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SCIENTIFIC CONTRIBUTION

# Doctor, please make me freer: capabilities enhancement as a goal of medicine

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## Abstract

Biomedical innovations are making possible the enhancement of human capabilities. There are two philosophical stances on the role that medicine should play in this respect. On the one hand, naturalism rejects every medical intervention that goes beyond preventing and treating disease. On the other hand, welfarism advocates enhancements that foster subjective well-being. We will show that both positions have considerable shortcomings. Consequently, we will introduce a third characterization in which therapies and enhancements can be reconciled with the legitimate objectives of medicine inasmuch as they improve the capabilities that enable the freedom to pursue personal well-being.

**Keywords** Autonomy · Capability approach · Goals of medicine · Human enhancement · Naturalism · Welfarism

## Introduction

Consider a person who visits the doctor and requests a medical prescription for a drug that will enhance her capabilities to be freer. This scenario would surely be surprising to us for two reasons: firstly, because we do not usually think of this as one of the tasks of doctors, who are essentially there to heal; secondly, even if doctors were there for other purposes, enhancing us does not seem to be in their power. In our view, this particularly responds to some factors that have little to do with the work of doctors. In this regard, the path towards a freer life would go beyond what medicine has to offer.

At the same time, being surprised by this imagined situation is also strange, especially if we pay attention to two aspects of today's reality. Firstly, for a long time now doctors do not only heal people.[1] They prescribe vaccinations in order to improve our immune system, help infertile couples to have children and fertile couples not to have them, and perform surgeries on the bodies of individuals who are not satisfied with their looks. In light of these other things that health professionals do, it is increasingly accepted that the goals of this discipline may also include: enhancing particular functions of individuals, such as their immune response; bringing them satisfaction in terms of preferences or life projects, such as (not) having children; or simply making these individuals feel better, enjoying their physical image and its social consequences—for instance, by means of a hair transplant. These are all medical procedures of our times which aim at increasing people's quality of life. This aspiration is in line with the WHO's broad definition of health in the Preamble to its 1946 Constitution, that is, "the state of complete physical, mental, and social well-being and not merely the absence of disease and infirmity". In this context, we should not be surprised if a patient concluded a visit to the immunologist, the specialist in assisted reproduction or the cosmetic surgeon with the phrase "doctor, please improve my living conditions".

Secondly, those who were initially surprised by the patient's request in the imagined situation above could now acknowledge (after reflecting on what we have just explained) that doctors do not only heal, but also improve our lives and increase our welfare. Still, some may be surprised by the request to enhance our capabilities. This could be due to either ignorance or to the limited importance that they place on a second aspect of reality evidenced by recent findings—the strong (although not determining) influence of biology on our behaviour and the potentialities of biomedicine to modulate it. There are many ways—some safer

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[1] Complementarily, see Hofmann (2001b); Saborido (2020, Chap. 8).

than others—in which science could help us to enhance our cognitive, emotional, physical, or moral capacities, to the extent of allowing us to live much longer than we currently do in order to fully enjoy them. Such an attempt to potentiate ourselves is known as "enhancement" and, under certain conditions, it could free human beings from our biological chains (Harris 2007, Chap. 1; Kurzweil 2005, Chap. 7; Savulescu 2010). Let us think of a person who, thanks to biomedicine, could satisfy their wish to make less deliberative mistakes, control their impulsive emotions, or curb their excessive egocentrism.

There is a very productive philosophical debate on whether such enhancements should be permissible (for a recent review, see Kudlek 2021). As most enhancement would entail biomedical interventions on human beings, the present debate is extended to the goals of medical practice (Young 2015). The objective that we pursue in this article is thus to address whether such enhancements should be integrated in the role of doctors, and if so, in which manner. First of all, we will criticise the arguments that—despite the aforementioned reality of medical practice—attempt to limit the scope of medicine to strictly therapeutic goals. We believe that such a reduction is impossible because any clear-cut treatment-enhancement distinction (TED) lacks both descriptive and normative grounds. In addition, the argument for the strictly therapeutic goal of medicine is implausible. Secondly, after acknowledging the virtues of an alternative conception of the goals of medicine—such as the one referred to by the WHO, which understands therapy as a subclass of enhancement at the service of well-being—we will dismiss it due to theoretical and practical reasons. Then, we will put forward a new proposal of the goals of medicine based on the capability approach. We will argue that this is a stronger alternative to include enhancement into biomedical practice. Lastly, we will defend that enhancing the capabilities related to procedural autonomy can be a manner of making people freer through biomedicine.[2]

## I'm sorry, curing is my only duty

Doctor House believes that his job as a doctor is to treat diseases.[3] He enjoys an established reputation and has a vast knowledge of his discipline. Perhaps his mastery of the job makes him superior to every other colleague at the hospital. His authority is legitimised by two fundamental reasons. One the one hand, his epistemic expertise allows him to skillfully discern the goal of his professional practice: combating diseases. His approach is markedly naturalistic: he leaves his personal values aside and focuses on the facts that interest him, that is, the patients' pathologies, which are seen as biological phenomena that can be identified, studied, treated, and, at best, healed (Saborido 2020, Chap. 2). There is no knowledge to be shared by the patient that he would not be able to decipher himself through his engagement with the case. Furthermore, House is efficient at combating diseases and death itself. His pragmatic attitude seeks to restore the health of individuals, or, what is the same to him, to have them function with normality—understood in biostatistical terms (cf. Boorse 1975, 1977). House believes that the only interests of patients that are worthy of his consideration are either helping them to preserve the good functioning of their organisms or restoring their health in case they are ill. Many see House as a crude and patronizing person. For him, the autonomy of patients is a secondary matter—in other words, he is more interested in diseases than the ill.

