

# Balancing Individual and Collective Benefits in the Case of Cognitive Enhancement

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## Ponderar el beneficio individual y colectivo en el caso de la mejora cognitiva

**ABSTRACT:** The aim of this paper is to analyze the exact nature and implications of the benefits provided by cognitive enhancement. More specifically, I will mainly look into such issues as those regarding the identity of enhancement beneficiaries and whether there are any strings attached to the enjoyment of these cognitive goods. I intend to argue that, in some cases, cognitive upgrades bring individual advantages to the detriment of societal or collective goals, while, in other cases, the situation is reversed: collective benefits are enjoyed at the expense of individual optimality. Apart from outlining the areas in which individual and collective cognitive benefits are most likely to clash, this paper will also try to provide a useful perspective for balancing these sometimes different sets of goals.

**KEYWORDS:** cognitive enhancement; individual benefits; collective benefits; clash of interests

**RESUMEN:** El objetivo de este trabajo es analizar la naturaleza exacta y las implicaciones de los beneficios proporcionados por la mejora cognitiva. Más concretamente, me ocuparé sobre todo de asuntos tales como los concernientes a la identidad de los beneficiarios de la mejora y si hay alguna condición asociada al disfrute de estos bienes cognitivos. Pretendo argumentar que, en algunos casos, las mejoras cognitivas proporcionan ventajas a los individuos en detrimento de objetivos sociales o colectivos, mientras que, en otros casos, la situación es la inversa: se disfrutan beneficios colectivos a expensas de la optimalidad individual. Aparte de delinear las áreas en las que es más probable que se den conflictos entre los beneficios individuales y colectivos, el presente trabajo también pretende proporcionar una perspectiva útil para lograr el equilibrio de esos objetivos que a veces están en conflicto.

**PALABRAS-CLAVE:** mejora cognitiva; beneficios individuales; beneficios colectivos; conflicto de intereses

## Introduction

No other biotechnologies are met with the same amount of skepticism and enthusiasm as enhancements are. Whether we love or hate them, the truth is that we cannot remain insensitive to the expectations that these technologies raise. While pharmaceuticals, medical devices and procedures that are strictly meant to treat or prevent disease and disability are generally welcomed, enhancements raise the public eyebrow. As with all complex social phenomena, this reaction is caused by a multitude of factors: safety concerns, hubristic charges, worry over the loss of personal identity, the deepening of socio-economic inequalities, the distortion of social values and, most importantly, the threat held against human nature itself.

Within the spectrum of enhancing technologies, the neuro-cognitive area enjoys a special status, in the sense that it can fuel on its own all the range of concerns that have been already enumerated. Discussions revolving around mind uploading, brain-computer interfaces, mind-controlled avatars and, ultimately, cognitive immortality augment both the feelings of trust and distrust



in these types of enhancements. In the end, cognitive enhancers are feared and revered for the very same reason, perceived from opposing angles: the brain's importance in fundamentally shaping our personality and identity, as well as its ability to survive and function outside of the human body.

Although the idea of upgrading our cognition does not appeal to many in its most ambitious and visionary format, it is safe to argue that moderate advances in this area have been met with general openness and, moreover, have been even transformed into daily habits. Probably not even the most radical conservatives nowadays would deny a steamy cup of coffee or the advantages of having a personal computer with an Internet connection.

In this context, the aim of my paper is to analyze the exact nature and implications of the benefits provided by cognitive enhancement. More specifically, I will mainly look into such issues as those regarding the identity of enhancement beneficiaries and whether there are any strings attached to their enjoyment of these cognitive goods. I intend to argue that, in some cases, cognitive upgrades bring individual advantages to the detriment of societal or collective goals, while, in other cases, the situation is reversed: collective benefits are enjoyed at the expense of individual optimality.

Let me refer to some concrete examples. Information technologies, for instance, speed up progress, at the collective level, by facilitating interpersonal communication and collaboration, data storage, and data retrieval. Nonetheless, the people using these technologies, taken individually, might be disadvantaged by them in one way or another. Worsened memories, fading vision, or a lack of adequate social skills are only some of the possible drawbacks associated with these devices. One particular area that will occupy a prominent place in my paper is that of democratic reasoning and public decision-making, where cognitive diversity trumps high cognitive ability.

