

Kaleidoscope

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As I understand things, by the time you read this, the artificial intelligence chatbot system GPT-4 will have taken over editorial control of the *BJPsych* and be regularly churning better monthly columns than this one. Ok, that last part isn't possible, with all known computer systems currently failing the Tracy Urbane Debonair Verve Test (the infamous TUDVT). However, there are serious concerns about this topic, with a recent open letter signed by Elon Musk, Apple co-founder Steve Wozniak, physicist Max Tegmark and others asking for a moratorium¹ (on chatbots, that is – they remain silent on the issue of the TUDVT). The *New England Journal of Medicine (NEJM)* is feeling more optimistic. A review by Haug et al² notes how contemporaneously artificial intelligence and machine learning assist us in: public health through identifying and tracking disease outbreaks; medical image analysis in making diagnoses; clinical trials via patient identification, recruitment, and outcome and side-effect monitoring; retrieval of medical information across digital databases; and organisational management including patient follow-ups. Further, future promises include real-time artificial intelligence coaching during history-taking and physical examination, and in medical education with 'flight simulators' of complex patient encounters.

What about the chatbots? In the same edition of the *NEJM*, Lee et al³ discuss their benefits, limits and risks in medicine. For the uninitiated, engaging in a session with a chatbot involves a natural language exchange where one enters a query or prompt, to which the bot rapidly responds, and a conversation ensues.⁴ They are developed to have general 'cognitive' skills in scouring open-source data-sets such as the internet, rather than being programmed with specific information. They're getting pretty good but are not infallible: the more, ahem, mature *BJPsych* reader might want to conceptualise the HAL 9000 from *2001: A Space Odyssey*. False answers are, in the lingo of chatbots, called 'hallucinations', and while, unlike the HAL 9000, they don't intentionally kill humans, one can see that in the field of medical advice queries, this could be an unintentional outcome, not least if the output is seemingly sensible and not evidently grossly misleading.

The authors provide a sample conversation between a human and GPT-4 (which stands for Generative Pretrained Transformer 4, in case you're interested) where the chatbot is queried about the use of metformin. Some advice was incorrect and, fascinatingly, when asked in a subsequent session to evaluate the veracity of its own initially mistaken reply, it recognised it as erroneous. The paper takes three scenario-based medical learning opportunities: medical note-taking, answering examination questions and seeking advice in a 'curb-side consult'. The results are astonishing and, for many of us, likely to be anxiety-provoking. GPT-4 was able to take notes by listening in to clinical consultations, reproducing them in a standardised medical format and offering prompts for relevant blood tests. When trialled on the USMLE examination, it answered correctly over 90% of the time and was even able to explain the reasoning behind its responses by pulling out medical facts and causal relationships and ruling out some options. In the curb-side consult, it had appropriate and helpful recommendations on what to ask. It wasn't perfect in any of these but, frankly, neither are any of us. It seems the future, but... you're not fully happy about

this are you? Why not? I'll punt you use Google in your medical practice on a regular basis. If you are feeling the need for a broader pause, you can add your name to the open letter on the moratorium: the link is at the bottom of the piece, if GPT-4 hasn't disabled it by the time you read this.

Functional neurological disorders (FND) are poorly understood and stigmatised. A recent paper powerfully argues that this is a feminist issue. McLoughlin et al⁴ start with the stark data on enduring gender bias and discrimination in medicine – implicit and explicit – in terms of diagnostics, treatment and follow-up. This is matched by a lack of research, including women participants more generally and in what they label 'stereotypically female disorders' more specifically, echoing the broader global societal burdens faced by women, from violence through poverty to social exclusion. FND is noted as the second most common presentation at neurology clinics, where 70% of such patients are women, with a broad range of symptoms across emotional processing, attention, interoception, and speech and motor functions. The authors note how there is a mean of 8 years to diagnosis and that without treatment, disability and distress match those of other severe neurological conditions. Moreover, even receipt of an appropriate diagnosis can be just the start of further discrimination in relation to a condition often inferred to be feigned or imagined, with associative echoes of 'hysteria'. I learned the diagnostic stability of FND, the persistence of investigative signs when investigations are appropriately carried out, and emerging neuroimaging data supporting predictive processing errors. The paper challenged me to reflect on what I knew, or thought I knew, and the biases I may implicitly carry. It speaks to the inequities and injustices, both historical and contemporary; it is a formidable piece I commend to all.

