



The ethics of doing human enhancement ethics

Jon Rueda ^{*,1,2}

Ph.D. Candidate in Philosophy, Department of Philosophy 1, University of Granada, Spain

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ABSTRACT

Human enhancement is one of the leading research topics in contemporary applied ethics. Interestingly, the widespread attention to the ethical aspects of future enhancement applications has generated misgivings. Are researchers who spend their time investigating the ethics of futuristic human enhancement scenarios acting in an ethically suboptimal manner? Are the methods they use to analyze future technological developments appropriate? Are institutions wasting resources by funding such research? In this article, I address the ethics of doing human enhancement ethics focusing on two main concerns. The Methodological Problem refers to the question of how we should methodologically address the moral aspects of future enhancement applications. The Normative Problem refers to what is the normative justification for investigating and funding the research on the ethical aspects of future human enhancement. This article aims to give a satisfactory response to both meta-questions in order to ethically justify the inquiry into the ethical aspects of emerging enhancement technologies.

1. Introduction

Human enhancement is a lively and evolving debate.³ The term ‘human enhancement’ refers to the deliberate use of technologies and science-based interventions in the body, brain or genes to improve to the traits, abilities, or wellbeing of healthy and normal individuals (Buchanan, 2011a; Rueda et al., 2023a; Jensen et al., 2020). The range of technologies that may enhance human capabilities is wide; including, among others, neurotechnologies, diverse pharmaceuticals, genetic innovations, prosthetics, nanotechnologies, or cyborgization practices (Erden and Brey, 2022). It is not surprising, therefore, that the study of the ethical aspects of human enhancement technologies has become a burgeoning issue in a number of disciplines. For instance, a recent topic-modeling study shows that enhancement is the subject that has experienced the largest increase in publications in bioethics and philosophy of medicine in recent decades (Bystranowski et al., 2022). Moreover, as Hazem Zohny (2021, p. 4) has pointed out, a search in Google Scholar is enough to realize the vast literature on “human enhancement”, and how these contributions outnumber other pressing topics in applied ethics such as “moral economics”, “poverty ethics”, or “preventable disease ethics”. Comparisons can definitely be odious between different fields of research.

The fact that this literature has proven to be so prolific becomes somewhat striking considering the admittedly future-oriented character that has hindered the human enhancement debate (Roache, 2008). Hundreds of publications have dealt with the ethical

* Correspondence to: Faculty of Psychology, s/n, Campus Universitario de Cartuja, 18071 Granada, Spain.
E-mail address: ruetxe@ugr.es.

¹ ORCID ID: <https://orcid.org/0000-0001-5789-7515>

² Current affiliation: Fulbright Graduate Visitor at the Institute for Practical Ethics of the University of California at San Diego.

³ The title of this article is inspired by a series of publications by Sven Ove Hansson (2015, 2017a, 2017b).

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aspects of yet non-existent enhancement scenarios ranging from the foreseeable, the plausible, the possible, the remotely imaginable, even to the practically impossible. In this article, I will focus on the ethics of investigating the moral problems of these *future* technological applications rather than focusing on the already existing possibilities for enhancement. The reason is that the former ethical analyses are the most challenging and the most subject to criticism.

They are challenging, on the one hand, because numerous enhancement applications depend on emerging technological developments, which confer an epistemologically uncertain status to the ethical claims about these future technological uses (Mittelstadt et al., 2015; see also Lucivero, 2016). The gap between the realistic technoscientific possibilities and their ethical analyses, moreover, has often been too broad (Ferrari et al., 2012; Nordmann and Rip, 2009). In this regard, it has been recurrently denounced that speculation has predominated in the human enhancement debate (Ferrari et al., 2012; Jones, 2006; Roache, 2008; Schick, 2017; Jensen, 2020). Some have even pointed out, as Armin Grunwald has, that much of the discussion about enhancement “can truly be called pure speculation” (Grunwald, 2010, 97). If speculation is a debatable method for normatively analyzing future enhancement scenarios, then much of the literature would be afflicted with this deficit.

