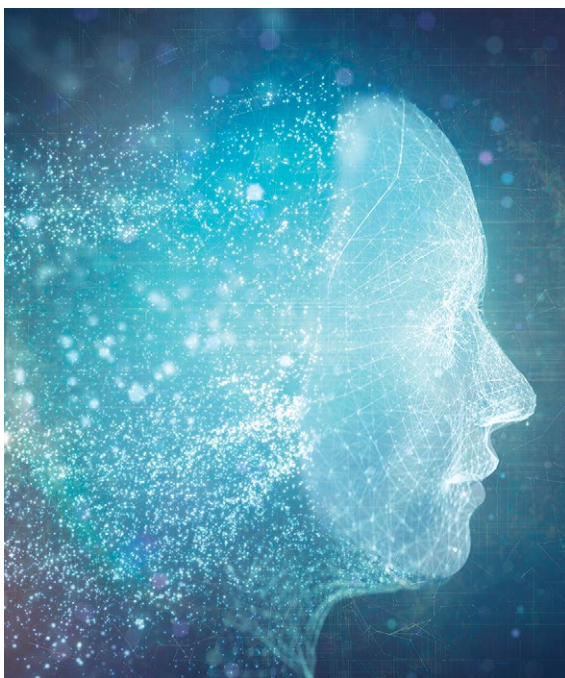


For artificial intelligence, the future is finally here



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AI will dramatically change how humans interact with the world

We are currently on the verge of yet another societal “revolution” that will exert an unprecedented impact on our lives. It may surpass prior seismic cultural breakthroughs like the internet, smartphones, and social media. Artificial intelligence (AI) has been fermenting for several decades, gathering steam to become equivalent (and eventually superior) to human intelligence. The escalation of AI sophistication will be jarring and perhaps change human life in completely unpredictable ways.

Composing thoughts into words and coherent sentences has always been a uniquely human attribute among all living organisms. Now, that sublime feature of the human mind is being simulated, thanks to advances in AI software, ironically created by the human mind itself! On November 30, 2022, Open AI introduced ChatGPT (generative pre-trained transformer), which can generate an article on any topic a user requests. Within a few weeks, it was used by more than 100 million people. ChatGPT is taking the world by storm because it is a harbinger (some pessimists may label it an omen) of how human existence will be radically impacted in the future. Such AI breakthroughs to surpass human intelligence are, ironically, the product of the advanced human brain, which I previously described as concurrently a triumph and a blunder by evolution.¹

Disclosures

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Anosognosia in schizophrenia (generated by ChatGPT)^a

Anosognosia is a condition in which a person is unaware or unable to recognize their own illness or disability. In schizophrenia, anosognosia can be present in up to 50% of cases and is characterized by a lack of insight into the presence and severity of symptoms.

People with anosognosia in schizophrenia may not believe that they have a mental illness, may deny the reality of their symptoms, or may attribute them to external causes. This can make it difficult for them to comply with treatment, as they may not see the need for medication or other interventions.

Anosognosia is thought to be caused by structural and functional changes in the

brain, particularly in areas associated with self-awareness and insight. It is often more severe in people with more severe forms of schizophrenia and may be associated with poorer treatment outcomes.

Effective treatment for anosognosia in schizophrenia typically involves a combination of medication and therapy, as well as strategies for improving insight and awareness of symptoms. Family members and caregivers can also play an important role in helping people with schizophrenia to recognize the presence and impact of their illness, and encouraging them to engage in treatment.

^aBased on "Is anosognosia a delusion, a negative symptom, or a cognitive deficit?" *Current Psychiatry*, January 2022, p. 6-8,14. doi: 10.12788/cp.0210

How we got here, and what's next

ChatGPT is a large language model based on neural networks.² It generates realistic text responses to a wide range of questions by mimicking the pattern of language in gargantuan online databases. One Hong Kong-based, AI-powered drug discovery company (Insilico Medicine) declared it published articles generated by AI tools, even before ChatGPT became available. This indicates how AI can be misused in scientific publications and may be hard to detect as a new form of plagiarism.³

The roots of AI date back to the 1950s, when Alan Turing, now considered the father of AI, published a seminal article about creating a machine to "imitate the brain" and to "mimic the behavior of the human."⁴ The term "artificial intelligence" was coined in 1989 by McCarthy,⁵ who defined it as "the science of engineering for making intelligent machines." Since then, several subsets of AI have been developed:

- Machine learning: The study of computer algorithms to generate hypotheses
- Deep learning: A type of machine learning algorithm that uses multiple layers to progressively extract higher-level features from raw input. (Both machine learning and deep learning are used in the burgeoning fields of computational psychiatry⁶ and neuroscience research⁷)

- Expert knowledge system: A computer-based system that mimics human decision-making ability

- Neural networks: An interconnected group of artificial neurons that uses a math or computer model for information processing

- Predictive analytics: An algorithm to predict future outcomes based on historical data.

