The danger of overselling science

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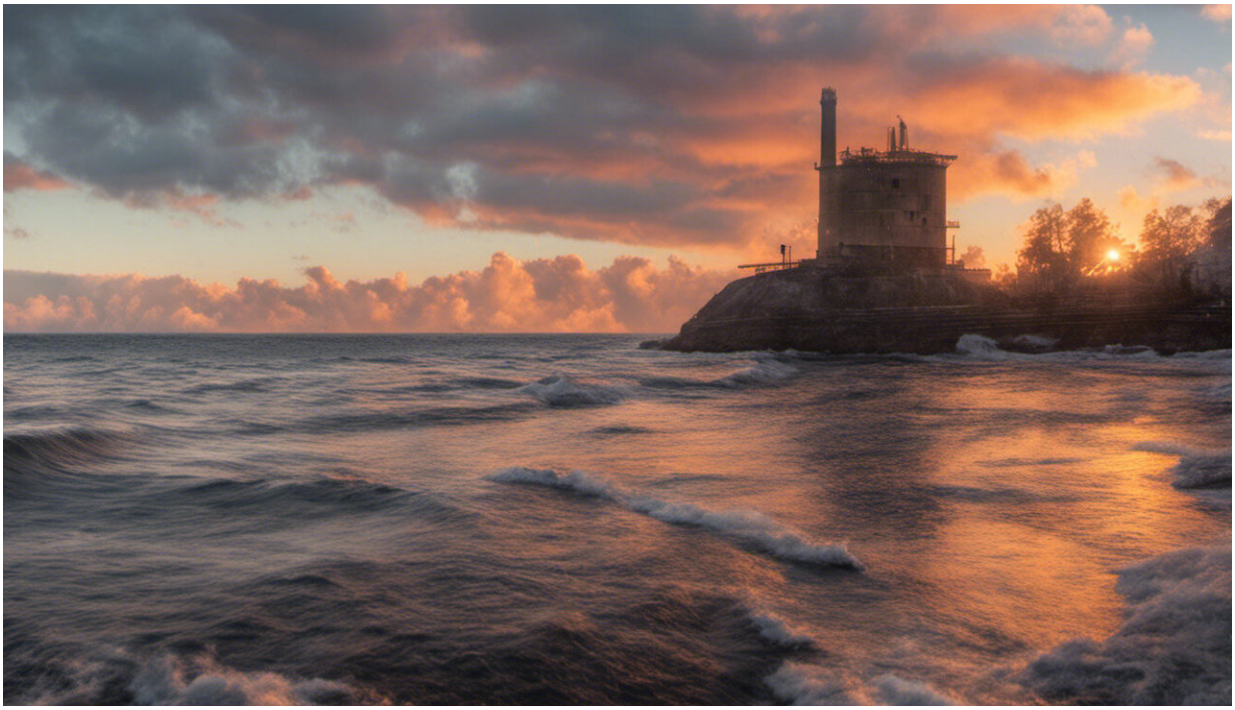

Credit: AI-generated image (disclaimer)

Imagine seeing this headline:

A zap to the brain could make you a genius

The story might go something like this:

Neuroscientists have proven that zapping your brain with an electrical

pulse can make you three times smarter.

In a recent study, researchers scanned the brain before and after applying a state-of-the-art technique, known as transcranial direct current stimulation (tDCS), and found an increase in brain size that allowed individuals to solve a significantly greater number of challenging questions.

Based on this evidence, a future in which it will be possible for each of us to unlock our inner genius is not far away.

What's the problem here?

You'll be disappointed to hear that, in reality, significant improvements in a scientific study don't necessarily mean significant life improvements. Nor do we know if the effects extend past the one-hour duration of the experiment. They sure won't make you an all-round genius anytime soon.

Almost every time we read about the latest scientific findings, they claim to be profound and life-changing. But they're often about isolated effects that have rarely been tested in real-world contexts.

Super Brain Yoga claims to increase synchrony between the two neural hemispheres, and went viral, even being used in many schools for students with special needs. Despite high media attention the study wasn't even based on scientific findings. Credit: Kelsey Palghat

It is the essence of good experimental design to allow researchers to control for confounding variables, such as those found in the real world. But, as a result, the applications are often left for speculation.

Researchers understand this. But when it comes time for these findings to be broadcast to the public, it can be akin to a game of Chinese whispers.

The message, originally so meticulously portrayed in the carefully worded journal article, has not only been turned into a sales pitch but interpreted by somebody who doesn't even speak the same language.

Why does this happen?

The three sources

The problem of exaggerating scientific findings stems from the interactions of three groups of people: scientists; the media; the public. Each of these groups has its own motivation to make findings seem as widely applicable as possible.

Scientists

Scientists are typically reserved with the claims they make about their research. In fact, if they're not, you should be worried.

They've often slaved away for many hours in the lab and know firsthand the limitations and pitfalls of their research. Many would be happy to sit inside their bubble of expertise and patiently continue building on knowledge that may one day lead to the betterment of humankind.

However, there is increasing pressure for scientists to prove their worth to society. This means finding, or creating, ways in which their research will "save the world", and then doing their best to communicate this in the hopes that their funding continues.

The pressure from a culture of "publish or perish" results in an increase in practices like "spinning" data, or dubious practices like "p-hacking".

The media

The role of the media in science communication is to sell findings to a public audience, which often translates to "how far can we inflate the implications of what's been said?"

Using ambiguous language is a key culprit for misinterpretation of findings. A modest scientist reporting on a small but "significant" (meaning "statistically unlikely to have occurred by chance", as opposed to "highly important") recovery in a mouse model of Alzheimer's disease suddenly finds it reported that he's discovered the next cure.

Journalists under time pressure or those without a scientific background are also more likely to rely on summaries of studies written by other media outlets. Even worse, some viral "brain-based" practices, such as super-brain yoga (which claims that squatting while holding your earlobes will make you smarter) were never based on peer-reviewed studies to begin with. Believe us, it's as ridiculous as it looks.

In the worst case, "sexing up" the results not only angers the researchers but ultimately deceives the public.

The public

The public is on the receiving end of the transmission and is often unaware of the embellishment the findings have gone through.

Neuroscientists, in particular, are seen as having unquestionable authority. Without reading articles critically, many people on the internet blindly buy into the claims that are being made: "Oh! This app trains my brain so I can be a rocket scientist!"

The second contributing factor is that members of the public are often all too enthusiastic to find ways in which the data is relevant to their own lives. This becomes an issue when the void created by scientists being unable to turn their claims into real applications is filled by ambitious, yet naive, individuals.

For example, take the latest trend in homemade tDCS systems, which

continues despite warnings from scientists.

Where do we go from here?

Scientists need to take more care in how they report their results, the media needs to stop overselling, and the public needs to be trained in critical thinking.

But we've all heard this before. In reality, the problem is only likely to become greater as access to advanced technology becomes mainstream.

All we can do is give people a basic tool for digesting research - ask yourself: "Does this sound too 'sexy' to be true?"

Understand that science works slowly and, as attractive as that new research sounds, its full impact will only be seen in future generations.

Most importantly, do not place blind trust in findings that claim to be based on science. Just because it's "neuro" doesn't mean you should strap a battery to your head.

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