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[Free Will in the Age of Neuromodulation](#)

Brain | Chemistry | Future | Neuroscience



Molecular neuropharmacology involves the study of neurons and their neurochemical interactions, with the main purpose of developing drugs that have beneficial effects on neurological function. / Image: rawpixel on [Unsplash](#)

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Nayef Al-Rodhan explores some of the implications of our increasing ability to chemically and technologically alter our moods and thoughts.

Are we really free, and responsible for our actions? Or are our choices determined by our environments, our upbringing, our genes, or other factors beyond our control? **Debates about free will date back at least to the pre-Socratic philosophers of ancient Greece.** Two and a half thousand years later, the tools of neuroscience permit us to study the notion of free will in a less speculative way. Moreover, **neuropharmacology**, which has developed in tandem with our ever-increasing knowledge of the brain, has evolved to modify and in some cases even create human experiences in ways once conceivable only in the abstract or in science fiction. **'Neuromodulation'** refers to the alteration of specific neuronal activity by employing either drugs or technology in a targeted manner.

The contemporary capacities for artificial neuromodulation raise many of the questions in the free will debate with renewed force.

Through studying the brain, we have an ever-growing body of evidence and data about **the neuroanatomy of our emotions and the neurobiological processes underpinning our morality**. We know for instance how pleasure, power, empathy, fear, neighborly behavior and altruism have neurochemical correlations in the brain. And because emotions and dispositions of character can now be correlated increasingly exactly with brain activity and brain chemistry, we also have the increasing possibility of altering them by chemical means. For example, artificially boosting levels of neurotransmitters such as **serotonin and dopamine provides a quick fix for many negative mental states** and, if done in a specific way in the brain, could also help to facilitate **learning**.

Given that our personality, emotions, and mental abilities may in future be deliberately modified by neurochemical interventions (for example, in ‘human enhancement’) we might find it necessary to revise **some of our basic philosophical notions of identity, personhood, and moral merit**. The possibility of intervening at the neurochemical level raises several important new ethical questions, including: What sort of responsibility exists, and to whom does it fall, if the authenticity of human experience is being threatened or even undermined through the use of neuromodulators? Is will power still an admirable attribute if it is artificially generated, or is it a mistake to even refer to the notion of ‘will power’ in such circumstances? Further, if ethical frameworks are developed around a common understanding of human experience, how are these frameworks being altered, and what are the ethical risks involved?

ETHICS ON THE SUPPLY & DEMAND SIDES

The use of so-called ‘**wakefulness disorder drugs**’, initially created to treat conditions such as ADHD, has become a widespread aspect of contemporary culture. Although it is difficult to track exact patterns, there can be little doubt that their ‘off-label’ use has eclipsed prescription-oriented consumption. But much of this other use is to little avail; or at least, its effect is not what the users suppose. Indeed, research suggests that users without the disorder the drug is targeted to treat are unlikely to see any substantial cognitive enhancement. **The much more common effect is emotional, and in the majority of cases it tends to be motivation** rather than thinking which is enhanced. Nevertheless, it is sobering to note that forms of consumption of such ‘enhancers’ resemble other kinds of **drug abuse and patterns of addiction**, and inevitably encourage a dubious secondary market. Further, analysis suggests that the desire for the associated substance is likely to persist even after it has been used for a specific situation.

Still on the demand side, **the ethical implications** can be even more complex. For example, surveys of college students who use ‘smart pills’ suggest that some are barely at the age of legal responsibility. Many of these will have become reliant upon – or addicted to – such ‘enhancers’ before even reaching university. As the philosopher [Robert Goodin](#) has argued with regard to nicotine addiction, if individuals become addicted before they are considered fully rational decision-makers (and hence legally accountable), they bear a correspondingly diminished responsibility for their ‘private vice’: **the brunt of the responsibility falls on the producers and regulators of the products**. Of course, nicotine and neuroenhancers are qualitatively different, but our societies will nevertheless have to face ethical questions about accountability and addiction in the future with regard to neuromodulators.

And we might remember that nicotine was used as a 'concentration tool' long before the meteoric rise in the prescription pharmaceuticals that are now put to that use.



When it comes to neuromodulators, our societies will have to face ethical issues about responsibility and future addiction.
Image: *unsplash*

The comparison is illustrative in that it bears out the notion that **users tend to confuse the reason for their improved performance**. Rather than creating any particular improvement in cognitive function, the effects are mostly mood-altering, making a person feel more alert or upbeat, which in turn causes tasks to seem more manageable or even enjoyable, ultimately making their completion seem easier. This may change with **more potent neuro-active drugs in the future**.