You're familiar with the 'social determinants of health'. Across a three-paper series, the *Lancet* opens a perhaps novel concept – the commercial determinants of health. To those of us working in the National Health Service, this might sound like the privatisation of healthcare, but, rather, it's a naming of the fact that 'commercial actors' such as transnational corporations cause widespread avoidable health harms through planetary damage and inequity. Just four industries – tobacco, ultra-processed food, fossil fuel and alcohol – account for a third of globally preventable deaths each year. Other supposedly benign industries are also called out: the financial sector for its role in 'deaths of despair', social media's impact on mental health and the pharmaceutical industry outpricing essential medicines. Yet, they may also contribute positively to essential products and services. The first paper⁵ sets out how a global move to 'market fundamentalism' has created a 'pathological system' wherein the multinationals can increasingly cause damage with impunity while governments, healthcare systems and society as a whole pay the costs of mopping up after them. The 'extraordinary concentrations of wealth and power among a narrow group' have profoundly intentionally altered global political and economic systems, pushing for changes that suit their interests via tax and regulation. As is too often the case, low- and middle-income countries get hit hardest. The second paper⁶ shows that we tend to have unhelpful and overly simplistic conceptualisations of 'private', 'industry', 'business' and so forth. It opens a better, more nuanced way to meaningfully distinguish them through laying out their diversity of practices, portfolios, resources, organisation and transparency. Ways to evaluate and mitigate conflicts of interest, and investment and divestment are discussed with a view to influencing health outcomes.

The final paper⁷ looks to the future. The authors note that they seek neither 'the overthrow of capitalism nor a full-throated embrace of corporate partnerships', but that there are better ways

^a If you want to give it a go, create an account here: <https://chat.openai.com/chat>

forward. These include more progressive economic models, international frameworks and regulatory/governance models, regenerative business practices, strategic civic mobilisation, and the incorporation of health, social and environmental goals into corporate practice. They strike a note of optimism in what feels an otherwise somewhat bleak area in proposing that systemic, transformative change is possible. Through the three papers, they develop a conceptual model to allow a digestible understanding of commercial practices that without adequate governance harm health, directly and indirectly; identify underpinning complex systems perpetuating problems such as corporate norm shaping via a compliant media; and guide solutions from specific interventions to broader policy requirements. Politicians can and must act at a policy level but can be stymied by multinationals operating across borders and indeed be caught by commercial interests. It might sound obvious, but we need governing for public interest, working constructively across jurisdictions, and having commercial actors respect this and work with society. The three papers are detailed but essential and important reading for government, policy makers, and those in healthcare and academia – that's you. Grab yourself some sustainably manufactured fair-trade coffee and have a read.

A problematic fronto-limbic network is an attractive model for bipolar affective disorder (BPAD). A mismatch between cognitive and emotional centres feels intuitive, but there has not been adequate evaluation of this on a large scale, and findings have been inconsistent. Mesbah et al⁸ meta-analysed all whole-brain functional magnetic resonance imaging papers comparing individuals with BPAD with healthy controls in the cognitive domains of emotional and reward processing and working memory tasks. Forty-nine studies involving 1000 patients and a similar number of matched controls showed that compared with controls, those with BPAD had: inferior frontal gyrus hypoactivation and amygdalar and hippocampal hyperactivity during emotional processing; orbitofrontal hyperactivation during reward processing; and ventromedial prefrontal hyperactivation during working memory tasks. The amygdalar data are especially interesting: with known roles of this region in emotion generation and regulation, the findings might indicate an oversensitivity and disproportionate behavioural responses, perhaps amplified by hypoactivation of normal frontal inhibition. Intriguingly, aberrant limbic activation was found in euthymic states in those with BPAD, suggesting a trait-effect, but more widespread frontal dysregulation also occurred in depressive and manic phases, implying a state-effect. The robust data align with conceptions of a fronto-limbic disconnect and the cognitive as well as emotional symptoms that contribute to illness burden. The brain changes present in euthymic patients remind us that residual cognitive difficulties and emotional dysregulation can remain even when individuals are in recovery.

Finally, you know that sensation when it just... feels like there's someone else nearby, even though there isn't? Oh, that's just me, is it? Well, I happen to know it's pretty ubiquitous – horror movies

make their money on it. Joe Barnby and colleagues update us on the mysterious case of the 'felt-presence',⁹ evoking William James's description of an 'imperfectly developed' hallucination that 'stirred something more at the roots of my being than any ordinary perception'. It does occur in psychosis, though I confess I was surprised to read this might be in up to half of all cases (although the paper challenges us that it's relatively underexplored by clinicians). It also has wider associations, including in neurological conditions (notably Parkinson's, cerebrovascular accidents and seizures), sleep deprivation, bereavement, intense religious experiences, psychedelic consumption and, more broadly, non-pathologically among the wider population. As an interesting link to the first piece in this month's Kaleidoscope, it has even been reported in interactions with chatbots. Felt-presence is a break in 'the common sense of everydayness', but the authors note the variation that can occur in the degree of personification, frequency, vividness, and any distress, comfort or personal meaning. Neuroimaging and psychometric data suggest a bilateral network involving the inferior frontal gyrus, ventral premotor cortex and posterior middle temporal gyrus. Whether there are differences between otherwise healthy and clinical populations is not clear, though we typically adopt a continuum model to map to hallucinations more generally, recognising their non-pathological occurrence in a significant percentage of the public.

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