However, his conception of the clinical relationship has two advantages. First, his therapeutic view on medicine gives it a clear and unified goal. Secondly, the demands that stem from this perspective are objective: the mastery of medical practice must be directed towards the treatment of diseases. Therefore, it seems evident that House's reaction to the phrase "doctor, please make me freer" would be something like: "You can find a section of self-help books in the library around the corner".

House's naturalist position is supported by some academics who reflect on medical practice and many health professionals. Callahan (1999, p. 104) presents four goals that must be at the heart of the work of medical specialists, that is, preventing disease and injury; relieving the pain and suffering caused by diseases; taking care and curing the ill, and taking care of those who cannot be cured; avoiding premature death and pursuing a peaceful end of life. He rejects medical interventions that go beyond maintaining and/or restoring health because they would alter the meaning of everything around us, to the point that they would erase our very sense of humanity. Picking up from Callahan, Pellegrino (2004) points out that technological advancements allow for a new discussion about what the purpose of professional medicine should be and the boundaries of its scope. For him, an enhancement is something that increases, intensifies, raises

[2] Needless to say, autonomy has been also a recurrent criticism against enhancement. Unfortunately, here we do not have space to meet those critics properly. In the case of being interested, we recommend the clarificatory article published by Heilinger and Crone (2014) about autonomy-based objections and autonomy-promoting arguments in the human enhancement debate. In the case of autonomy in relation to genetic enhancement, see also 1st Author (YEAR).

[3] We take inspiration from the philosophical interpretation of this famous fictional character carried out by Saborido (2020).





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up, exalts, heightens, or magnifies a human capacity. In other words, it means going beyond those functions or traits that are built into our human nature, in the same way as Callahan explained. He understands that even though the fulfillment of people's wishes to enhance their physical traits—or, in a more distant future, to perfect the distinctive characteristics of human beings— could be a logical phase of scientific progress, the goals of medicine are only justified when what is pursued is the restoration of the patient's health. He sums it up in the following utterance: "[T]he physician functions in his time-honored role as healer" (Pellegrino 2004).

It is no coincidence that the big critics of enhancement share this essentially therapeutic approach to medicine. According to Fukuyama (2002, pp. 208–9), the original purpose of medicine is to heal the sick and to restore their health, understood as a natural functioning of individuals that results from the evolutionary history of our species. Complementarily, Kass (2003, pp. 18–9) claims that medicine should act as a "servant" of nature and correct those deviations and deficiencies that distance patients from their natural wholeness. Along these lines, Sandel (2007, p. 47) holds that medicine has a *telos* that orients and constrains its practices: the norm of restoring and preserving the natural human functions that constitute health.

The reflections of these philosophers are very interesting, not only because of the conclusions that they reach, but because they were the first ones to think about the ways in which the goals of medicine could change with the development of new non-therapeutic interventions. They clearly advocate a level of intervention that is very close to what doctor House's case exemplifies.

In what follows, we will introduce two reasons that make us question this naturalistic view on medicine: the irrelevance of the TED[4] and the implausibility of medicine's essentially therapeutic goal. Since the TED has received so much criticism over the last two decades, we will only summarise it here in order to concentrate our efforts on the criticism of the exclusively therapeutic end of medicine, which is much less developed.

From our point of view, the TED is irrelevant for a number of reasons. First, it is deficient at a *descriptive* level because it does not succeed at drawing a clear and consistent line between therapy and enhancement (cf. Bess 2010; Harris 2009; Hofmann 2017; Juengst 1997; Malmqvist 2014; Parens 1998). There are a large number of difficult cases that show how such a boundary is not only vague, but also arbitrary. The inconsistency is evidenced by interventions that lead to the same result but are addressed differently according to each individual's particularities. One of the most cited examples is considering the treatment of a boy with growth hormone deficiency (GHD) as therapy but viewing the same treatment on an extremely short boy without GHD as an enhancement (Daniels 1992). This is even more problematic when this distinction leads to the conclusion that we can administer the hormone to the former boy but not to the latter. Would that not be unfair? Secondly, the TED does not serve as a guideline at a *normative* level, that is, it says very little about the moral permissibility of the practices at one or the other side of the distinction. The TED often raises moral warning flags and it is used as a way to draw red lines between what should and should not be allowed. However, conceiving the TED as a "moral firebreak" is a mistake (Buchanan et al. 2000, p. 307). The ethical validity of biomedical interventions—whether these are therapies or enhancements—must be considered after accounting for a large number of procedural, contextual, and consequential factors that go beyond the simplistic confrontation of the TED.