Using neuromodulators in the form of pills or electrical devices could have a more potent and durable effect on motivation compared to the transient effects of nicotine. Nicotine is also associated with health problems, so its use is discouraged. But if other forms of neurostimulation **can increase will power and the drive to stay engaged in long and tedious activities**, or the ability to abstain from bad habits, with limited or no deleterious effects, their attractiveness will be undisputed. **Does it matter then that such neuromodulation is not 'natural', but is rather a manipulation of the brain?**

Are our decisions really 'ours' anyway? Neuroscientific research has prompted the question whether **what we call 'choice' exists at all in the way that philosophers have traditionally defined it**. For instance, over a decade ago, in a lab of the Bernstein Centre for Computational Neuroscience in Berlin, a team of scientists conducted an experiment using functional magnetic resonance imaging in which volunteers had to push a button with either their right or their left index finger. To widespread surprise, it revealed not only that the conscious decisions of the subjects had been taken before the actual act, but that **the brain activity preceding the decision could to a certain extent be used to predict that decision up to seven seconds before**. In other words, the subjects' brains had decided before the subjects were consciously aware of the decision they were making. As neuroscientists literally go deeper into the brain (by implanting electrodes), and study brain activity

related to conscious decision-making, **the old idea of free will may finally be eradicated** – but to do that, neuroscientists will need to convince society that their findings are beyond any doubt. Nevertheless, the question of the authenticity of free will is rendered even more complicated under artificial neuromodulation. If we are already starting to debate how much of our conscious decision-making truly represents us (meaning, our conscious self as opposed to our neurobiology and neurochemistry), then what can be said of thoughts and motivations that are regulated by external interventions?

SELF-KNOWLEDGE & AUTHENTICITY

Aristotle (384-322 BCE) judged the good life to be one in which an individual is deeply engaged in worthwhile activity, and many philosophers since have argued along similar lines. Famously, Robert Nozick devised his ‘experience machine’ to do just that in his 1974 book *Anarchy, State, and Utopia*.

In this thought experiment, Nozick invited the reader to imagine there was a machine that gave them any experience they desired, and moreover, make them feel that that was their real life. An individual hooked up to it could have a rich set of synthesized experiences without any of them really coming to pass, with the machine feeding the necessary sensations directly into their brain, without their even knowing this was happening. Nozick proposed his thought experiment in order to argue against hedonism – the idea that the pursuit of pleasure is the greatest contributor to a person’s happiness. Even if the synthesized experiences provided by the machine were ideal, Nozick believed that given the choice, most of us would choose not to be plugged into the machine, and opt instead for real life, with all its risks and let-downs. He argued that this shows **we want our experiences to be real and meaningful, not just pleasurable**. Perhaps the experience of being loved, appreciated and rewarded can be neurologically recreated without the attendant reality; but this doesn’t make it equivalent to the real thing. Whether or not one shares Nozick’s conclusion, **the question of distinguishing between ‘real’ and ‘synthesized’ experience** remains relevant for the current topic.



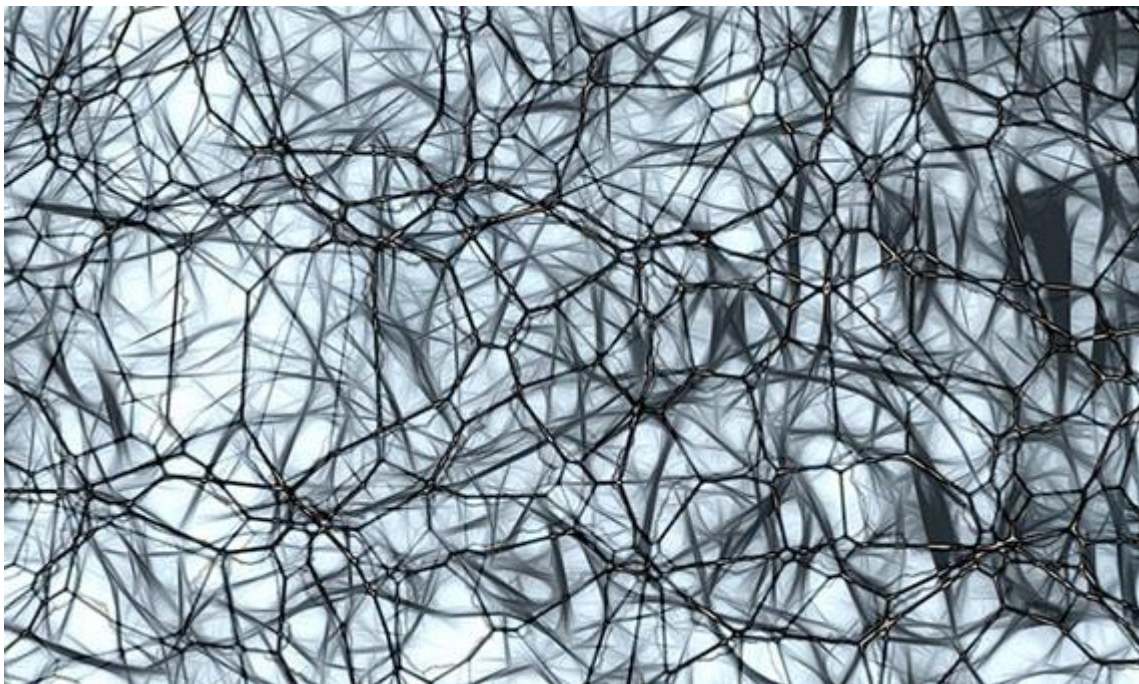
Artificial neuromodulators pose a series of problems in relation to the authenticity of human experience and, especially, in regard to the authenticity of free will. / Image: *unsplash*