Apart from outlining the areas in which individual and collective cognitive benefits are most likely to clash, this paper will also try to provide a useful perspective for balancing these sometimes different sets of goals. Let me start with the beginning, which in this particular case, amounts to the definition of cognitive enhancement and the ways in which it can be achieved.

## 1. What is cognitive enhancement?

As cognitive enhancement is first and foremost a type of enhancement, I will first explain what I mean by enhancement throughout the length of this paper. Enhancement represents an improvement in a human capacity or in the completion of a task that is dependent upon a human capacity. However, in order for this improvement to be classified as enhancement it needs to evolve from good to better and to be dispensable to a good state of health.

Cognitive enhancement can be seen as an upgrade of the intellect, which is achieved by speeding up different cognitive processes. Some specific aims of this type of enhancement would be boosting individuals' memories, analytical skills or logical rigor. Interestingly enough, the improvement of our cognitive capacities can be an intentional undertaking or simply the byproduct of other non-cognitive enhancements. Suppose, for instance, that by releasing nanorobots in the bloodstream it would be possible to perfectly control insulin production in such a way as to avoid even the smallest insulin spikes. Although one would feel tempted to characterize this enhancement as a physical one, due to the fact that its direct object is the pancreas, in fact, the effects of the nanorobots' activity would also reach the cognitive field. How? First, as there are no insulin spikes anymore, the drowsiness that is usually associated with them disappears as well. As such, mental alertness is prolonged, which means that different cognitive processes may be put to use, in their peak state, throughout a longer period of time. Cognition represents one of those fields in which not only an upgrade in a desired good constitutes a benefit, but also the prolongation of its delivery time. This extended time frame would enable individuals to take advantage of the momentum that is constantly built through uninterrupted focus in order to provide faster and potentially better solutions to their problems.

Cognitive enhancement can be achieved through 'improvement or augmentation of internal or external information processing systems' (Bostrom & Sandberg, 2009, 311). This means that not only human capabilities may constitute the object of cognitive enhancement, but also the end products of these capabilities. Although this distinction might seem irrelevant at a first glance, I believe that it is of great significance for the very reason that in many cases the two types of enhancement cannot coexist, following instead altogether different pathways: that of human and non-human enhancement.

Let me use an example to illustrate this idea. It is that of the mobile phones. Mobile phones represent a technology that we are more than used to. It is many times argued that they have managed to enhance our memories due to the fact that they generously offer their own memory capacity to store all the telephone numbers that we know and might need. But is it really the case that mobile phones improved *our* memory? I doubt that most of us can remember the top three most frequently used numbers if they are dialed exclusively from a mobile phone. The reason for this lack of knowledge is quite simple: we do not need to memorize them in order to make a phone call. What we do instead when we want to call somebody is search for a name, press a button, and wait for the phone to ring. Now, it would be difficult to characterize all this process as an improvement of the human memory because we have not actually made use of it. But it is an improvement in the way in which we complete a task that is dependent on memory. The results of this technology are fantastic: the storage of loads of random strings of numbers that connect us with specific people is no trivial betterment of one's life. Now, despite the fact that the end results of our mnemonic function are extraordinary, our function itself has deteriorated. It would be no false generalization to say that prior to the widespread use of mobile phones, we did know by heart the most frequently dialed number(s).

I hope this example is illustrative of the distinction between the enhancement of human capabilities and that of the end products of these capabilities. It seems that, at least in some cases, the former does not coincide with the latter. As such, it is not useful, nor accurate, to refer to all sorts of technological devices as instances of human enhancement, although they can indeed enhance processes, procedures and results.

Following a similar line, it is important to emphasize that the enhancement of a particular human capacity need not necessarily overlap with a systemic, overall improvement of an individual or of her well-being. We should not be surprised if, after considering all the effects brought by an enhancing intervention, we realize that we are left worse off or at least not better than we were prior to the modification. Allen Buchanan offers a very good example to illustrate this point: 'if your hearing were greatly enhanced, it might not improve your life. It might make you miserable, because you might not be able to concentrate due to all the noise' (Buchanan, 2011, 6).