Similarly, we believe that assigning a strictly therapeutic goal to medicine is unacceptable. There are several authors who support this criticism, such as Buchanan (2011, p. 27), who is sceptical of the essentialist vision of the goals of medicine. Medicine is a profession and a social institution that, for all therapeutic practices it may perform, need not exclude enhancements. Furthermore, even if enhancements were not amongst medicine's own goals, that would not mean that it cannot include them. Traditionally, medicine's practices are influenced by society's values and interests (Juengst 1997, p. 128; see also, Hofmann 2001a; Juth 2011). To Erik Parens (1998), moreover, the essentialist argument has two problems. First, the goals of medicine cannot be universally formulated and are supported by the problematic TED. The second is that this argument does not prevent the appearance of professional figures who wish to perform enhancements without doing it in the name of medicine: the *schmocters*.[5] *Schmocters* (or enhancement doctors) could not care less about the jargon of the goals of medicine, because they do not practise medicine, but *schmedicine* (enhancement medicine). According to Parens (1998, p. S6), those who wish to prohibit doctors from performing enhancements on the grounds of the argument of the goals of medicine

[4] There are further authors who defend the relevance of the TED, see Daniels (2000); Schermer (2013a); Schwartz (2005); Sparrow (2010). More specifically, in Buchanan et al. (2000), Norman Daniels argued that the TED can be supported by reasons of distributive justice. According to him, the naturalistic emphasis on normal functioning marks what a just society must guarantee with its public resources on the basis of fair opportunities (in a Rawlsian sense). In the third section, we will defend a more open-ended conception of justice in relation to enhancement from the capability approach.

[5] Parens (1998) explains that this term was coined by James Lindemann Nelson in reference to Saul Kripke's "schmidentity" (*Naming and Necessity*).

would not be able to prevent *schmocters* from doing the same, as in the case of cosmetic surgeons in the private sector. All in all, contemporary medicine does not have a fixed, binding list of goals that can be used for guidance in many controversial cases, such as the aforementioned enhancement (Buyx 2008, p. 137).

Furthermore, our criticism has an ally who could surprise some of the proponents of the House's position. Recently, Boorse (2016), the proponent of the biostatistical conception of health as a normal function—whose approach has been fundamental to some of the previously cited authors—believes that medicine is compatible with enhancement. We shall summarize Boorse's severe criticism of the essentialist view on medicine in four points. Firstly, he challenged the idea that there is historical continuity in the predominance of fighting disease in the Western medical tradition. In his own words (2016, p. 146): "[T]here never was a classical golden age of purely pathocentric, or even sanocentric, physicians". The different Hippocratic contraceptive methods or Victorian obstetric anesthesia are good examples of that: fertility is not a disease and labour pain is statistically normal in our species. Secondly, he rejects the idea that there is a *telos* or "internal morality of medicine" that allows for an assessment of the virtuous practices of the profession, unlike claimed by some communitarian authors (such as Callahan) and essentialist Thomistics (such as Pellegrino). For Boorse, on the contrary, what shapes the future of medicine are society's "external" demands. Thirdly, based on the fact that many of the medical activities do not seek to treat diseases, he distinguishes seven goals of medicine grouped under two main categories: the ones connected to the patient's best interest and the purely epistemic ones. Lastly, he points out that medicine can adopt practices such as voluntary active euthanasia or enhancement if such practices are in the benefit of the patient's interests. For all these reasons, there are no valid theoretical grounds to oppose enhancement as a genuine and permissible medical practice. However, Boorse (2016, pp. 173–4) doubts that we will have substantial enhancements in the short term. In his view, we must accept that enhancement technologies are still in their early stages, so the familiar medicine of biostatistical normality promotion will continue to prevail in our society.

Since Doctor House will not fulfill our request of enhancement because he is only there to heal—and as his arguments are not persuasive enough—maybe we should change clinics and visit Doctor Welfare.

## It will be my pleasure to enhance you

Doctor Welfare[6] believes that medicine should make people's lives better. According to her, medical interventions should promote patients' well-being. Preventing, treating, and mitigating pathologies are actions that undoubtedly advance that goal. However, Doctor Welfare maintains that scientific and technological innovations open up a range of non-therapeutic possibilities that can also benefit individuals. Medicine, in fact, has never restricted itself to *only* treating diseases, and this still holds true. Following the WHO, this doctor thinks that health consists in promoting a state of complete well-being for individuals. To her, welfarism compels us to raise the standards of our medical practices. This extended view on the goals of medicine demands that medical interventions go beyond treating diseases, allowing the enhancement of healthy people's capabilities whenever that increases their well-being.

