



# Cognitive Enhancement and the Threat of Inequality

Walter Veit<sup>1</sup>

Received: 2 July 2018 / Accepted: 29 October 2018 / Published online: 12 November 2018  
© The Author(s) 2018

## Abstract

As scientific progress approaches the point where significant human enhancements could become reality, debates arise whether such technologies should be made available. This paper evaluates the widespread concern that human enhancements will inevitably accentuate existing inequality and analyzes whether prohibition is the optimal public policy to avoid this outcome. Beyond these empirical questions, this paper considers whether the inequality objection is a sound argument against the set of enhancements most threatening to equality, i.e., cognitive enhancements. In doing so, I shall argue that cognitive enhancements can be embraced wholeheartedly, for three separate reasons. However, though the inequality objection does not sufficiently support the conclusion that cognitive enhancements should be prohibited, it raises several concerns for optimal policy design that shall be addressed here.

**Keywords** Human enhancement · Cognitive enhancement · Modafinil · Genetic engineering · Inequality · Eugenics · Capitalism

## Introduction

Self-improvement has been of philosophical interest since the ancient Greek philosophers. New technologies, however, might fundamentally alter our understanding of what it means to “improve.” Furthermore, new ethical challenges present themselves that need to be answered. Eugenics has been the subject of diverse dystopian science-fiction novels and movies, from *Brave New World* to *Gattaca* and more recently *Star Trek*. They mostly depict a bleak future of humanity in which genetic determinism is taken to its extreme. Nevertheless, genetic engineering is not the only way humans could enhance themselves or others in the future. Enhancements through chemical means such as drugs or technologies such as computer chips in the brain are also the subject of many futuristic fiction settings. However, these settings are not mere fictions, and could be much sooner realized than anticipated. In the case of many drugs such as modafinil or less obvious coffee, we are already faced with the question whether to enhance or not. Scientific progress has reached a point, where a serious engagement with the philosophical issues at stake has become unavoidable.

In this paper, I critically examine the claim that human enhancement will inevitably accentuate existing inequality<sup>1</sup> and analyze whether prohibition is the optimal public policy for this objection as various sorts of egalitarians might, therefore, advise.<sup>2</sup> Naturally, various moral theories will evaluate this claim, which I shall call the *inequality objection* (IO), differently. Yet, for the purposes of the present paper, I shall consider the ethical concerns of the IO in a way that is non-committal to any of the main moral theories, but may nevertheless be treated as relevant to policy evaluation, e.g., unequal access or an increase in criminal activity. An expanded abstract of an early version of this paper concerned more narrowly with utilitarianism and well-being is forthcoming in the Proceedings of the IX Congress of the Spanish Society for Logic, Methodology and Philosophy of Science (forthcoming; 2018). Of course, very strong versions of egalitarianism may be immune to the criticism to the objections I present in this paper. However, such an immunity may then be considered as a liability of strong egalitarianism.

The question then becomes whether enhancement poses a threat to society. This *threat* is a deliberately vague notion, as

---

✉ Walter Veit  
wrwveit@gmail.com

<sup>1</sup> University of Bristol, Bristol, UK

<sup>1</sup> Various authors such as Mehlman and Botkin (1998) raised the inequality objection. Though they only focused on unequal access to genomic testing, I extend the concern to all cognitive enhancements.

<sup>2</sup> Lamont, Julian and Favor, Christi, “Distributive Justice”, *The Stanford Encyclopedia of Philosophy* (Fall 2014 Edition), Edward N. Zalta (ed.), Accessed on June 19, 2018: <http://plato.stanford.edu/archives/fall2014/entries/justice-distributive>