Artificial neuromodulators raise a number of issues concerning the authenticity of human experience, and especially the authenticity of free will. The concern here is that whatever activity one takes up has less value in its own right as the individual becomes motivated to pursue the activity because of a mood enhancer rather than for the sake of the activity itself. In addition to the philosophical grounds for believing that real value is lost in such a shift of motivation, there are also worrying practical implications. For example, **the widespread use of cognitive enhancers could diminish the value of education and merit**, to the detriment of both the education system and life in general. Another particularly unsettling prospect concerns **the tendency of neuromodulators** to push individuals towards isolation.

HUMAN NATURE, HEDONISM & IDENTITY

There are two broader implications of artificial neuromodulators, one philosophical and the other social and political. Philosophically, we could consider that **the use of 'smart pills' ultimately equates to a kind of hedonism**. Because such drugs improve one's mood rather than altering one's cognition in any significant way (for now), they could be deemed **a mode of seeking pleasure for pleasure's sake rather than a means to better ideas**.

Within certain parameters, pleasure-seeking is fundamental to human nature, as, in addition to our fundamental survival-oriented disposition, **the human brain is pre-programmed to seek pleasure and avoid pain**. This leads us to seek out and repeat actions from sensual to intellectual pursuits, or a combination of the two, which share a common basic thread: they gratify us in some way that ultimately operates at the neurochemical level.



Neuromodulation could alienate people from those fundamental elements of our human character that have helped us to develop a kind of moral compass. / Image: *Unsplash*

However, a large and longstanding body of thought, from Plato and Aristotle through to Nozick, argues that pleasure is only one value among many, and warns against the dangers of pursuing it to the exclusion of all other values. This adds moral and philosophical weight to the need for greater efforts to ensure that the use of enhancers is better regulated and preferably curbed before it

becomes more of a public epidemic, with the potential to do great damage. Indeed, **any way of life that comes to rely upon repeatedly modifying one's brain chemistry in order to be able to endure one's circumstances is dangerously unhealthy**. It can be life-threatening to the individual, or a threat to others, if it is manifested in deep depression or mania, for instance.

Unless it's being used for debilitating neuro-cognitive deficits, powerfully self-modulating behavior equates to a kind of self-deception, with a concomitant loss of free will. And enacted consistently over time, these actions could in principle interfere with or even conflict with any coherent sense of identity. Ultimately, then, neuromodulation could estrange people from fundamental elements of our humanity which have helped us develop a moral compass. Fear, anxiety, **negative emotions, remorse, guilt – these are all examples of unpleasant yet indispensable and educative** emotions that guide us towards greater empathy, resilience and compassion for others. Inhibiting these negative emotions may be temporarily convenient, but extremely damaging in the long run.

Indeed, some apparently negative drivers of human behavior such as selfishness and competitiveness may be just as necessary for human progress and survival as positive behaviors such as cooperation, collaboration, and symbiotic co-existence. This provokes one last question: what if artificial neuromodulation were used to instill more compassion, altruism, and pro-social behavior and empathy in us? Would even too much of a good thing be bad for us?

Find the original publication in this link to [Philosophy Now](#)

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