Welfarism encourages medicine to promote people's well-being by all means available. It is evident that, because of their training, physicians—be they like Doctor House or like Doctor Welfare—know how to use biomedical means not only to heal diseases, but also to perform non-curative interventions that make their users' lives better. This is particularly relevant in light of the observation that diseases or disabilities do not have exclusively biological causes or forms—they also have social aspects. Our shortages and differences in a social context contribute to our lives being better or worse in a variety of ways. But this is not just about doctors having a broader perspective on disease, but also about being able to use their biomedical knowledge to pursue the goal of improving people's well-being through different means. Welfarists even see therapy as a subclass of enhancement. Since the purpose of enhancement is to make people's lives better, to increase the well-being that is produced in them, this can be achieved both by medically treating the disease and by enhancing the natural potential of human beings (Savulescu 2006, pp. 324–6; Savulescu et al. 2011, pp. 6–8).

Due to this conception of medicine as a discipline open to multiple possible uses to achieve maximum well-being, this proposal overcomes the main shortcomings of the naturalist position. It does not need to differentiate conceptually between therapy and enhancement and openly assumes as part of medicine those non-restorative functions that have traditionally acted in the best interest of the patient, in very general terms.

[6] Doctor Welfare is a figure that we have invented to embody the welfarist position and counter the naturalistic model (reluctant to enhancement) previously exemplified by Doctor House, the famous fictional character.





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However, the understanding of medicine from the point of view of welfare faces a difficult theoretical challenge. Welfare is often conceived as the satisfaction of one's preferences—a position commonly referred to as 'preferencism'.[7] When personal preferences are met, wellbeing is promoted. A recurrent objection relies on the formation of individual's welfare preferences. A person may state a set of preferences as his or her own, when in fact they are not.

Let us think of preferences due to disinformation. Individuals can have particular preferences due to the absence of relevant knowledge. When this ignorance is overcome, it may be the case that those preferences would change. Therefore, satisfying those preferences would not increase their well-being. This implausibility of the concept is clearly seen in what is known as the problem of adaptive preferences. These are the preferences that many people unconsciously build to endure very precarious situations and whose satisfaction makes them feel well and subjectively consider that, because of that, their level of well-being is not as low as it objectively is (Clark 2012; Teschl and Comim 2005). This preference problem also occurs in medical settings and is known as "the disability paradox"—people who, due to a supposedly subconscious adaptive process of their aspirations and expectations, reflect a subjective state of well-being that does not match their serious disabilities or chronic diseases (Albrecht and Devlieger 1999). It also happens with personal preferences in favour or against cognitive or physical enhancements (Schermer 2013b). Satisfying these types of adaptive preferences does not really bring welfare to the individual and also, collectively they are clearly unjust decisions, since they are the result of equating the banal but intense preferences of someone with many opportunities and the survival "preferences" of someone who would also enjoy satisfying them very much due to their precarious circumstances (Sen 1985, pp. 185–203).

This implausibility of preferencism could be avoided if we demand certain conditions of the preferences so that these are taken into account when determining someone's well-being. Preferences should come from informed and autonomous judgements that the individual would reach in regard to the degree of satisfaction with their own life. It would no longer be a well-being based on the mere subjective feeling of happiness that would produce the satisfaction of an immediate preference—it would be about experiencing one's life as satisfactory from a global and well-considered perspective. This would require two things: to be informed of the true conditions of one's life and to have values or goals which are really one's own (Schermer 2013b; Sumner 1996).

Still, it is worth considering whether the preferences adopted by an individual, once they have undergone a process of receiving more information about their social or psychological factors as well as other possible preference options, would really constitute their welfare. Let us think of cases of supposedly autonomous and informed decisions about treatments or enhancements which could not really reflect an increase in well-being. For instance, Jehovah's Witnesses who reject transfusions, people with apotemnophilia who wish a healthy part of their bodies to be amputated, or people who long for strange cosmetic enhancements. All of this suggests that determining the real well-being of individuals cannot be exclusively based on subjective experiences—it must be restricted with some objective conception of what is generally desirable to pursue personal well-being.

## Enhancing human capabilities

Restoring only normal functioning and satisfying only well-being preferences are two different views of the ends of medical endeavour. We have shown that both have some implausible philosophical consequences. Whereas naturalism rejects incongruously biomedical enhancement as something that does not fall within the scope of the doctor's duties, welfarism tends to reduce enhancement to the fulfilment of subjective well-being preferences. In this section, we shall advocate a third conception of medicine that, unlike the naturalistic one, integrates therapy and enhancement in medical practice and that, moreover, values the freedom to pursue personal well-being more reasonably than welfarism.