These subsets of AI have been used to identify psychiatric disorders using neuroimaging data⁸ and to classify brain disorders.⁹ There are many potential uses of AI in psychiatry.^{10,11} My first experience with AI was 13 years ago, when we conducted a project to distinguish fake suicide notes from genuine ones.¹² AI was more successful in correctly identifying fake notes (78% correctly detected) than senior psychiatric residents (49%) or even faculty (53%).

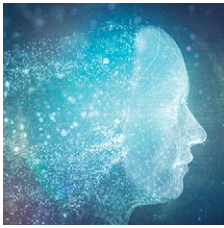
AI will dramatically change how humans interact with the world and may lead to enhanced creativity and new explorations and forays into novel, previously unknown horizons. It is expected to significantly boost the global economy by many trillions of dollars over the next decade. Major high-tech companies are vigorously competing to develop their own AI tools like ChatGPT (Microsoft invested \$10 billion in Open AI). Google, which owns DeepMind (an AI lab that invented the T in GPT) developed its own chatbot called Bard. Amazon

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Artificial intelligence

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AI was more successful at detecting fake suicide notes than senior psychiatric residents or faculty

Box 2

Benefits of metformin in psychiatry (generated by ChatGPT)^a

Metformin is a medication commonly used in the treatment of type 2 diabetes. However, there is growing interest in its potential use in psychiatry, particularly in the treatment of certain mental health conditions. Some potential benefits of metformin in psychiatry include:

1. Treatment of mood disorders: Studies have suggested that metformin may be helpful in the treatment of mood disorders, such as depression and bipolar disorder. One proposed mechanism is that metformin may help to regulate glucose metabolism and insulin sensitivity, which in turn may help to stabilize mood.

2. Treatment of schizophrenia: Some studies have suggested that metformin may be helpful in reducing symptoms of schizophrenia, particularly negative symptoms such as social withdrawal and apathy. One proposed mechanism is that metformin may improve brain energy

metabolism, which may in turn improve cognitive function and reduce symptoms.

3. Weight management: Metformin has been shown to be effective in weight management, which can be particularly important for people with certain mental health conditions, such as bipolar disorder, where weight gain can be a side effect of medication.

4. Neuroprotection: Metformin has been shown to have neuroprotective effects, which may be beneficial for people with certain mental health conditions, such as Alzheimer's disease and Parkinson's disease.

It is important to note that while there is some evidence for the potential benefits of metformin in psychiatry, further research is needed to fully understand its effectiveness and safety in this context. People with mental health conditions should not start taking metformin without first consulting with their healthcare provider.

^aBased on "Beyond diabetes: The beneficial uses of metformin in psychiatry," *Current Psychiatry*, March 2022, p. 7-9. doi: 10.12788/cp.0225

Box 3

Epidemic of intellectual constipation (generated by ChatGPT)^a

The term "epidemic of intellectual constipation" refers to a phenomenon in which individuals, groups, or even entire societies are seen as lacking the ability to think critically, creatively, or expansively. It can be characterized by a lack of curiosity, a narrow range of interests, and a reluctance to engage with new or challenging ideas.

The cause of this phenomenon can be attributed to a variety of factors, including cultural, social, and educational influences. For example, some argue that a narrow and standardized educational system, as well as a lack of exposure to diverse perspectives, can limit creativity and critical thinking skills. Additionally, the prevalence of social media and other forms of digital media may encourage a focus on immediate gratification and quick information, rather than more in-depth and meaningful engagement with information.

The consequences of this epidemic can be far-reaching and can impact personal, social, and political aspects of life. For instance, a lack of critical thinking skills can lead to the spread of misinformation, while a narrow range of interests can limit personal growth and the ability to connect with others.

To combat the epidemic of intellectual constipation, it's important to foster critical thinking skills, encourage exposure to diverse perspectives, and encourage a lifelong love of learning. This can be achieved through education, community engagement, and personal effort.

In conclusion, the "epidemic of intellectual constipation" refers to a phenomenon in which individuals, groups, or entire societies lack the ability to think critically, creatively, and expansively. To combat this epidemic, it's important to foster critical thinking skills, encourage exposure to diverse perspectives, and encourage a lifelong love of learning.

^aBased on "From debate to stalemate and hate: An epidemic of intellectual constipation," *Current Psychiatry*, January 2023, p. 3-4. doi: 10.12788/cp.0321

has invested heavily in Stability AI by giving its founder and CEO Emad Mostaque 4,000 Nvidia AI chips to assemble the world's largest supercomputer (1 year ago, Stability had only 32 AI chips!). Apple recently integrated Stable Diffusion into its

latest operating system. Chinese tech giants Alibaba and Baidu also announced their own chatbots to be released soon.

Other competitors include Cohere, Hugging Face, Midjourney, GitHub Copilot, Game Changer, Jasper, and Anthropic,

SWOT analysis of psychiatry (generated by ChatGPT)^a

SWOT analysis is a tool used to assess the strengths, weaknesses, opportunities, and threats of a particular entity or industry. In this case, we will conduct a SWOT analysis of psychiatry as a field of medicine.