this paper aims to explore a variety of concerns the inequality objection raises. However, in what follows, I argue that the IO has several problems. In light of these, I argue that cognitive enhancements can be embraced wholeheartedly, for three separate reasons. First, there is no empirical evidence that cognitive enhancement will lead to more inequality; rather, I argue it has the potential to decrease it. Second, even if we accept that human enhancement will lead to inequality, it is not clear whether this will outweigh the potential benefits of human enhancement. Third, even if enhancement technologies do accentuate existing inequalities and have a negative impact on society, a strict egalitarian solution, i.e., outright prohibition of enhancement, may be worse than other kinds of policy responses. Therefore, the claim that human enhancement leads to inequality does not sufficiently support the conclusion that cognitive enhancements should be prohibited by policy makers. Nevertheless, the inequality objection raises several concerns for optimal policy design that shall be addressed in this paper.<sup>3</sup>

My criticism is structured as follows: In the “What Is at Stake?” section, I attempt to bring the IO into formal argument structure and clarify terms that are unclear. In the “Human Enhancement leads to Inequality?” section, I attack the claim that cognitive enhancements lead to inequality. In the “Inequality Leads to a Negative Social Outcomes?” section, I analyze how inequalities in access to enhancements could negatively impact society and argue that such an impact is outweighed by the positive effects of enhancements. In the “Prohibition of Human Enhancement, the Best Solution?” section, I argue that even if the IO is right and a decrease in well-being is unavoidable, prohibition is unlikely to be the best possible policy response in order to maximize well-being. Lastly, in , I summarize my criticism and conclude that the IO does not sufficiently support the conclusion that human enhancement should be prohibited by policy makers.

## What Is at Stake?

Though perhaps having raised the largest concerns in the public perception of human enhancement, the IO is neither a very sophisticated argument nor a genuinely new one against the introduction of new technologies that could enhance humans beyond what might be considered “normal.” In the following, I am going to show that the whole argument is just old wine in new bottles. Concerning inequality, Bostrom and Roache claim that one could hold the prima facie justified worry that:

“...people with radically enhanced cognitive capacities might gain vast advantages in terms of income, strategic planning, and the ability to influence others; in other words, an enhanced cognitive elite may gain socially significant amounts of power.” (Bostrom and Roach 2007: p.15)

Interestingly, Bostrom and Roache restrict themselves to cognitive enhancements, suggesting that other enhancements might be less problematic or rather domain-specific, such as ethical discussions of doping in sports. Hence, I will restrict the following discussion to cognitive enhancements, which seems to be the more problematic subset of enhancements providing a competitive advantage more severe than other sorts of enhancement. If cognitive enhancements are unproblematic, then by extension, human enhancement, in general, should not face much opposition. Of course, the idea of an enhanced elite accumulating a lot of power and creating a two-class society seems intuitive and rather unappealing. But whether this is even a plausible scenario is an open question. Rather than considering whether such extreme cases are likely, I focus instead on inequality in general, i.e., evaluate the various scenarios in which increases in inequality can have a negative impact on society. From this broad perspective, the IO can be formulated formally as follow:

- P1: Human enhancement accentuates existing inequalities.
- P2: Inequality has a negative impact on society.
- P3: New technologies that have a negative impact on society should be prohibited by policy makers.
- C: Therefore, human enhancement should be prohibited by policy makers.

As I shall show in my three-horned attack, this argument has major flaws. Though I am sure opponents of enhancements will find this restructuring of their worries exceedingly oversimplified, this argument should enable both critics and proponents of enhancements to see where their substantial disagreement lies.

Hence, in order to attack the IO in a more precise and clear manner, let me first clarify how I am going to use three crucial terms from the debate, i.e., human enhancement, inequality, and negative impact. First, I deviate from the “orthodox” definition of human enhancement provided by Bostrom and Roache, who define human enhancement as interventions that “[...] aim to improve the state of an organism beyond its normal healthy state” (2007: p.1). This definition of enhancement faces several problems. What a *normal healthy state* is, has plagued philosophy of medicine since its very conception. In the following, I will use a definition of enhancement that avoids employing the concept of normality. This is in contrast to Lin and Allhoff (2008) who criticize a pro-enhancement stance on functional rather than human enhancements.

