980s heavy metal band we're too ashamed to admit we loved. Von Mohr and colleagues take the opposite tack,[11] which is that love heals. Pain is modified by social context (stubbing one's toe in November rain compared with summer nights), but most research on this has looked at more passive forms of support. In this work, participants were given laser-induced pain while receiving different types of touch (social, active, affective). Affective touch from a romantic partner reduced laser-evoked potentials on pain fibres at both earlier and later stages of cortical processing. The results, the first of their kind in humans, fit with animal work on grooming and licking – not that either of those two behaviours were explored in this piece on humans. In fairness to Def Leppard, their song bewailed the pain felt at love's ending – and thus a lack of affective touch – so perhaps they understood the neuroscience of the C tactile afferent pathway perfectly well.

1 Woolley AW, Chabris CF, Pentland A, Hashmi N, Malone TW. Evidence for a collective intelligence factor in the performance of human groups. *Science* 2018; **330**; 686–8.

2 Rush AJ, Thase ME. Improving depression outcome by patient-centered medical management. *Am J Psychiatry* 2018; doi: 10.1176/appi.ajp.2018.18040398.

3 Bullmore E. Inflamed depression. *Lancet* 2018; **392**: 1189–90.

4 Deakin B, Sucking J, Barnes TRE, Byrne K, Chaudhry IB, Dazzan P, et al. The benefit of minocycline on negative symptoms of schizophrenia in patients with recent-onset psychosis (BeneMin): a randomised, double-blind, placebo-controlled trial. *Lancet Psychiatry* 2018; doi: 10.1016/S2215-0366(18)30345-6.

5 Aarseth G, Natvig B, Engebretsen E, Lie AV. Acting by persuasion – values and rhetoric in medical certificates of work incapacity: a qualitative document analysis. *Med Humanit* 2018; doi: 10.1136/medhum-2018-011496.

6 Wooton RE, Lawn RB, Millard LAC, Davies NM, Taylor AE, Munafò MR, et al. Evaluation of the causal effects between subjective wellbeing and cardiometabolic health: Mendelian randomisation study. *BMJ* 2018; **362**: k3788.

7 de Vrieze J. The metawars. *Science* 2018; **361** (6408): 1185–8.

8 Wirz L, Reuter M, Felten A, Schwabe L. An endocannabinoid receptor polymorphism modulates affective processing under stress. *Soc Cogn Affect Neurosci* 2018; doi/10.1093/scan/nsy083/5102366.

9 De Vita MJ, Moskal D, Maisto SA, Ansell EB. Association of cannabinoid administration with experimental pain in healthy adults a systematic review and meta-analysis. *JAMA Psychiatry* 2018; doi:10.1001/jamapsychiatry.2018.2503.

10 Morin J-F G, Afzali MH, Bourque J, Stewart SH, Séguin JR, O'Leary-Barrett M, et al. A population-based analysis of the relationship between substance use and adolescent cognitive development. *Am J Psychiatry* 2018; doi: 10.1176/appi.ajp.2018.18020202.

11 von Mohr M, Krahé C, Beck B, Fotopoulou A. The social buffering of pain by affective touch: a laser-evoked potentials study in romantic couples. *Soc Cogn Affect Neurosci* 2018; doi/10.1093/scan/nsy085/5106208.

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