This novel alternative is based on the capabilities approach and may encourage biomedical enhancement insofar as they improve the freedom to achieve more well-being. We shall first briefly sketch the basic theoretical assumptions of the capability approach. We then delineate the relationship (and differences) between well-being and freedom

[7] Another alternative conception of well-being, although less widespread, is the hedonistic one. This was harshly criticised by Nozick (1974, pp. 42–5), who demonstrated with his imagined experience machine that we do not really think that well-being is just pleasure. If this were the case, we would not hesitate to connect ourselves to a machine that would provide us any type of pleasure that we wished. We want to enjoy ourselves if we have a reason for it (not just a cause for it) or, in other words, a reason that something has happened in the world outside our minds. Only this way we will say that our well-being has really increased—it is not just about feeling better. For a deeper understanding of the keys and limitations of this criticism see, for example, Bramble (2016), Glover (1984, Chap. 7–8) and Unger (1990, Chap. 9). Another less elaborate argument for questioning the identification of pleasure and true well-being could be constructed from the excessive use of pleasure-providing substances. In this line, studies have shown how deep brain stimulation of certain areas associated with pleasure can lead to compulsive self-stimulation and total indifference towards anything else (Portenoy et al. 1986).





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and mention four potentials of this approach concerning enhancement.

The capability approach is a normative framework that focuses on what individuals are able to be and to do. Although its theoretical grounds were primarily established by the works of Amartya Sen and Martha Nussbaum, it is now a perspective adopted by a wide variety of scholars in philosophy, economics, social sciences, human development, or health justice. It is based on two core normative claims: first, the ethical importance of the freedom to achieve well-being and, secondly, that the freedom to pursue well-being needs to be understood in terms of personal capabilities (Robeyns 2016). There is a relevant distinction between capabilities and functionings. While *functionings* are the actual beings and doings, *capabilities* are the (valuable) opportunities to realize those beings and doings. Capabilities are related to freedom to the extent that they are substantive opportunities to accomplish functionings (beings and activities) that individuals have reason to value. This distinction, along with the liberal commitment of its proponents, is key to understanding the relationship between welfare and freedom in the capability approach.

According to Sen (2009, pp. 235–238) and Nussbaum (2007, pp. 171–173), capabilities are generally of greater importance than functionings in terms of designing public policies. In liberal societies, it is often problematic (or paternalistic) to oblige people to do certain activities or to be in some particular way. Conversely, giving people the substantive opportunity for beings and doings that one has reason to value leads to empowerment, that is, it confers more freedom to pursue well-being according to well-informed preferences. Sen (2009), accordingly, argues that "well-being freedom" (capabilities) is more relevant than "well-being achievement" (functionings). When planning public services and other social arrangements (in which medicine could be included), the freedom to advance one's own well-being is of higher priority than straightforward well-being achievement (Sen 2009, pp. 286–290).

The capability approach has moreover some appealing characteristics to being considered as a stronger candidate for including biomedical enhancements within the goals of medicine. We shall develop four aspects that we consider particularly attractive: the advantages of this approach over naturalism and welfarism, its normative and conceptual openness to include practices that foster the freedom to achieve more well-being, its attention to biological factors influencing human freedom and welfare, and its versatility in distributive justice issues.

First, as we have seen, the capability approach acknowledges that well-being is of primary importance. This differentiates it from naturalism, which grounds medical practices on restoring species-typical functioning in biostatistical terms.[8] However, well-being is not simply what matters intrinsically, as welfarists defend (Savulescu 2010, pp. 4–15), but rather improving the freedom to pursue personal well-being in an informed and rational manner. This explicit emphasis on freedom constitutes, in our opinion, a significant advantage of the capability approach over welfarism.

In his seminal Tanner Lecture *Equality of what?*, Sen (1979/1980) stated that there is a fundamental diversity in human beings. Recognizing the pervasive diversity in human affairs and in personal life plans are core foundations of liberal and pluralist societies. Thus, the focus of the capability approach in promoting the freedom to advance personal well-being is overall more liberal than prompting to achieve particular states of well-being. This nuance is also significant in human enhancement debate: achieving welfare through biomedical enhancements could be permissible as long as they are freely and rationally pursued.

Second, the potential theoretical applications of the capability approach are open-ended. It is yet true that the main authors of this trend have predominantly studied topics related to poverty, famines, education, gender inequalities, disabilities, human development, climate injustice, or basic healthcare entitlements. Although the focus has been placed mainly on former topics in poor and developing countries, the capability approach does not necessarily need to be restricted (conceptually or normatively) to such issues (Robeyns 2016).

Human enhancement has been a field that has been particularly neglected by authors aligned with the capability approach, probably because it is a debate mostly concerned with future-oriented and high-tech scenarios and which does not correspond with the most urgent unmet global needs. Needless to say, enhancement debate has been led in rich countries in which basic capabilities are already largely covered. However, this disregard for enhancement from the capability approach is not properly justified. Medicine can impact people's capabilities both through therapeutic and enhancement endeavours. In fact, if enhancement technologies improve human capabilities, they can make us freer, increasing our substantive opportunities to pursue lives of greater well-being.

Third, the capability approach is particularly well-equipped to deal with questions related to the biological

[8] At this point, a clarification is necessary. Although Nussbaum (2007, pp. 179–195) focused on "the species norm", she does not rely on a strict naturalistic view of species-typical functioning related to the philosophy of medicine. Rather, she used it to refer to an Aristotelian conception of dignity, in the sense that a minimum threshold of central capabilities is needed to have a dignified *human* life. We align more with the Senian approach that does not endorse particularly with this view of dignity and who stress primarily the role of public reasoning and what people have reason to value in deciding the most important capabilities (Sen 2004).