<sup>3</sup> Due to limited space, I shall restrict myself here to discussing optimal policy design in the Western nations. As a reviewer pointed out, different cultures may require very different policy responses to enhancement technologies.

In a previous article on genetic enhancement, I suggested that much disagreement between proponents and critics of human enhancement can be resolved, by recognizing that most proponents of enhancement technologies such as Savulescu et al. (2011) simply do not accept the orthodox view of what enhancements are (2018: p. 76). They draw an important distinction between “[f]unctional enhancement, the enhancement of some capacity or power (e.g. vision, intelligence, health) and human enhancement, the enhancement of a human being’s life” (2011: p. 3). Human enhancement is then defined as “[a]ny change in the biology or psychology of a person which increases the chances of leading a good life in the relevant set of circumstances” (2011: p. 7). The latter is the definition relevant for the argument in this paper. *Cognitive* enhancements are most often associated with the increase of a cognitive capacity, irrespective of whether this increased the likelihood of leading a better life. That is not the form of cognitive enhancements I defend here. I argue that if a cognitive enhancement qualifies as a human enhancement given the normative definition by Savulescu et al. (2011), the IO is insufficient to warrant prohibition. Whether something qualifies as an enhancement is then the important issue at stake.

However, in shifting our focus from *functional* to *human* enhancement, critics might respond that we have opened up ourselves to a much more severe criticism. Now, rather than dealing with the problem of defining normal functioning, they could insist that trying to give an account of *a good life* is a much bigger problem. I agree; hence, I shall remain uncommitted to any particular view of the good life and employ Savulescu’s strategy of defining all-purpose goods that would qualify as enhancements under all major accounts of the good life:

*“I have not committed myself to any particular substantive conception of the good life. That is a complex question as old as philosophy itself. I believe the best life is a life of objectively worthwhile activity that provides pleasure and is desired.”* [2007; p. 286].

Without committing myself to a particular view, I follow Julian Savulescu’s (2007) suggestion of *all-purpose means* that would qualify under all major accounts of what makes a life go better, i.e., hedonism, preference-satisfaction, and objective list theories. This enables us to avoid one of the oldest debates in philosophy and focus on the ethical implications of various cognitive enhancements. He suggests several cognitive enhancements that could satisfy his criteria such as “[m]emory, self-discipline, impulse control, foresight, patience, sense of fairness, honesty” (2007, p. 284). Notably, some notion of general intelligence or computational power is missing here and for good reason. The idea is that an improvement beyond a certain point, rather than going beyond what is considered normal, can have negative effects on the well-being of the altered. Think of people who have no memory filter and remember any unnecessary detail

of their lives and the higher rates of depression among scholars. Though research has not established sufficient links between higher intelligence and unhappiness, one should be wary of the fact that for increased abilities, there might be a tradeoff of certain other capacities. Whatever goes beyond the point of making a human life expected to be better should simply not be considered as a human enhancement that is expected to improve a life (2018).

Opponents might respond that the set of proponents of enhancement are trying to defend, i.e., mostly future technologies would then just be empty given our insufficient knowledge in how they will affect the lives of agents. However, the welfarist definition of enhancement already covers almost all medical treatments as a subset of enhancements as they are expected to improve the life of the recipients. In an earlier paper I argued that “[a]ccording to this welfarist definition, a conception of normality is not needed to define enhancement as we do not define an enhancement as being better than normal, but simply being better full stop” (2018: p. 77). This also enables us to draw a useful distinction between interventions and enhancements, terms that are often used interchangeably, with enhancements being interventions expected to improve the life of the recipient.