According to the therapeutic nature of the means used for enhancing, cognitive enhancement can be either genetic or non-genetic. Some would argue that there is a dividing moral line between (1) using a drug or a medical procedure in order to either modify the genotype of a person in such a way as to lead to the upgrade of her phenotype, or to select a genotype that is known to be associated with an improved phenotype and (2) enhancing lifestyle components, such as diet, training, peer selection, caffeine, drugs like Ritalin, Modafinil and racetams.

According to the extent to which traits are to be improved, cognitive enhancement can be classified into three categories: enhancement of characteristics within the normal human distribution, enhancement of characteristics beyond the normal human distribution, and enhancement of characteristics that are not naturally present in human beings. While raising one's IQ from 140 to 160 would account for the first typology, going even further, to an IQ of 200 or 300, would take us to the second class. Adding a new sense, like telepathy, to the five ones that we have inherited from our predecessors would correspond to our third category, which is that of enhancement that no human possesses. The moral concerns associated with these types of enhancement increase in intensity as one proceeds from the first to the last group and are mainly circumscribed to issues such as personal identity and species integration.

According to the kind of recognition that it receives, cognitive enhancement can be divided into two types: front-door and back door enhancement. One can include within the first category those drugs and procedures that are introduced on the market as enhancements. The second typology, however, contains the drugs and procedures that are recognized as treatments or preventative measures, but, at the same time, exhibit the yet untested potential of upgrading normally functioning traits or processes of otherwise healthy people. Unfortunately, the number of back-door enhancements probably exceeds the number of the front-door ones on the medical market. The most notorious examples of back-door enhancing drugs are those of ADHD and stroke recovery medication. As they are meant to boost the cognitive capacities of individuals suffering from different kinds of impairments, they are also used by a large number of people in the hope of upgrading their own cognition from good to better.

Unfortunately, whenever enhancement is introduced through the back door, it is a hazardous undertaking because it is not subjected to rigorous testing that could

determine its short-term and long-term effects on healthy individuals. Nonetheless, the fact that the back-door type of enhancement may pose some health risks does not have any bearing on the safety of the front-door prototype.

## 2. Benefits and beneficiaries: The why and the who of cognitive enhancement

There are many reasons for which someone would decide to be cognitively enhanced. First of all, an upgrade of one's cognitive abilities and the pleasures that could be derived from it might correspond to one's idea of a good life. Second, cognitive enhancement may be pursued not as an end in itself, but for its instrumental value in securing a good job and, together with it, a satisfying socio-economic status. These professional advantages, taken together, may also lead to collective benefits, felt at both the group as well as at the individual level. Suppose more people would be able to perform fairly difficult tasks in one specific area of interest. In that case, it would be only natural to assume that the field in question would grow much faster than otherwise. Extending this type of reasoning to the larger social scale, cognitive enhancement might reasonably be expected to speed up our technological progress and, in this way, improve various aspects of our everyday life.

Third, cognitive enhancement might be embraced as a duty that current generations have in relation to future generations. In Nick Bostrom's view, for instance, utopia, the place towards which humanity should be steered, is characterized by unimaginable intellectual pleasures which cannot be grasped in the absence of adequate cognitive endowments.

Your brain must grow beyond any genius of humankind, in its special faculties as well as its general intelligence, so that you may better learn, remember, and understand, and so that you may apprehend your own beatitude. (Bostrom, 2008, 6)

It is generally believed that the upgrade of our cognition will not happen all of a sudden, but will rather follow a gradual path paved with many milestones in between its starting point and greatest aims. As such, from a generational perspective, it might very well be the case that those individuals who invest the highest amount of effort in drafting the roadmap towards cognitive enhancement will end up receiving marginal benefits as compared to their descendants. However, it is also important to emphasize that although there is an asymmetry with respect to the benefits re-

ceived by each generation, pursuing cognitive enhancement will overall leave everyone better off than not pursuing it.