The ethics of future human enhancement is subject to criticism, on the other hand, because there are normative reasons to question the legitimacy of this scholarship, or at least its priority over other research. There are several arguments in this respect. First, these studies are part of a growing trend in ethics that pays disproportionate attention to the future while neglecting the present (Zohny, 2021). This is problematic both when these analyses neglect present and more proximate problems of these same technologies (Jones, 2006, 80; King and Jones, 2011, 147; Nordmann and Rip, 2009; Schermer et al., 2009), and also when they distract us from other more pressing present problems unrelated to these innovations (King and Jones, 2011, 147; Nordmann, 2007). Second, there is a kind of “high-tech fetishism” that favors research on the ethical aspects of cutting-edge technologies to the detriment of other non-technological social issues (Fabi and Goldberg, 2022, 4; Guyer and Moreno, 2004, W16–17; Nordmann, 2007, 44; National Academies of Sciences, Engineering, and Medicine, 2020, 54). Thirdly, professional ethical research is a scarce resource, the distribution of which is a question of distributive and social justice, in which prioritizing the study of future scenarios of enhancement over other more urgent issues becomes a problematic phenomenon (Hansson, 2017b; King and Jones, 2011; Nordmann and Rip, 2009; Zohny, 2021). Hence, the opportunity costs of this academic scholarship are not negligible.

The questions and doubts that arise from these particularities are many and far-reaching. To what extent can we rely on normative analyses performed on hypothetical technological scenarios? How can we evaluate the moral issues of uncertain future technologies from our present values and limited empirical knowledge? Are we wasting time and resources researching issues that may never come to pass while neglecting pressing contemporary problems? For some people, considering those challenging questions, academic attention to the human enhancement debate may be overemphasized (Lucke et al., 2010; Nordmann, 2007). Or even worse, it may be questionable on ethical grounds. Is it ethical to do human enhancement ethics? In this article, I focus on the two main concerns in the literature that have questioned the legitimacy of the scholarship around the ethics of future human enhancement. I will formulate them as second-order questions to help us rethink the ethics of doing human enhancement ethics. These meta-questions point out relevant puzzles that we should consider in the research on the ethical aspects of emerging human enhancement technologies. Call the first meta-question the *Methodological Problem* and the second one the *Normative Problem*. They go as follows:

The Methodological Problem: How should we methodologically address the ethical aspects of future applications of human enhancement technologies?

And.

The Normative Problem: What is the normative justification for investigating and funding the research on the ethical aspects of future human enhancement technologies?

The answers to these second-order questions have unfortunately not been entirely systematic. Therefore, my goal is to give a satisfactory answer to both problems. Moreover, in my view, both meta-questions are not entirely unrelated. To some extent, the ethical conclusions that we draw from specific topical research depend on the methodological approach that we choose. This is something that already happens in most scientific disciplines. The quality and rigor of the results depend on the methods employed. That is, methodological aspects are fundamental because they determine the validity and soundness of the results. Then, the methods adopted in the ethics of human enhancement may influence the normative legitimacy of these investigations. In other words, the normative desirability of investing time, money, or human resources in the ethics of enhancement can be increased if we improve our research methods about the moral aspects of future technologies.

To meet my objective of responding to both meta-questions, the structure of this article is the following. In the section about the Methodological Problem, I approach the so-called ‘speculative ethics’ and ‘anticipatory ethics’. Both terms refer to different methodological approaches and, unfortunately, are sometimes used vaguely. Therefore, I will offer a conceptual clarification of both notions, showing the particularities that characterize them, and the pros and cons of each. In the section about the Normative Problem, I clarify the nature and scope of this challenge by summarizing the most recurrent concerns in the literature. I present three objections, to which I provide counterarguments. After that, I will offer four reasons to publicly fund the research on the ethics of enhancement technologies in a world with competing scientific priorities. The arguments are based on the defense of academic freedom, on consistency with other concerns, on trying to maximize the social utility of these technologies, and because of the progress made in this debate. Finally, I will offer some concluding remarks.

2. The methodological problem

In bioethics, methods matter (McMillan, 2018). The human enhancement debate is not an exception. Since methods influence the reached conclusions, and these results can have a public impact, we must pay attention to the methods we use in bioethics (Herissone-Kelly, 2004). Interestingly, methodological choices are not value-free (De Melo-Martín, 2017, 207; Lucivero, 2016, 17). Thus, what methods to use when doing human enhancement ethics is an *ethically* sensitive decision. This becomes more noticeable when we look at the future-oriented nature of many enhancement interventions. What kind of methodological approaches can be used for addressing the ethical aspects of future enhancement scenarios? Are these methods equally desirable?