Though the notion of normality has perhaps guided thinking in the biomedical sciences, since the very beginning, the danger of such thinking becomes clear, once it is recognized that it served as the very basis of discrimination against minorities, such as the LGBTQ community or the disabled. Deviation from what is considered “normal” should not be seen as a moral vice, but even those who oppose the discrimination of minorities use the very same moral concept to argue for a distinction between medical treatments and enhancements. Surely, no one taking the IO seriously would argue that we should prevent the developments and use new medical treatments, just because this might lead to an increase in inequality, with only richest being able to afford new treatments. New experimental treatments might be prohibitively expensive but become available to all with further medical advancements. However, by defining medical treatments as a subset of enhancements, the burden of proof is shifted to those who oppose enhancements. The proponent flat-out denies a moral difference between treating someone and enhancing the life of someone. What the IO illustrates, however, is that there might be better policies reaping the benefits of enhancements while making them available or affordable to everyone. Let me postpone this issue to the “[Prohibition of Human Enhancement, the Best Solution?](#)” section. The notion defended here then are human enhancements expected to improve the lives of those receiving them. However, the term cognitive enhancement is tightly tied to the conception of functional enhancements such as an increase of a particular cognitive capacity, e.g., memory and alertness. To ease avoidable disagreement within, the debate proponents of enhancements should clarify that they are specifically interested in cognitive enhancements that qualify as human enhancements, while opponents of such

technologies might realize substantial agreement once this qualification is recognized. Nevertheless, when individuals enhance themselves or other individuals, there might be unforeseen negative consequences for the society. With this in mind, let me now turn to P1 and examine whether human enhancements lead to inequality.

### Human Enhancement Leads to Inequality?

Each of the following sections will be focused on one of the premises. Let me begin with the claim that human enhancement will increase inequality. This premise is empirical in nature and as such requires supporting evidence. While it is unclear what evidence for the adequacy of this premise has been provided, there is at least some evidence that seems to speak against it. More specifically, there are reasons to believe that human enhancement will not affect inequality at all, or even decrease it as Bostrom and Roach (2007: p. 16) suggest by making people “more equal” like it is the case with modafinil (Randall et al. 2005). Modafinil is a drug used to treat narcolepsy and disorders causing sleepiness. Modafinil helps people to stay awake and focused, with a similar effect to that of caffeine. Just like coffee is used as a cognitive enhancer, people not suffering from any of the aforementioned disorders started using modafinil to reap similar benefits. The effects Bostrom and Roache (2007: p. 16) argue have a diminishing effect on those already possessing higher cognitive capacities, and can even lead to the opposite effect in those who already possess much higher intelligence than the average. If everyone had access to modafinil, it seems likely then that the result would be more rather than less equality as suggested by Bostrom and Roache (2007: p. 16). A substantial division between the unenhanced and enhanced seems then unlikely.

Furthermore, Bostrom suggests that we know far more about genes responsible for inheritable diseases than genes responsible for talents, intelligence, and longevity; hence, genetic enhancement might especially help the genetically worse off in the society (2003: p.18). As I argued in a previous publication (2018, p. 12), at least when it comes to genetic enhancements, we can expect them to get rid of a major source of inequality, i.e., the elimination of the natural lottery which would then truly provide more equal opportunities. The IO is then actually an objection against unequal access to these technologies due to existing inequity. Limited access or unavailability of such technologies for those who are already worse off may widen the gap between the rich and the poor even further. Many cognitive enhancements, however, in fact the majority, are freely available. Malinowski and Shalamanova (2017) argue that research into meditation has shown that many cognitive capacities can be enhanced by meditation practices and even halt the effect of aging on the brain. These forms of cognitive enhancement seem to be entirely unproblematic. Critics of other forms of enhancement might want to defend a moral distinction between natural and

artificial means. After all, they are not opposed to such forms of enhancements nor following a healthy diet that increases cognitive capacities; instead, they attempt to carve out a definition of enhancement excluding those we deem acceptable making use of the enhancement concept solely for the purpose of drawing a limit to the aims of medicine. I do not think such a distinction can be provided for reasons going back as far as those provided by J.S. Mill (1874) who argued against the common idea to equate the good with the natural. After all, what is so natural about using a wheelchair or swallowing medicine against a headache?