The significance of the generational perspective for cognitive enhancement becomes apparent also at a smaller scale, namely, in the relationship between parents and their offspring and it manifests mostly in the area of genetic enhancement. From a medical point of view, it is much easier to modify the genome of an individual prior to her birth. This could take place either through pre-implantation embryo selection or gene therapy. These limits related to the time frame of the genetic intervention lead to an interesting situation, although not peculiar to the requirements of parenting: the identities of the direct recipient of the enhancing procedure, on the one hand, and of its decision-maker, on the other, do not overlap. While the parents are the ones to decide, first of all, whether to enhance their offspring or not and, second, what to enhance and to what extent, it is the children who experience and get to live with the cognitive upgrade. Surrogate decision-making is a very common, though not uncontroversial, feature of parenting. Parents make all sorts of decisions related to their offspring and their future, ranging from diet and lifestyle to education and social environment. In this context, why would decisions related to genetic therapies be any different? Ultimately, the very act of choosing a life partner is in itself a choice that influences the genome of future offspring.

There is only one theoretical framework that can accommodate the view that decisions related to genetics are significantly different from any other type of choices that parents have to make. This framework is that of genetic determinism. According to it, we are the direct and unfiltered product of our genetic make-up and there is no escape from the long reach of our genes. As such, if parents decide on the specificities of their children's genotypes they will rob the latter of free will and the benefits derived from its exercise. One could say that embracing genetic determinism annihilates free will from the very beginning because if it is not the parents' choice, then it is the random shuffling of genes during conception that determines the exact phenotype of the future child. However, in order to escape this situation, the proponents of genetic determinism usually follow a religious path according to which the will of a God-like entity endows the future child with a certain genotype that will perfectly integrate her in the grand design of all things. Consequently, changing this genotype will disrupt the desired balance and order, with negative consequences both for the future child, as well as for others around her.

Now, the main problem with the perspective offered by genetic determinism is actually its lack of any scientific backup. An important body of research shows that genotype does not equal phenotype. We are the products of nature and nurture, although we might not currently know their exact proportions in all our phenotypic traits. One interesting example that aroused the interest of the media in the past few years is that of James Fallon and his research on the neural underpinning of psychopathic behavior. Without having a personal history of psychopathic or murderous behavior, Fallon discovered that his genome contained the alleles for violence, aggression and low empathy, including the high-risk variant of the MAO-A gene. He considered the label of a 'pro-social psychopath' as appropriate for his condition, depicting the fact that he exhibited the tendencies of psychopathy but not the actual behavior (Stromberg, 2013). I referred to the example of James Fallon because it is one of the most known and discussed in the debate surrounding genetics and free will. But there are many cases out there, including twin studies, which show how our individual phenotypes are more than the translation of our genotypes. Given all this, parents' decisions regarding their children's genetic make-up cannot be more deterministic than other choices that they make. Also, it is crucial to emphasize that the simple fact that there *is* parental choice in the genetic realm shows there is a lack of independence from the parents' life views from the very beginning. As such, parents will influence their children's genetic make-up either by choosing or refusing to choose a certain genetic configuration. The mere possibility of altering genes annihilates independence. Even if parents abstain, they still make a choice.

Although radical cognitive enhancement pursued through genetic means may be limited at its beginnings to the pre-birth period of an individual's life, this situation might change. Given the exponential growth that characterizes most technologies over time, the input of those that are already enhanced and the natural upgrade of human cognition as captured by the Flynn effect, it is reasonable to assume that genetic cognitive enhancement might eventually be possible during adulthood as well. This would alleviate parents' burden of surrogate decision-making and will foster individual autonomy. However, in order to reach this point, we need to proceed from more modest beginnings.

It can be noticed from this discussion that the goods associated with the improvement of human cognition can be both intrinsic and instrumental. Cognitive upgrade amounts to an intrinsic benefit whenever it is sought solely for the intellectual

pleasures that can be derived from it. On the other hand, cognitive enhancement is instrumental if it is pursued as a means towards another goal, such as that of obtaining a successful job. Some of these instrumental goods are also positional in character, making them prone to being a target for coordination dilemmas and enhancing arm races. Ultimately, this situation does not make any individual better off, at least directly. However, indirectly and at the collective level, it has the potential to accelerate progress in different areas and, in this way, improve the lives of those seeking enhancement for other reasons.