In this section, I shall address two approaches that have been specifically used (and discussed) in ethical debates about human enhancement and other emerging technologies: ‘speculative ethics’ and ‘anticipatory ethics’. Although the ethics of human enhancement can be analyzed by other classical bioethical methodologies (such as principlism, casuistry, or deliberative approaches), I will restrict my analysis to these two for being distinctive in the controversy about future technologies—and yet require clarification.⁴ After addressing both, I will give some recommendations to improve the methodological deficits in the ethics of human enhancement.

2.1. Speculative ethics

Simply put, speculative ethics is ethics based on speculative methods. This unqualified definition, however, is descriptively poor and masks the fact that the term ‘speculative ethics’ is often used in a pejorative way. As mentioned by S. O. Hansson:

[speculative ethics] is usually employed in a derogatory sense about thoughts or discussions “of a conjectural or theoretical nature.” In discussions on philosophical style, it refers to claims or arguments that are based on implausible or unrealistic assumptions. Perhaps a less pejorative terminology, referring to “unrealistic,” “fictional,” or “imaginative,” rather than “speculative” thoughts and examples, would have been preferable (Hansson, 2020, 631).

It is important to note, as Hansson does, that a more neutral definition is possible and even necessary. What does speculation mean in ethics? And how is speculation used in the human enhancement debate? To answer these questions, it is worth to first consider some examples. By way of illustration, I shall address two thought experiments from the moral enhancement debate.

First, Julian Savulescu and Ingmar Persson (2012) proposed an intriguing thought experiment called the “God machine”. The scenario is as follows. In 2050, when the field of optogenetics and the science of morality is far advanced, people’s genetically modified neurons can be controlled by a bioquantum computer named the “God Machine”. This bioquantum computer “could monitor the thoughts, beliefs, desires and intentions of every human being”, being also “capable of modifying these within nanoseconds, without the conscious recognition by any human subjects” (Savulescu and Persson, 2012, 412–413). The God Machine would only intervene to stop human actions that would cause great harm and/or grossly immoral behavior in which the perpetrator would have landed in jail. With this highly speculative scenario, Savulescu and Persson wanted to argue, *contra* Harris (2011), that losing “freedom to fall” is not something to regret when benefits are great for people and society.

Second, I have also used this type of speculative argumentation when proposing a thought experiment called the “ultimate mostropic” (Rueda, 2020).⁵ This refers to a future moral enhancement possibility based on an extremely cheap and completely safe pill that enhances “cognitive, emotional and motivational abilities related to moral behavior far beyond what is normal in members of the human species” (Rueda, 2020). My intention with this (highly implausible) best-case⁶ scenario was to argue, *contra* Persson and Savulescu (2012), that a moral bioenhancement program aimed to mitigate climate change would still have exhaustive implementation challenges and huge collective action problems.

Those examples make salient prominent characteristics of speculative ethics and may help us understand how speculation may work around human enhancement. In both cases, speculation is a philosophical strategy aimed to defend a position about a particular dispute. As an argumentative technique, speculative reasoning poses the question of “what if” (McMillan, 2018). Speculation is then related to “mere possibility arguments” (Hansson, 2020). Regarding future-oriented speculation, it generally refers to cases in which one recurs to foreseeable, futuristic, or remotely possible scenarios related to technology. This form of reasoning is commonly based on “a set of unknowns, or unverified social, empirical, and scientific knowledge about the future” (Racine et al., 2014, 327). As the ethics of human enhancement is closely related to emerging and future technologies, it is not surprising that speculation has thus played a methodological role.

At this point, the features of speculative ethics should become clearer. Speculative ethics is an argument-derived methodology,

⁴ It is well-known that traditional bioethical methods can have limitations to solve bioethical issues (Holm, 1995; Sorell, 2011). Regarding human enhancement debate, many conspicuous contributions had come from moral philosophers employing ethical theory and conceptual analysis. Precisely, some have even argued recently that the normative debate on human enhancement can benefit from bringing the various positions of ethical theory into greater dialogue (Kudlek, 2022). Concerning the two methods I shall present here, the application of ethical theories would not simply be restricted to speculative ethics, but can also play an important role in anticipatory ethics (Nestor & Wilson, 2022, 25).