Strengths

- Psychiatry plays a crucial role in addressing mental health issues and improving the quality of life of individuals who struggle with them.
- Psychiatry has made significant advances in understanding the biological and psychological underpinnings of mental illness, which has led to the development of more effective treatments.
- There is growing public awareness and acceptance of the importance of mental health, which has led to increased demand for psychiatric services.
- The field of psychiatry attracts many talented and compassionate professionals who are dedicated to helping those in need.

Weaknesses

- There is still a significant stigma associated with mental illness, which can deter individuals from seeking treatment.
- The effectiveness of some psychiatric treatments can be limited, particularly in cases of severe mental illness.
- The shortage of mental health professionals in many areas means that access to psychiatric services may be limited, particularly for individuals with lower incomes.

- The cost of psychiatric treatment can be prohibitively expensive, particularly for individuals without insurance coverage.

Opportunities

- New advances in neuroscience and technology, such as brain imaging and genetic testing, hold promise for improving the accuracy of psychiatric diagnoses and developing more targeted treatments.
- Telepsychiatry and other online mental health services offer new ways to increase access to care and reach individuals in underserved areas.
- Greater collaboration with primary care physicians and other healthcare professionals could improve the integration of mental health services into routine healthcare.
- The ongoing destigmatization of mental illness could lead to greater public acceptance and support for mental health services.

Threats

- The ongoing COVID-19 pandemic has increased the prevalence of mental health issues and placed additional strain on mental health services.
- The shortage of mental health professionals, particularly in certain areas of the country, could worsen in the coming years.
- Changes in healthcare policy, such as cuts to mental health funding or changes to insurance coverage, could limit access to care.
- Misinformation and stigma surrounding mental illness could continue to deter individuals from seeking treatment.

^aBased on "Contemporary psychiatry: A SWOT analysis," *Current Psychiatry*, January 2023, p. 16-19,27. doi: 10.12788/cp.0320

Clinical Point

Some fear the ultimate goal of AI may be to create artificial general intelligence (AGI), which can think and learn better than humans

which released Claude as its chatbot at a lower cost than ChatGPT. Open AI also developed Dall-E2 in April 2022, which can generate very realistic images from text, one of which recently won an award at an art competition.

One of the major concerns about these AI developments is that chatbots can make errors or disseminate misinformation and even enunciate racist or misogynist statements. The greatest worry is that the ultimate implicit goal of AI is what is called artificial general intelligence (AGI), which can think and learn better than humans. Some fear AGI may wipe out humans as a species, a grave outcome indeed. That's why AI developers intend to align AGI with "basic human values" in the event it surpasses human intelligence. Some are

even calling for a transition from AI to AW (artificial wisdom), with built-in empathy, kindness, self-reflection, acceptance of diverse perspectives, and promotion of pro-social ideas.¹³

Creating content: artificial intelligence vs human authors

ChatGPT has opened a Pandora's box of concern about potential plagiarism by students or scientific authors. This has prompted several journals,¹⁴ including *CURRENT PSYCHIATRY*, to establish policies regarding the use of AI (see "A 'guest editorial' ... generated by ChatGPT?" *page 6*). To give readers additional concrete examples of the quality of articles generated by ChatGPT and to highlight the differences

between text created by AI vs a human, I asked it to write articles on the same 4 topics on which I had written articles for CURRENT PSYCHIATRY:

- Anosognosia in schizophrenia (**Box 1, page 9**); based on “Is anosognosia a delusion, a negative symptom, or a cognitive deficit?” CURRENT PSYCHIATRY, January 2022, p. 6-8,14. doi: 10.12788/cp.0210

- Benefits of metformin in psychiatry (**Box 2, page 10**); based on “Beyond diabetes: The beneficial uses of metformin in psychiatry,” CURRENT PSYCHIATRY, March 2022, p. 7-9. doi: 10.12788/cp.0225

- Epidemic of intellectual constipation (**Box 3, page 10**); based on “From debate to stalemate and hate: An epidemic of intellectual constipation,” CURRENT PSYCHIATRY, January 2023, p. 3-4. doi: 10.12788/cp.0321

- SWOT analysis of psychiatry (**Box 4, page 11**); based on “Contemporary psychiatry: A SWOT analysis,” CURRENT PSYCHIATRY, January 2023, p. 16-19,27. doi: 10.12788/cp.0320.

These ChatGPT articles are verbatim as generated, without any copyediting, fact-checking, or addition of reference citations. One can easily notice that while factually acceptable, the ChatGPT articles tend to be rather synthetic, simple, bland, and lacking creative language or going beyond the facts to express personal viewpoints. However, I have no doubt that future versions of ChatGPT or other chatbots will evolve into far more sophisticated products and may match what a human can compose in terms of quality and complexity.

AI has arrived with a bang. Going forward, I predict it will continue to surprise us, with elements of “future shock.” The credit (or blame) belongs to the boundless creativity of human intelligence that is seeking to invent an intelligence higher than its own. Caveat emptor!

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