To sum up, I have argued so far that cognitive enhancement is usually embraced for at least one of these non-exclusive sets of reasons: (1) personal preference; (2) professional and socio-economic benefits; (3) as a duty owed to future generations. Interestingly enough, the beneficiaries of the goods derived from cognitive enhancement need not always be those who decide on the enhancement, nor those who are enhanced. I will look into this last issue in the following section.

### **3. Internal contradictions within the nature of the benefits of cognitive enhancement**

There are many examples of technologies that are not characterized by a linear relationship with respect to their benefit scheme. In this context, I define a linear benefitting relationship as that setting in which the agent that performs or exhibits a certain action or behavior is the one to enjoy the bulk of the goods associated with that action or behavior. By contrast, a non-linear benefitting relationship is that arrangement in which the agent that performs or exhibits a certain action or behavior does not receive the main goods associated with it. To put it differently, a non-linear benefitting relationship transforms the main reason for which someone would embrace a particular course of events into something that resembles a spillover effect more than a principal outcome.

We have already seen that when it comes to cognitive enhancement, its beneficiaries need not always be its recipients. As such, we can characterize the benefitting scheme of cognitive enhancement as non-linear. Moreover, it might also be the case that not only do the recipients of the enhancement fail to receive the main advantages, but, in the end, they are left worse off (in some respects) than otherwise.

Most of the time, individuals pursue a certain course of action in order to secure personal benefits and do not regard collective gains as strong determinants for their decision-making rationale. However, losses and disadvantages that are felt at the group level have a higher potential for acting as deterrents due to the way in which societies are built around directly punishing anti-social behavior, while remaining neutral or, at most, indirectly rewarding pro-social attitudes.

Taking this into account, you should not be surprised if and when cognitive enhancements that are clearly pursued and designed for individual gains end up as favoring the collective more. Or when enhancements that are reasonably considered to bring the highest advantages to society at large eventually lead, through an obscure twist of events, to greater payoffs to the members of that society, taken individually.

I will proceed now to outlining those areas in which not only the benefitting relationship derived from cognitive enhancements is non-linear, but it is also relatively conflicting. This means that the agents involved in the relationship present sets of benefits and expectations that are highly likely to clash.

As I have previously mentioned, one of the reasons for which individuals might opt in favor of enhancing procedures would be that of securing a personally advantageous professional environment, which could be positively correlated with a higher socio-economic status. In the end, this kind of benefit is sought in order to improve one's well-being and probably that of one's near and dear. However, even if the ultimate goal is achieved and one does indeed fulfill one's most ambitious career dreams, the enhancement-seeking person might be left worse off in other unexpected areas of her life. In other words, the desired correlation between one's dream job, socio-economic status and personal welfare might be severed in unexpected ways. So, let us have a closer look at this entire process.

Even nowadays, when we have a fairly limited range of cognitive enhancers at our disposal and none of them are able to radically upgrade our cognitive function, having an office job requires intellectual effort that does not remain unaided. Thus, it is fairly common for all sorts of professionals to rely on daily caffeine consumption, which may vary from moderate to high, in order to go through their tasks and achieve their professional goals. Research indicates that drinking coffee, one of the most popular caffeinated beverages worldwide, is beneficial to one's health through

its antioxidant properties. Also, it has been suggested that coffee can protect one from Alzheimer's, diabetes and even skin cancer. The jury is still out on the direct connection between coffee intake and the aforementioned conditions, as chances are that the correlation between them is spurious. Just to refer to one example only, it might be that coffee drinkers are less likely to develop melanoma due to the simple fact that most of the coffee that we drink is consumed indoors, while pursuing some kind of intellectual activity. So, it could be that the lack of sun exposure, which is associated with drinking coffee, is the main protective factor in this reduced risk of skin cancer.