⁵ I have also used an introductory speculative case in Rueda (2022b).

⁶ This best-case scenario was inspired by the methodology of “pragmatic optimism” proposed by Nick Agar (2004, 34), which is based on a “technologically ideal scenario” that “intentionally abstracts from considerations of risk and feasibility” to more clearly focus on the ethical aspect of the situation. For the role of worst-case scenarios in the ethics of enhancement and the future of humanity, see the proposal of the “heuristics of fear” of Hans Jonas (1984).

triggered by questions like “what if”, disengaged from prediction and often empirically unsubstantiated, which tolerates an elevated level of abstraction, giving more value to theoretical and conceptual conclusions than to practical recommendations (such as regulation or policy). Understood in this way, speculation is a recurrent and long-standing tactic in bioethics and philosophy, especially in the analytic tradition. That said, what are the advantages and disadvantages of this methodology? Since the term ‘speculative ethics’ has recurrently been used as a negative indictment of the enhancement debate, I will start with the drawbacks.

Among the arguments against speculative ethics, the first important objection is that this method has little value for practical problems. In debates that require high levels of realism, speculative ethics is of little help. This is because scientific details are key in practical ethical analysis (Guyer and Moreno, 2004) and speculative approaches often avoid them (Maslen, 2015a, 2015b). For example, some ethical debates about neurotechnologies lack a “reality check” (Evers, 2005; Kushner and Giordano, 2017). These facts can make speculation positively harmful to applied ethics (Hansson, 2020). Moreover, in bioethics, where it is often necessary to arrive at a tentative solution to practical moral problems, the use of speculation (and the abuse of “farfetched possible worlds counterexample”) can be counterproductive (McMillan, 2018, 93).

A second methodology-related objection arose from nanoethics. The “what if” of speculative ethics might derive into the “if-and-then syndrome”, namely, a “radical foreshortening of the conditional” (Nordmann, 2007, 32). This process can be described as follows:

‘If-and-then’ statements begin by suggesting possible technological developments and then indicate consequences that seem to demand immediate attention. What looks like a merely possible, and definitely speculative future in the first half of the sentence (the ‘if’), turns into something inevitable in the second half (the ‘then’). As the hypothetical gets displaced by a supposed actual, the imagined future overwhelms the present (Nordmann and Rip, 2009, 273).

According to this second concern, speculative ethics misleadingly validates hypothetical futures. It diverts ethical attention from present issues to emerging or future issues. Doing so, the “if-and-then” methodological challenge may present future enhancement applications as actual ethical issues (Nordmann, 2007, 34; Schick, 2017). In this way, the speculative future overwhelms present considerations, making the enhancement discourse blind to the historical contingency of technological trajectories (Nordmann, 2007, 39). Worryingly, speculative approaches can therefore reinforce deterministic visions about technology (Ferrari et al., 2012; Schick, 2016, 2017) and risk perpetuating problematic scientific misconceptions (King and Jones, 2011, 143). This “if-and-then” phenomenon can be considered a frequent argumentative practice, not only restricted to the type of thought experiments recently presented.⁷

Although these objections are important, they should not prompt us to abandon speculative methodologies altogether. Speculative ethics has also some advantages. It can generate theoretical knowledge (Maslen, 2015a, 2015b) and it is a valid method for ethical theory or foundational moral philosophy (Hansson, 2020). Furthermore, speculative ethics can have an instrumental value, being able to motivate important ethical projects (Roache, 2008), particularly when it acknowledges its assumptions explicitly (Racine et al., 2014).

However, as we have seen, speculative ethics is not good at foreseeable predictions or foresight—nor does it need to be interested in it. Many ethical debates about emerging enhancement technologies require urgent practical responses and regulations in which empirical evidence and the current state of technoscientific knowledge are important. So, to deal with future problems from a practical perspective, it may be better to contemplate other methodologies.