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factors of human freedom and welfare. Several important capabilities are partly biologically influenced. For instance, Nussbaum (2007, pp. 76–78, 2011, pp. 33–34) purported a well-known list of ten central human capabilities: (1) life of a normal length; (2) bodily health; (3) bodily integrity; (4) senses, imagination and thought; (5) emotions; (6) practical reasons; (7) affiliation; (8) other species; (9) play; and (10) control over one's environment. Most of them have a biological, genetic, physical and/or mental baseline and, consequently, the new life sciences can expand our knowledge about their underlying factors and increase the possibilities to influence them (Papaioannou 2013; Venkatapuram 2013, p. 278). Thus, the capability approach is adequate to deal with issues corresponding to biomedical enhancement technologies to the extent that they may impact on the biological determinants of (not only basic) human capabilities.

Moreover, this framework can also contribute to not falling into the excessive biological reductionism and "high-tech fetishism" that sometimes abound in the champions of human enhancement (1st Author et al., YEAR). The capability approach stresses all kinds of "conversion factors", that is, the aspects that influence the transformation of a good or a resource into a functioning. These include personal (e.g., psychological or biophysical), social, and environmental conversion factors: all of them influence what a person is able to do or to be (Robeyns 2016). This biology-attentive and context-sensitive nature of the capability approach makes it a comprehensive theory to improve human freedom with all means available, including biomedical ones, while at the same time it does not neglect systemic inequities and structural social injustices.

Fourth, it establishes a metric of justice to make interpersonal comparisons of well-being opportunities and effective freedom. Not surprisingly, the currency is that of capabilities. At this point, we want to address a particular controversy regarding the TED in the domains of medical distributive justice. According to Theo Papaioannou, from the capability approach, therapeutic interventions are manifestly justified whereas enhancement practices lack validity. In his words:

> Therefore to perform genetic interventions (by means of life science innovations) to enhance otherwise healthy people is not justified by the outlined Senian perspective of justice. What is justified is genetic intervention to either prevent or treat diseases that result in a state of basic capability deprivation. (…) Any genetic intervention beyond that point (aiming at unlimited capability development) can be considered as enhancement and therefore can be rejected on the grounds that it increases inequality. (Papaioannou 2013, p. 10).

We want to raise two objections against this view. First, the assumption that (genetic) enhancement would increase inequality is not necessarily true. Enhancement can be used either to decrease current unfair inequalities or to broaden them (Savulescu 2006). This would depend on access conditions and distribution policies that remain open to multiple directions. Secondly, it is disputable that, from a Senian perspective, biomedicine should be limited to therapeutic endeavours while neglecting enhancement ones. In contrast to Nussbaum (2007), who does defend a sufficientarian view of medicine related to health entitlements and human central capabilities, Sen remained uncommitted to any (sufficientarian, prioritarian, or egalitarian) distributive rule (Nielsen 2015, p. 406; Robeyns 2016). He not only has left the distribution patterns as a largely open question, but also do we think that biomedical enhancements could be defended from his normative framework to the extent that they might improve the freedom to achieve well-being. Of course, this does not preclude that therapy or avoiding disabilities could have *prima facie* priority over enhancement. Health and agency-related capability deprivations reflect an absence of substantive freedoms and opportunities to well-being. In that sense, due to reasons of justice, we could overall prioritize treatment over enhancement. Again, however, this does not mean that medical interventions should be limited to treating and preventing diseases and disabilities, but solely that we should guarantee public resources to meet first those basic capabilities.

Summarizing, the capability approach is a robust candidate to include, in theory, biomedical enhancements within the ends of medicine. As in this section we have focused mainly on the theoretical potentials of this approach, in the following section we will provide a practical example of how cognitive enhancement that improves capabilities for procedural autonomy could be included among the goals of medical practices.

## The case for enhancing capabilities for procedural autonomy

Medicine can contribute to making people's lives more autonomous. To some extent, this is not surprising because illness is "autonomy inhibiting" and health is "autonomy eliciting" (Malmqvist 2014, p. 46). Being *more* autonomous, however, depends on a wider range of factors that are not restricted simply to health and disease. In this last section, we argue that enhancing the cognitive capabilities related to procedural autonomy is an objective that could be integrated in the goals of medicine. We start clarifying procedural autonomy, we then address how the capability approach could align with its enhancement and we finally





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mention some biomedical interventions that could be candidates to meet this purpose.

Procedural accounts stress that the process which leads to *autonomous* decision making needs to be rational and self-reflective. According to this view, personal choices are autonomous to the extent that they have survived the standard of critical self-scrutiny. Understood in this way, 'autonomy' refers to the agents' ability to make their preferences and values truly theirs, in the sense that they can identify with them more deeply and stably. In order to achieve this ability, one needs to have certain capabilities for rational decision making and self-control (Berofsky 1995; Meyers 1989; Young 1991). With these capabilities, one can reinforce or change one's values by virtue of processing relevant information, finer deliberation, or a more calmed attitude. Presumably, the value judgement adopted after this kind of procedure will ultimately be more authentically own.[9] Procedural autonomy would thus emphasize the value of the capability to be able to choose thoughtfully personal well-being from a wide and real range of different life plans.