In spite of the highly advertised benefits of coffee, there is also an important mention to be made: they come only when it is consumed in small or moderate doses. However, in many cases and mostly in those situations in which coffee is drunk as a cognitive enhancer, it is very difficult to avoid a high caffeine intake. The rationale behind this behavior is two-fold. On the one hand, caffeine is a substance to which the body may become tolerant in time. Thus, in order to feel the same energy kick and enjoy a similar cognitive response, one needs to constantly increase the daily caffeine dose. Second and partially related to the previous thought, it is usually the norm for employees across different job sectors to exhibit at least the same energy levels as their predecessors. As such, the fact that most people rely on some kind of cognitive stimulant in order to successfully complete their professional tasks acts as a reinforcing loop. While peers are able to get certain jobs done without complaining or demanding extra work benefits, one is also reasonably expected to perform in a similar way. In time, this process leads to more work, translated either into more effort or more time, and leaves everybody worse off. On top of this, high caffeine intake, to which a stressful and demanding job might eventually lead, is inversely correlated with an optimal state of health. More specifically, it is not uncommon, among other things, to experience an increase in one's cortisol levels and heart rate, to be jittery or to suffer from insomnia.

While seeking good professional outcomes, individuals do not only rely on caffeine as a cognitive enhancer. Technology has also provided us with many gadgets and equipment that can act as external cognitive enhancements and to which we can delegate many of the tasks that used to be routinely performed by the human brain alone. From simple calculators to more sophisticated computers, tablets and smart phones, there is a wide range of technological assistance nowadays that can be effectively put

to use for different purposes. Communication technologies, for instance, have been increasingly facilitating human interaction, leading to faster actions and results, a better synchronization of attitudes and behavior and even a higher number of joint projects unconstrained by time and space differences. Data storage has been taken to sky-rocketing proportions through the conquests of nanotechnology, its ability to effectively use every bit of space and also through the advent of cloud computing. However, one of the most impressive and useful deployments of human technology is the easiness and accuracy of data retrieval. Thus, the refinement of search algorithms has transformed search engines into very smooth operators that facilitate access to precise information in less than a second. In this way, as information is readily available for use, many industries and professional areas have known a great boost and increased efficiency in terms of time and other types of resources.

While society at large has definitely come to benefit from this external cognitive support, what happened exactly to the people using them directly? On the one hand, it is relatively safe to say that if one's work domain is flourishing, one's individual career is also prone to being upgraded. Nonetheless, the advantages experienced in this particular area of one's life may be set aside and partially or totally eclipsed by the development of other key determinants to personal well-being. First of all, as the main topic of this discussion is cognition itself, it would be appropriate to identify the effects of external cognitive enhancement on the human brain. As I was emphasizing earlier in the case of mobile phones, it might just be that relying on technological gadgets erodes certain human cognitive capacities by not putting them to direct use. In other words, depending on their type and exact configuration, cognitive enhancers could end up worsening rather than improving various aspects of human cognition. Now, some might argue that this is not an empirically sound statement. The reason is that the external cognitive enhancements, which are in most cases technological devices, can only be used if one acquires the skill(s) associated with their mastery and successful deployment. As such, even if one's memory, for instance, might worsen, there are other cognitive gains that should be taken into account, like improvements in numerical skills and pattern recognition or the possibility of e-learning. In fact, the need to understand and use different technologies is thought to represent one of the underlying factors leading to the Flynn effect, which depicts the constant increase in the human IQ from one generation to another (Flynn, 2012).

In order for the aforementioned arguments to be valid, there is one condition that needs to be met, namely, that the use of different technologies amounts to and presupposes an understanding of how they work. Now, it wouldn't be an exaggeration to state that although most of us are proficient in handling all sorts of devices and gadgets, we are not actually familiar with the way in which they are put together or with the principles behind their functioning. Given this, it would be ultimately incorrect to state that the very intricacy and complexity of a certain technology permeates the mind of its user. After all, the more elaborate a certain device is, the easier it is to use. We take the Internet for granted and rely on it for a wide range of purposes, but how many of us could be able to say what it really is and how it could be replicated? The same goes for telephony, television or computing, just to name a few technological areas that we employ the most on a daily basis.