2.2. Anticipatory ethics

Anticipatory ethics is a flourishing approach to emerging technoscientific issues (Brey, 2012a, 2012b, 2017; Diakopoulos & Johnson, 2020; Johnson, 2010, 2011; Nestor & Wilson, 2022). It has been considered as a more methodologically rigorous way to engage with the moral implications of future technologies (Gordijn and ten Have, 2014). Unfortunately, the term ‘anticipatory ethics’ is too often used without proper clarification. Before analyzing the methodological potentials of anticipatory ethics when applied to enhancement technologies, its meaning should be specified. A first difficulty is that some previous definitions conflate speculation with anticipation (Racine et al., 2014, 327), or consider anticipation as a subcategory within speculation (Schick, 2019, 262n3, see also Schick, 2016, 227ii). This is misleading. To offer a more consistent characterization of anticipatory ethics, we need a clearer demarcation from speculative ethics. I believe that anticipatory ethics can be defined more consistently and in a way that better clarifies its distinguishing characteristics.

Anticipatory ethics refers to various methodologies characterized by their systematic, strategic, and proactive approaches to emerging technologies in which the ethical analysis is combined with foresight (Brey, 2017, 175; Nestor & Wilson, 2022; Racine et al., 2014, 328; Schick, 2017, 25). These exercises attempt to match plausible or possible futures with desirable ones. In a nutshell, anticipatory ethics is a foresight-derived methodology, often triggered by interdisciplinary studies that are empirically informed and science-based, which gives more value to applied and practical issues than to abstract theoretical ones, and which may have regulatory and policy-oriented character. Moreover, in its recognition of the complexity and uncertainty of its objects of analysis, anticipation does not necessarily involve prediction (Ankeny et al., 2022; Brey, 2017; Lysaght, 2022)—although, of course, “predictability is a matter of degree” (Bostrom, 2007, 134).

Anticipation can operate in many forms in bioethics—a discipline with a consolidated pedigree in the forward-looking analysis of

⁷ Moreover, not all thought experiments are speculative. Regarding technology, thought experiments are speculative if they are based on futuristic applications or remotely possible scenarios. See Wilson (2016) for an analysis of methodologically rigorous developments of thought experiments in ethics taking into account internal and external validity.

ethical aspects of future technologies (Schick, 2017; Scott and Barvely, 2022). In recent years, however, the field of ethics of technology has been more fruitful in developing particular methodologies that combine foresight with ethical analysis.⁸ Prominent examples are the following: the checklist of the ethical technology assessment (Palm and Hansson, 2006), the techno-ethical scenarios approach (Arnaldi, 2018; Boenink et al., 2010; Stemerding et al., 2010; Swierstra et al., 2009), ethical impact assessment (Wright, 2011), the ETICA approach (Stahl et al., 2010), the moral plausibility approach (Lucivero et al., 2011; Lucivero, 2016), anticipatory technology ethics (Brey, 2012a, 2012b, 2017), and the methodology of translation from discourse ethics (Mittelstadt et al., 2015). Each of these models has its own particular methodological approach to deal with the ethical aspects of emerging technologies. Moreover, anticipatory ethics is permeable to other methods of foresight from technology assessment and future studies, such as horizon scanning, expert consultation, scenario methods, Delphi panels, trend analysis, relevance trees, roadmapping, participatory foresight, and so on (see Brey, 2017). And it can use diverse methods for collecting stakeholders' perspectives, such as interviews, nominal group techniques and (again) Delphi panels (Nestor & Wilson, 2022). Using these methods would help to give greater legitimacy to the normative analyses of future human enhancement (Zohny, 2021).

Here a significant difference emerges between speculative ethics and anticipatory ethics in relation to how (and for what purpose) to engage with future scenarios. In contrast to speculative approaches, most anticipatory ethics models delineate a particular protocol to gather information about future developments and to analyze the ethical aspects at stake. Anticipatory ethics approaches show that some methodology is required that is not restricted argumentative efforts of moral philosophy. The use of forecasting and foresight models are good examples of *how* to engage with the future. Forecasting (or predicting) is to state that something will happen (and when). Foresight is to envision that something may happen. In the latter, multiple futures are possible because diverse courses of action might lead to different futures. Regarding the *purpose*, the use of foresight methodologies enable influencing the futures that are envisioned (Masum et al., 2010; Gariboldi et al., 2021). Estimating the plausibility that something may happen in the future can influence our present behavior. Therefore, a distinctive feature of anticipatory ethics is to envisage future technological scenarios in order to prepare for present action with the aim of influencing the trajectory of development of the technology under discussion, as initially conceived by Deborah G. Johnson (2010, 2011) and Philip Brey (2012a) (2012b).

