Humans are aggressive. Could 'moral enhancement' technologies offer a solution?

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It's a mistake to think problematic aggression is limited to those with psychiatric disorders. Healthy people have also the capacity for impulsive violence—and resulting "morally" poor behavior.

Traditionally, moral development has been facilitated by social

institutions such as religion, education and societal convention. But technology could change this.

If scientists could identify the predictors of reactive aggression, bio-medicine may offer ways to improve the moral behavior of those more at risk of problematic aggression.

This concept of "moral enhancement" is strongly contested. Bioethicists ask: can, and should, biomedical interventions be used to make people "morally" better?

We need a lot more research before we can weigh up the practical and ethical feasibility of aggression-reducing techniques. But exploration in this space is well under way.

What is 'moral enhancement?'

Broadly, moral enhancement refers to the use of bio-medicine to improve moral functioning. Some suggested methods include decreasing bias, increasing empathy, improving self-control and enhancing intelligence.

While this may seem like science fiction, consider the other types of human enhancement that already exist.

Transhumanists are acquiring new modes of perception through seismic sensors, neural implants and magnetoreception devices. Smart drugs are used for purported cognitive benefits such as memory and alertness—and brain-computer interfaces are fusing mind and machine.

It's not a huge leap, then, to imagine we could target the biological processes that mediate our social behaviors.

Of course, moral enhancement is controversial, and bioethicists disagree over its feasibility and ethical implications. Could it work? And under what conditions (if any) might it be justified?

My latest research explores a proposal I think is underappreciated: that moral outcomes could be improved by reducing aggression.

Everyday aggression

Aggressive disorders have long been treated by medical practitioners. But this is usually confined to psychiatric cases, and we know aggression is more widespread than clinical and forensic statistics reflect.

Research indicates only half of non-fatal violence is reported, with around 72% of unreported cases being assaults that don't cause severe injury. But just because aggression may fall outside a clinical scope, that doesn't mean it's not morally problematic.

Everyday aggression plays out in familiar settings. Violence flares up in professional sports. Parental outbursts at youth matches aren't uncommon; we've seen several examples of mums and dads physically assaulting referees and umpires.

In 2014, one-punch attacks became so frequent in Australia, media outlets deemed them an "epidemic." Then there's road rage, which accounts for numerous cases of injury and property damage each year.

These examples tell us aggression pervades almost every forum of human activity. They suggest otherwise healthy people have the capacity to lose themselves to episodic violence. And perhaps some of us pose a greater hazard than others—without necessarily knowing it.

If we can identify risk-predictors of impulsive aggression, we may be

able to prevent some of this spontaneous harm before it's inflicted.

How do we classify aggression?

Psychology defines aggression as any behavior intended to cause harm. This excludes consensual harm which a person desires for some greater good, such as surgery or tattooing.

Aggression comes in two broad varieties: reactive and instrumental. Reactive aggression is described as "hot-blooded" and involves extreme anger in the face of a threat. Instrumental aggression is "cold-blooded" and involves calculated acts with low emotional arousal.

While both types of aggression can overlap, each has a distinct neurophysiological signature. Reactive aggression activates "primal" parts of the brain, while instrumental aggression recruits more evolved areas in the neocortex.

Morally speaking, there's reason to think reactive aggression is more hazardous than other forms. That doesn't mean instrumental aggression isn't worrisome. In fact, it's involved in some of the most damaging conditions such as criminal psychopathy.

But reactive aggression is different because it lacks higher-order cognition. It engages the relatively basic limbic system—the region of the brain which deals with behavioral and emotional reactions. It also shuts down the prefrontal cortex, which is responsible for rational decision-making.

What can be done?

Precise biomarkers of reactive aggression haven't yet been established,

but scientists have identified some key contributors. These include a range of genes, receptors, neurochemicals related to serotonin and dopamine, hyperactivity of the amygdala, and reduced brain matter in particular regions.

Certain biomedical procedures show promise. Neuromodulation techniques have been found to lower aggression by directly altering brain activity. One example involves a painless procedure in which electrodes are placed on a person's head to excite or inhibit a specific part of the brain.

Researchers have suggested we could use such technology on young people with conduct disorders to prevent problematic behavior in adulthood.

Another emerging technique is psychedelic-assisted therapy. Working with therapists, patients use substances such as LSD, MDMA, and psilocybin to access altered states of consciousness and positively shape values, thoughts and behavior. Early clinical trials have shown impressive results for treating conditions including addiction, depression, and post-traumatic stress disorder.

Gene-based strategies such as CRISPR also offer hope for therapeutic and enhancement purposes. These work by inserting genetic material into a person's body to modify or replace unwanted genes. Most gene therapies are still in early trial stages. They'll need much more evaluation before they can used safely and ethically on humans.

Importantly, there are questions over whether moral enhancement is already happening, such as when we take drugs that change our brain chemistry. If so, should we simply think of new moral enhancement strategies as a part of existing pre-emptive medical treatments?

The barriers

There are major challenges in implementing any of the above techniques to target aggression. One is non-specificity: the neural structures involved in aggression are also implicated in states such as fear, reward, motivation and threat-detection.

Also, antisocial behaviors can't simply be associated with one or two genes. They're a result of a complex genetic architecture in which hundreds of genes, or even thousands, interact with a person's environment and lifestyle.

Even if we could safely target the determinants of reactive aggression, there are lingering practical and ethical considerations. For one, not all aggression is antisocial. Aggression is often necessary for acts of protection and self-defense.

People can also have mixed motivations, meaning different aggression types can be present in a single act. To complicate things further, some researchers argue for additional classifications such as "micro-", "prosocial" and "appetitive" aggression.

Any moral enhancement proposals must consider the impact on the person, their character and sense of self. Additionally, there are concerns around autonomy, personal freedom and the possibility of coercive treatment.

These factors would need to be carefully weighed against the potential benefits of moderating an individual's aggressive tendencies.

Moving forward, we need to learn more about the moral significance of different types of aggression, how they present in an individual's actions, and how they're reflected in their biology.

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