Similarly, although the Flynn effect does indeed depict a constant human cognitive upgrade, this does not mean that the improvement is largely dependent on external enhancements. There is actually a multitude of factors at play here. Better nutrition, hygiene, even the rendering into routine of Caesarian sections, which allow babies with larger skulls to be born, are also part of the conundrum of variables accounting for the continuous development of human intelligence. On top of this, we do not know how the human intellect would have evolved in the absence of those technologies that have taken over some of our cognitive tasks. This would be an interesting and complex analysis, worthy of its own separate space. In the meantime, the thought remains: there is no direct causal relationship between the use of different technologies and the Flynn effect.

After having looked at the effects of external cognitive enhancements on the functions of the human brain itself, I will now proceed to those areas which are unrelated to our cognition. Have external technologies influenced them in any way? I believe the answer is yes. Health, for instance, has been negatively affected by long hours spent in front of bright screens, with the potential of contributing to eyesight problems, circadian rhythm irregularities and bone structure dysfunctions. Social skills have also not been left untouched. The ability to instantly communicate with a large number of people through different messaging platforms speeds up the completion of certain tasks. However, the lack of direct, unmediated social interaction may compromise one's ability to engage into meaningful conversations and personal relationships.

In spite of all the disadvantages regarding the use of external cognitive enhancements, one cannot deny their input in the development of our contemporary societies. What I would like to emphasize, nonetheless, is that it might be the case that the biggest gains that are to be incurred from this type of technologies is not felt by the individuals that use them. Or, at the very least, they are enjoyed indirectly via the group. As members of a collective whose welfare is dependent on technological progress, individuals might end up receiving lots of benefits. But, on the other hand, their expectations regarding overall well-being might not be fully met. Thus, in this case, the allotment of benefits is skewed in favor of the collective, which comes at the partial expense of its individual members.

Now, the reverse situation is also highly likely to occur, namely, that in the pursuit of cognitive enhancement, the personal advantages drawn by each individual misalign at the level of the group. Right now, this issue is not a particularly worrying problem because the type of enhancements that might lead to this state of affairs has not been developed yet. However, this does not mean that they will not eventually be available or widely used. The main difference between these anticipated cognitive enhancements and the ones that can be already found on the market, either as mild enhancers or as treatments for cognitive impairments, relies on the nature of their direct target. The drugs and procedures that could be labeled at this moment as cognitive enhancers act at the level of the whole brain by stimulating cerebral blood circulation or the communication between the left and the right hemispheres. These drugs are not specialized and do not aim at improving specific cognitive functions. At the very most, they can be directed towards memory upgrading, although not in a radical way. On the other hand, the cognitive enhancers that have the potential of creating some coordination problems at the collective level are characterized by a high degree of specialization. As such, they upgrade particular areas of the brain and their associated cognitive functions. The reason for which highly specialized cognitive enhancers might pose a challenge for groups and societies at large is due to the reduction in human cognitive diversity. This issue is evident into two main contexts: executive board decision-making and democratic decision-making.

According to Hong and Page, each agent that is involved in a decision-making group is endowed with a perspective and a heuristic. A perspective can be defined as 'a problem solver's representation of a problem, an encoding' (Hong & Page,

2001, 126), while a heuristic represents 'an algorithm, or rule(s) of thumb that a problem solver applies in searching for a solution' (Hong & Page, 2001, 126). In this context, cognitive diversity does not depict the diversity of IQs or of cognitive abilities, but rather that of perspective-heuristic pairs. Hong and Page's analysis of the decision-making capabilities of economic agents indicates that cognitive diversity trumps cognitive ability and that a cognitively diverse group will outperform the cognitively highest able group. The explanation of these results lies in the fact that a problem solver's contribution to a group's outcome is context dependent, being circumscribed to 'the relationship between his or her human capital and those of the other problem solvers' (Hong & Page, 2001, 127). As such, collective decision-making should be perceived as a synergistic, rather than an individualistic cognitive endeavor. It is not only about personal cognitive endowments, but also about the way in which each agent's perspective and heuristic relate to those of others and, in this way, add value to the group's decision-making outcome.