However, there are other kinds of cognitive enhancements that might be prohibitively expensive, e.g., computer chips in human brains to increase cognitive capacities or increase the release of dopamine and oxytocin. The same would hold for expensive drugs with similar effects. What we have to be concerned with is the plausibility of the IO. Erik Parens claims that “Those who already have economic resources will readily gain access to new technologies and those new technologies will make them stronger competitors for more resources” (1998: S8). If Parens’ claim is to hold, then an implicit premise needs to be true, i.e., enhancements of say cognitive capacities must be good investments. Surely, enhanced cognitive abilities could help you in the market. But that does not mean they are good investments. Owning the most recent sports car would certainly help you to transport pizza from place A to B faster, but that does not mean it would be a good investment for a pizza place that could hire a significant amount of additional workers instead. For this worry to hold, we need to consider cognitive enhancements that might enable agents to become more competitive. If they are investments worth making, it seems unlikely that people would not consider taking loans for self-enhancement, in order to increase their expected wage. Banks might even hand out loans for cognitive enhancements in a similar fashion to education loans. After all, if there is an expected monetary payoff, then a market will be created. However, one potential worry is that when everyone is “forced” to enhance in order to stay competitive; inequality in the society will increase while competitiveness remains the same. This precludes the possibility that a society where everyone is enhanced can have positive social outcomes such as higher wealth and productivity. Let me defer this discussion until “[Inequality Leads to a Negative social Outcomes?](#)” section where I discuss positive and negative social outcomes. The enhancements equal out, as everyone is enhanced. Instead of paying for advanced training courses, employers might even consider paying for cognitive enhancements of their employees. Just like many companies offer coffee for free for their employees, they might provide free access to modafinil, a cognitive enhancer that is fairly cheap. Though I deem these markets to be problematic, after all, education loans are hardly uncontested; I argue that there is no substantial difference between current policies against the accentuation of inequality in accepted cognitive enhancements



and the future treatment of enhancement technologies. Hence, they should be treated equally. After all, when one considers education a form of cognitive enhancement, similar concerns arise. Children from a better socio-economic background do receive better education, benefits which can accrue over time. Affirmative action is widely accepted as an intervention to prevent these inequalities to become larger and larger. This gives us reason to believe that similar solutions are available in the case of enhancement technologies. Let me postpone this discussion until “[Prohibition of Human Enhancement, the Best Solution?](#)” section.

A systematic review of Battleday and Brem (2015) in healthy individuals suggests that attention, learning, and memory can be improved by taking modafinil without any negative effects, with long-term effects to be determined. Smart drugs such as modafinil are used among students, faculty, and people in the economy, especially highly competitive jobs such as trading (see Fronda et al. 2018). As many people believe the usage of smart drugs to provide an unfair advantage, perhaps even count as cheating, the number of actual users might be even higher than what surveys suggest. In fact, drinking good coffee over a whole day is hardly more expensive than taking a pill of modafinil. However, why then is drinking coffee morally unproblematic? Whether employers will provide their employees with cognitive enhancements such as modafinil is, of course, an open question, as the profitability and risks of most cognitive enhancements are currently unknown and still under research. However, once we reach the point to make confident statements on the expected life-improving capacity of cognitive enhancements, all the alternative scenarios just suggested seem, if not more than, at least as likely as the scenario of a divided society ruled by a cognitively enhanced elite. Even so, let us grant for the moment that the above worries are well motivated, and the poor will not be able to access cognitive enhancements themselves. In what follows, I consider premise (2) and question whether inequality will really lead to a negative social outcomes.