The relationship between procedural autonomy and the capability approach is neither straightforward nor far away. On the one hand, one of the central human capabilities highlighted by Nussbaum is practical reason, that is, "being able to form a conception of the good and to engage in critical reflection about the planning of one's life (Nussbaum 2007, p. 77). Practical reasoning is undoubtedly on the baseline of procedural autonomy. On the other hand, Sen's famous expression of "having reason to value" and his studies on adaptive preferences, although with some caveats, may not be too distant from procedural accounts.[10] Moreover, the liberal and pluralist commitments of both the defenders of the capability approach and the proponents of procedural accounts is another common point. The freedom to pursue the life that one has reason to value, in fact, is dependent on exercising rationality and self-revision of personal goals. Similarly, the capabilities of individuals to assess what they value or to evaluate their own well-being are fundamental to conduct a reflective and autonomous life.

However, some may object that this emphasis on rational self-assessment that procedural autonomy vindicates could be at odds with the criticism of the capability approach to subjective evaluative approaches. We think that this objection, after carefully considered, does not hold true. The capability approach was conceived to overcome the problems of subjective and monistic theories in relation to well-being such as welfarism (Agee and Crocker 2013; Naz 2016; Nielsen 2012). In the second section, we have rejected welfarism (i.e., preferencism) because it is mainly based on the satisfaction of subjective well-being preferences. The criticism that can be directed from the capability approach to welfarism is twofold. Firstly, welfarism is based on a subjective perspective: what counts is the self-assessment of well-being without necessarily considering other external objective factors. The capability approach, conversely, is based on the interpersonal comparison of objective capabilities and functionings, due to the fact that subjective preferences can be distorted because of informational deficits, social injustice, and/or unfair expectations. Secondly, welfarism entails a monistic account of justice because it is based on the single-scaled metric of the fulfillment of subjective well-being mental states. The capability approach, by contrast, has a pluralistic character: it recognizes that there are a variety of capabilities that are necessary to pursue personal well-being.

Having those clarifications in mind, procedural autonomy does not conflict with the aspirations of objectivity (in interpersonal comparisons) and plurality (of valuable well-being) of the capability approach. Rather, it could serve us to emphasize the objective differences between individuals concerning their procedural capabilities to evaluate critically and rationally what kind of personal well-being they want to achieve, without committing to a single or predetermined substantive value scale. Moreover, autonomy—in the sense of the formal requirements needed to the process of preference formation and their reflective self-evaluation—is a relevant constituent of welfare, not something completely separate from it. Thus, the focus is not on the subjective satisfaction of those preferences, but on the capabilities that enable to develop truly autonomous preferences that one has reason to value after a procedural endeavour.

That said, what are the capabilities linked to procedural autonomy that should be enhanced through biomedical means? Overall, procedural autonomy may require capabilities related to cognition, (working and long-term) memory, executive function, information processing abilities, practical reasoning, self-control, gratification delay, and/or the anticipation of the consequences of one's actions. Not surprisingly, Juth (2011) and Schaefer et al. (2014) had argued that some cognitive enhancements can have a positive net impact on improving the autonomy of the agents. Indeed, enhancing cognitive abilities and executive functions might improve the formation of second-order volitions and lead

9FL01 [9] According to hierarchical conceptions of procedural autonomy,
9FL02 self-reflected high-order desires are more authentic and of greater
9FL03 importance than first-order desires (Dworkin 1988; Frankfurt 1971).

10FL01 [10] Procedural autonomy is one of the plausible interpretations that
10FL02 could be given to 'having reason to value'. According to Khader and
10FL03 Khosko (2019), that interpretation is consistent with Sen's refusal of
10FL04 establishing a fixed list of valued functionings, but it is inconsistent
10FL05 with the possible general disvalue of the content (even if reflectively
10FL06 arrived) of some particular functionings. The commitment of proce-
10FL07 dural autonomy with content-neutrality and its avoidance of compre-
10FL08 hensive substantive values (Christman 2005) could conflict, therefore,
10FL09 with the fact that some functionings may generally be considered of
10FL010 negative valence. Khader (2009) also challenged the predominant
10FL011 view of adaptive preferences as deficits in procedural autonomy.