Hong and Page's analysis does not solely apply to economic agents. Helene Landemore, for instance, has extended their results to the field of democratic theory as well. According to her, 'democratic reason is more a function of the cognitive diversity of the individuals taking part in the decision than of their individual ability' (Landemore, 2012, 1). Although increasing the number of the individuals involved in the decision-making process is likely to naturally increase the cognitive diversity of the group, 'trying to increase the IQ of the average member of the decision-making group by picking a certain type of people is likely to reduce cognitive diversity' (Landemore, 2012, 6).

With the advent of specialized cognitive enhancers, one does not only need to choose specific individuals, part of a certain cognitive category, in order to reduce the cognitive diversity of the collective. This can ultimately occur naturally if everybody ends up enhancing their cognition in a similar way. The fact that cognitive enhancements dedicated to specific areas of the brain are very likely to be developed gradually and to enter the market in a stepwise fashion means that whoever wants to enhance their cognition will only have to decide whether they want to enhance or not. The method of enhancement will most likely not be prone to choosing. Again, I have to emphasize that this line of thinking applies exclusively to specialized and radical cognitive enhancers.

In this context, the balance of benefits and burdens associated with cognitive enhancement is tilted in favor of the individual and at the expense of the collective. When a cognitive upgrade can be correlated with so many socio-economic advantages, it seems only natural for people to want to pursue this enhancement path. However, the decrease in cognitive diversity that accompanies it may be detrimental to optimal group decision-making. Is there any way to ensure a good coexistence of these sometimes conflicting sets of expectations and benefits, namely, of the individual, on the one hand, and of the collective, on the other?

#### 4. Solving the Clash of Interests

Trying to come up with a good framework for balancing the individual and collective benefits stemming from cognitive enhancement might prove to be a fairly difficult task. The reason lies primarily in the fact that one has to design a solution that somehow takes into account the liberal values on which most of our contemporary societies are either built on or aspire towards. As such, the ideals of individual freedom and autonomy, among other liberal tenets, should be fostered and cherished.

The first step in reconciling the interests of the individual and of the collective in the case of cognitive enhancement is to recognize the fact that they may sometime clash. Second, as I had tried to do in this essay, it would be very useful if each problematic area could be identified and properly described. Right now, it is very hard to anticipate all the specificities that these areas might embrace. In time, however, and as enhancers continue to be developed, it will be a lot easier to pinpoint the most serious obstacles that aim at perturbing the alignment of individual and collective cognitive benefits.

Third and specifically addressing the situation in which the individual is disfavored while the group is favored, it might be a good choice to encourage the pursuit of cognitive enhancement as an end in itself, as a step towards reaching one's image of the good life. The reverse could also apply: discouraging the pursuit of cognitive enhancement as a means towards the attainment of another type of goods. In practice, these two goals could be met through various measures: from policies meant to regulate the amount of effort/time/cognitive capabilities

that different jobs require, to psychological counseling prior to and even after the enhancing procedure.

Finally, in the case in which the individual is benefitted at the expense of the collective, it might just be the safest approach to acknowledge the problem and bite the bullet. Given that a full spectrum of cognitive enhancements can only be developed if and only if one starts from somewhere, the lack of cognitive diversity accompanying this process is inevitable and, fortunately, temporary. However, even if we bite the bullet, this does not mean that we cannot do anything about it. If we cannot avoid the temporary decline in diversity, we may at least speed it up. This could be achieved by encouraging and investing in the cognitive enhancement industry.

Ultimately, consequentialism might act as an appropriate background moral theory that could guide the balancing of individual and collective cognitive benefits in such a way as to promote human welfare.

## 5. Conclusion

Radical and specialized cognitive enhancement is highly anticipated by some, while tremendously feared by others. Although enhancing our cognition can bring us unimaginable goods, it also has the potential of disrupting life as we know it and of changing some of the fundamental characteristics of human nature. In this essay, I have argued that cognitive enhancements may bring benefits to both individuals, taken separately, and to human collectivities as well. Due to the intricacies of the complex social interactions that characterize our contemporary societies, the expectations that these two different sets of agents have regarding the benefits provided by cognitive enhancement might misalign at significant junctures. I have identified here those junctures which may be visible as of yet, and also tried to provide some rough guidelines for transcending them. As a general recommendation, the faster we develop a broad range of cognitive enhancers, the faster we can solve some of the issues depicted in this essay.

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