### Inequality Leads to a Negative Social Outcomes?

According to egalitarians, everyone should be equal. The conception of this equality might differ, e.g., economic equality, equality in well-being, and equality of opportunity (Arneson 2013). Inequalities of all sorts have long been defended on grounds that they improve the overall well-being or improve the lives of those who are worse off. What matters, for enhancement advocates, such as Savulescu et al. (2011), is how different kinds of inequality have the potential to negatively impact society. Several reasons could come to mind: potential oppression, discrimination, unfairness, exploitation, envy, or simply a preference for equality (Mehlman and Botkin 1998). Even if we grant that these are worrisome consequences of cognitive enhancements, we would still have to weigh the benefits against these costs. Proponents of prohibition often

referred to as *bioconservatives* (Bostrom and Roach 2007) seem to either ignore the benefits of human enhancement or implicitly think that they are far outweighed by the costs. To make their claim as strong as possible, I will give them the benefit of the doubt and tackle the latter. While we may grant that cognitive enhancement might decrease overall well-being by introducing inequality, there are other areas where human enhancement can potentially increase well-being enormously and outweigh losses through inequality.

Even if only one cognitively enhanced scientist discovers a new cure to a disease, the effects on well-being would be substantial. Even minor increases in productivity, say 10%, in the workforce could have substantive positive effects in the long-run. Since the industrial revolution, standard of living has improved to a level people could not have anticipated. This is largely due to the availability of new technologies for solving old problems ever more efficiently. Furthermore, I deem it unlikely that someone would be opposed to surgeons taking cognitive enhancers to increase their ability to concentrate during a complicated procedure, just because they would gain a competitive advantage over their peers. The value of saving lives outweighs the negative effects of peer pressure to take enhancers. Competition drives innovation and technological progress, and the availability of cognitive enhancers will only accelerate this process. However, these innovations may vastly improve the lives of others; after all, in most professions, competitiveness is not a mere zero-sum game.

The worry of oppression and discrimination would require being able to determine who is enhanced and who is not, which is impossible with most cognitive enhancements. Unless you would have an enormous scar on your head where a computer chip might have been implemented and people who do not have such scars are discriminated against, the worry rests on the discrimination of those who are less well off. When advantages in society are based on access to cognitive enhancements, rather than claims such as effort and skill, the argument for redistribution seems to be strong, while an account of Desert for those born rich enough to pay for enhancements seems incredibly weak. As argued in my paper *Procreative Beneficence and Genetic Enhancement* (2018), there could be potential solutions to keep the benefits of human enhancement while limiting the costs of inequality, most obviously state-funding. Therefore, what I analyze next is the possible solution of prohibition and how it compares to other alternatives.

### Prohibition of Human Enhancement, the Best Solution?

Even if we accept that human enhancement has the potential to increase inequality in the society and the costs they put on society outweigh the potential benefits, the question arises whether a prohibition is actually the best policy to weigh these against each

other. What we shall be concerned with are the consequences of this prohibition. I argue that it is wrong to think that we have the choice between status quo and a world where human enhancement takes place. The mere availability of one additional option alone can change the whole situation. In the economic domain, one can often observe seemingly irrational preferences. Suppose a customer looks at the menu of a restaurant and orders salmon rather than a steak. However, the waiter then suggests a burger with fries as an alternative that is not on the menu. The customer then replies: “No thanks, but I’ll take the steak now.”<sup>4</sup> This example seems irrational, but one explanation could be that a restaurant selling burgers has the risk of selling low-quality fish, hence, revealing new information. A well-done steak, on the other hand, might then seem like a safe bet. The availability of other options can drastically change a situation, even if prohibitions are in place. One only has to look at the prohibition of alcohol in the USA. Even though a world without alcohol might be better, prohibition might lead to a much worse state of the world with high rates of illegal activity. Applied to human enhancement, it is easy to see that a world where it is illegal does not equal a world where this technology is not available. Illegal provision of cognitive enhancers in black markets is just as possible as the provision of alcohol during the Prohibition. The same applies to common debates in relation to doping, drug abuse, weapons, etc. The liberal argument against the prohibition of different sorts’ points out that even if a technology or practice is considered detrimental to the well-being of the population, the consequences of prohibition might be even worse. Not much more of an argument is needed to point out the failure of the war on drugs in the USA (see Baum 1996). In the following, I am going to argue that the same applies to cognitive enhancements. Let us take a look at several problems suggested in the literature, which need to be considered:

First, Bostrom and Roache highlight that a legal prohibition of human enhancement requires distinguishing current practices of medicine from enhancements, which creates several problems (2007: p.1–3). Proponents of human enhancements as interventions that improve well-being do not have to deal with this arguably arbitrary distinction. When cognitive enhancements like meditation and coffee are legal, but modafinil should be illegal, a distinction would have to be drawn. A distinction perhaps is unjustifiable, similar to the legal status of alcohol compared to marijuana. Second, the prohibition would have to be globally enforced; otherwise, one could still access these technologies at least somewhat legally (Heller and Peterson 2006). Permanent alterations to the human body are hardly detectable nor is there any suggestion how perpetrators should be punished. Would they be forced to undergo brain surgery? What about genetically enhanced embryos that

develop into highly intelligent children? Detection and punishment in all of these cases will lead to heated debates even among those advocating a ban on such practices. Third, Anders Sandberg and Nick Bostrom claim that a prohibition will be an incentive for the creation of black markets, which as with drugs may tend to make these technologies even more expensive, while legal enhancements would become less risky and less expensive as time goes on (2009: p. 333). Not only would a ban make cognitive enhancements more expensive, it could even lead to more inequality than a free market in cognitive enhancements. Fourth, Mehlman and Botkin (1998: chapter 7) raise the question of how those breaking the law should be punished; for instance, will someone with genetic enhancements be forced to alter his DNA back to the point it was before or have to be sterilized? Will people who would have died without enhancements have to be sentenced to death by revoking their enhancements? These issues are not easily avoidable for legislators when effective prohibition is being implemented.

So even if the claim is correct that human enhancement will lead to inequality, the proposed solution of prohibition seems to face severe problems that proponents of prohibition are invited to address. In short, there are several reasons speaking against prohibition and some that speak in favor of other solutions. Let me shortly expand on them. For instance, Nick Bostrom (2003: p.17) proposes subsidies or free access for poor families. I agree with Lamont and Favor (2014: section 6) that the middle ground between open market access and prohibition needs to be considered. As such, it seems that prohibition is not the best policy against the potential risks of inequality. Prohibition is likely to turn out to be worse than many other kinds of regulation that addresses at least some of the legitimate concerns that proponents of the IO have brought forward.

## Conclusion

In conclusion, there seem to be at least three major problems with the *inequality objection* against cognitive enhancements. Firstly, there is no actual empirical evidence that the availability of cognitive enhancements will lead to inequality. There are several reasons to suggest that cognitive enhancements might actually decrease inequality by leveling the playing field. Second, even if we accept that human enhancement will lead to some sort of inequality, it is not clear whether this will outweigh the potential benefits of cognitive enhancements. Even when one assumes a free market without subsidies for such technologies, employers and financial institutes should be happy to support workers in their quest to enhance themselves if it is, in fact, the case that this leads to gains in efficiency. Third, even if the effects on well-being in the society through inequality are substantial, prohibition is very unlikely

<sup>4</sup> I recall a similar example given in one of my economics courses on irrational preferences as an undergraduate.

to be the best policy for maximization of well-being. This is because it is, for instance, plausible to assume that, given that human enhancement is possible and distributed via black markets, there are several plausible ways in which this will affect overall well-being negatively. In light of these concerns, I conclude that even if human enhancement leads to inequality, this is not sufficient to conclude that human enhancement should be prohibited by policy makers. However, this is not to say there might be other arguments than the inequality objection which could warrant prohibition.

**Acknowledgments** I would like to thank Donal Khosrowi and three anonymous reviewers for comments on earlier versions of this paper that helped to shape the paper into its current form. Furthermore, I would like to thank Paula Valero Sancho for discussions on the difference between meditation and drugs.