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to more rational and 'freer' decisions (Heilinger and Crone 2014, p. 15).[11]

Cognitive bioenhancement is one the most developed fields in human enhancement. It comprises a wide variety of methods such as widely consumed pharmacological drugs, emerging neurotechnologies, and future applications of genetic technologies.[12] Firstly, some drugs of clinical use such as modafinil—originally developed for the treatment of narcolepsy—and methylphenidate—developed for the treatment of Attention Deficit Hyperactivity Disorder—can be used off-prescription by healthy individuals to enhance working memory, the level of alertness, and concentration (Maher 2008; Maslen et al. 2014).[13] When used in complex tasks, modafinil can also improve executive functions, learning, memory, and attention (Battleday and Brem 2015). Secondly, various neurotechnologies can enhance cognitive performance. Deep brain stimulation can improve episodic learning and memory (Sreekumar et al. 2017; Suthana and Fried 2014). Electroencephalogram neurofeedback training can have positive impact on attentional performance, memory consolidation, short-term memory, or semantic processing in working memory (Dessy et al. 2018). Other neurotechnologies with potential application as cognitive enhancers are transcranial magnetic stimulation and transcranial direct current stimulation (Farah et al. 2014). Thirdly, there are genetic factors that contribute to cognitive abilities and general intelligence. It has been recently suggested that intellectual abilities are influenced by probably more than 500 genes (Hill et al. 2018). Thus, emerging technologies such as the gene editing toolkit CRISPR-cas or preimplantation genetic diagnosis could be used in the not so distant future for reprogenetic cognitive enhancement (1st Author, YEAR).[14]

All in all, medicine could have among its goals the fair distribution of the safest and most effective cognitive enhancers. This kind of enhancement may not only improve the capabilities related to procedural autonomy, but also could empower people to make more rational and critical use of the rest of their capabilities. Cognitively enhanced people, after all, could be freer to pursue their personal well-being.

## Conclusion

The future of medicine is not necessarily at odds with human enhancement. Lately, the possibility of including biomedical enhancement within the purposes of medicine has been hotly debated from two different and opposing perspectives. Whereas naturalism rejects the inclusion of enhancement because it goes beyond the restorative function, welfarism has endorsed enhancement mainly based on its potential to promote well-being. While each position may have some particular appeal, both fail to present a satisfactory approach to human enhancement. Naturalism relies on the dysfunctional distinction between treatment and enhancement and, in many instances, has portrayed a short-sighted view of medicine as restricted to therapy. On the other hand, welfarism (especially in its version of preferencism) can lead to a distorted subjective account to well-being that is particularly problematic in contexts of unchosen inequalities and unfair expectations.

In addition to having presented the deficiencies of both the naturalistic and the welfarist conceptions of medicine regarding bioenhancement, we have argued for a more promising third option. We have defended that the capability approach is a strong alternative that could integrate human enhancement within the goals of medicine. We hope that, as a result, we have redressed the remarkable neglect of the advocates of this framework concerning enhancement debate.

In particular, we have shown that the capability approach has some advantages. First, it seeks welfare (in contrast to naturalism), but it prioritizes well-being freedom rather than well-being achievement (in contrast to welfarism).

[11] A debate that we do not have space to address here is whether some kind of emotional enhancement would also be beneficial for procedural autonomy enhancement. In other publications about moral enhancement, we have argued that empathy enhancement may result in an epistemic advantage that could lead to a more autonomous decision-making (3rd Author YEAR; and 1st Author and 3rd Author, YEAR). For procedural moral enhancement, see also Schaefer and Savulescu (2019). Moreover, we do not rule out that emotional and cognitive enhancement might sometimes overlap. We also have no space to address here the relevance of the social context and of the emotional and embodied aspects of autonomous decision-making that have been highlighted from relational accounts of autonomy. The concept of relational autonomy is useful to solve some alleged shortfalls of the procedural perspectives such as not taking into account (a) the role of emotions and how they affect the agent's competence by relying on fully rational and dispassionate reflection, and (b) that the person builds her practical identity in relationship with a particular social environment. On the other hand, these appeals to the influence of the social environment run the risk of becoming substantive proposals for autonomy that could lead to a perfectionist and paternalist regulation of society (Friedman 2003; Mackenzie 2008; Mackenzie and Stoljar 2000; Stoljar 2017).

[12] Cognitive enhancement can be achieved also by a wide variety of conventional and mundane methods, such as education, enriched rearing environments, diet, caffeine, long-term exercise, mental training, or prenatal supplementation (Bostrom and Sandberg 2009).

[13] Might be worth citing that, according to an online informal survey conducted in *Nature*, around one in five of academics and health professionals make use of cognitive enhancement (Maher 2008).

[14] In addition to genetic cognitive enhancement, one of us has defended that targeting the genetic basis of addictive behaviour is another option to improve future children's capabilities for procedural autonomy (1st Author, YEAR).





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Secondly, it is an open-ended theoretical perspective that can endorse different practices concerning human freedom and welfare. Thirdly, it is sensitive to the biological differences between human beings without neglecting the relevance of social and environmental conversion factors. Fourthly, it is flexible to different distributive rules and can accommodate the extended intuition of why, as a matter of justice, guaranteeing basic health-related capabilities should have priority over enhancement (without rejecting the beneficial impact of the latter). Finally, we have also pointed out that the enhancement of the capabilities related to procedural autonomy could be a desirable end of medicine. That is a way in which medicine could make us freer.

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## Declarations

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