## Compliance with Ethical Standards

**Conflict of Interest** The authors declare that they have no conflict of interest.

**Open Access** This article is distributed under the terms of the Creative Commons Attribution 4.0 International License (<http://creativecommons.org/licenses/by/4.0/>), which permits unrestricted use, distribution, and reproduction in any medium, provided you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license, and indicate if changes were made.

**Publisher's Note** Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

## References

- Ameson, R. *Egalitarianism*, The Stanford encyclopedia of philosophy (Summer 2013 Edition), E. N. Zalta (Ed.)
- Battleday, R. M., & Brem, A. K. (2015). Modafinil for cognitive neuroenhancement in healthy non-sleep-deprived subjects: A systematic review. *European Neuropsychopharmacology*, 25(11), 1865–1881.
- Baum, D. (1996). *Smoke and mirrors: the war on drugs and the politics of failure*. Boston: Little, Brown and Company.
- Bostrom, N. (2003). Human genetic enhancements: a transhumanist perspective. *Journal of Value Enquiry*, 37(4), 493–506.
- Bostrom, N., & Roach, R. (2007). In J. Ryberg (Ed.), “Ethical issues in human enhancement” *New Waves in Applied Ethics*. Basingstoke: Palgrave Macmillan.
- Bostrom, N., & Sandberg, A. (2009). Cognitive enhancement: methods, ethics, regulatory challenges. *Science and Engineering Ethics*, 15, 311–341.
- Fronza, G., Balconi, M., & Crivelli, D. (2018). Neuroethical implications of neurocognitive enhancement in managerial professional contexts. *Journal of Cognitive Enhancement*. <https://doi.org/10.1007/s41465-018-0100-5>
- Heller, J., & Peterson, C. (2006). *Human enhancement and nanotechnology: a foresight nanotech institute policy issues brief*, Foresight Nanotech Institute. Accessed on 19 June 2015: <http://www.foresight.org/policy/brief2.html>
- Lamont, J., & Favor, C. "Distributive justice", The Stanford encyclopedia of philosophy (Fall 2014 Edition), E. N. Zalta (Ed.), Accessed on 19 June 2018. <http://plato.stanford.edu/archives/fall2014/entries/justice-distributive>
- Lin, P., & Allhoff, F. (2008). Against unrestricted human enhancement. *Journal of Evolution and Technology*, 18(1), 35–41.
- Malinowski, P., & Shalamanova, L. (2017). Meditation and cognitive ageing: the role of mindfulness meditation in building cognitive reserve. *Journal of Cognitive Enhancement*, 1, 96.
- Mehlman, M. J., & Botkin, J. R. (1998). *Access to the Genome. The Challenge to Equality*. Georgetown University Press.
- Mill, J. S. (1874). *Three essays on religion*. New York: American Mathematical Society.
- Parens, E. (1998). *Is better always good? the enhancement project*. The Hastings Center Report, Vol. 28, No 1. pp. 1–17.
- Randall, D. C., Shneerson, J. M., & File, S. E. (2005). Cognitive effects of modafinil in student volunteers may depend on IQ. *Pharmacology Biochemistry and Behavior*, 82(1), 133–139.
- Savulescu, J. (2007). In defence of procreative beneficence. *Journal of Medical Ethics*, 33, 284–288.
- Savulescu, J., Sandberg, A., & Kahane, G. (2011). *Enhancing human capacities*. Hoboken: Blackwell Publishing Ltd.
- Veit, W. (2018). Procreative beneficence and genetic enhancement. *KRITERION - Journal of Philosophy* 32 (1): 75-92. <http://www.kriterion-journal-of-philosophy.org/kriterion/issues/Permanent/Kriterion-veit-01.pdf>. Accessed 5th of June, 2018.
- Veit, W. (forthcoming). Proceedings of the IX Congress of the Spanish Society for Logic, Methodology and Philosophy of Science.