Moving from speculation to anticipation has then some advantages. Anticipatory methods are "the only ones capable of detailed and comprehensive forward-looking ethical analyses of emerging technologies" (Brey, 2017, 183). These approaches have two noteworthy potentials. On the one hand, in anticipatory ethics, interdisciplinary work is reinforced. As the devil is in the details, great attention is given to the scientific premises underlying ethical evaluations. Thus, collaboration with scientists who are experts in technological developments can be of great help. On the other hand, anticipatory ethics can improve public deliberation by clarifying fundamental issues at stake and offering a "responsible representation" of the ethical quandaries (Nordmann, 2014). This can be especially useful for regulatory efforts (Schick, 2017), the democratic governance of emerging technologies (Nelson et al., 2022; Scott and Barvely, 2022), and responsible research and innovation (Nordmann, 2014). In addition to promoting public interest and societal engagement, anticipatory ethics facilitates the early intervention on technological development to align it with widespread values and socially desirable goals.

Anticipatory ethics has some drawbacks, though. First, when disproportionate stress is placed on the potentially adverse effect of concrete technologies, it may run the risk of scaremongering (Carter et al., 2009; see also Rueda, 2023). Second, anticipatory bioethics can function as a problematic discourse of legitimation when it does not properly interrogate the technological future and when the agency in the present is bypassed (Schick, 2017, 25). Third, the persistent fact of uncertainty is inescapable, even if it sometimes comes in degrees (Brey, 2017; Mittelstadt et al., 2015).

Summarizing, anticipatory ethics has a variety of methodologies, which, although still in their infancy, hold great promise for a more rigorous analysis of the ethical aspects of emerging technologies. The human enhancement debate can benefit greatly from the use of these methodological approaches.

2.3. A methodological plea for human enhancement ethics

The future orientation of enhancement technologies makes their ethical evaluation methodologically challenging. This section is aimed to answer the Methodological Problem. In the introduction of the article, I have formulated this meta-question as to how we should methodologically address the ethical aspects of future enhancement applications. I have shown that speculative ethics and anticipatory ethics are two distinct options for that purpose. It follows then that there are at least two ways of responding to this "how". But, as I wondered above, are both equally desirable?

My response is that it may depend on the goal of each research contribution. Both approaches have different characteristics and (dis)values. After all, the methods of human enhancement ethics may have diverse utilities. Speculation can particularly be a respectable argumentative strategy in philosophical bioethics, in which human enhancement possibilities can elicit stimulating theoretical and conceptual quandaries. But if speculative ethics was used instead to give highly implausible future examples in a panel discussion on near-term technology policy, it can be completely misleading. When we are interested in giving effective societal responses to emerging enhancement technologies, anticipatory ethics is more convenient. Indeed, the potentials of anticipatory approaches can be beneficial for building public policies and achieving a more down-to-earth democratic governance of technoscience.

⁸ This fact brings the issue of whether anticipatory ethics is mainly conceptual (based on some necessary and sufficient features) or also a sociological (practice-based) phenomenon. Although this question needs further discussion, my characterization gives room for both (not mutually exclusive) interpretations. I thank this comment to Aksel Braanen Sterri.

That advantage does incline me to believe that anticipatory ethics may usually be more satisfactory than speculative ethics when discussing practical issues of future enhancement technologies. So, anticipatory ethics includes various innovative frameworks that should be increasingly applied to the ethics of human enhancement. This does not mean, of course, that speculative or non-anticipatory methodologies should be rejected across the board. In (bio)ethics, there is room for a diversity of approaches. What is important is to be transparent about the purposes of each publication and to explain why one takes one method instead of the other, either speculative or anticipatory (Maslen, 2015a, 2015b). This would help move the debate forward. Therefore, I recommend that future works should make explicit the nature of their contributions when analyzing prospective enhancement scenarios. At the normative level, both theoretical and practical objectives are legitimate, but it is desirable to state which method is used to achieve each end, since each methodology has its advantages or disadvantages. Table 1 summarizes the particularities of speculative and anticipatory methods.

3. The Normative Problem

After responding to the Methodological Problem, we must now address the Normative Problem. We shall first approach the three most recurrent objections to doing human enhancement ethics. I argue that these interesting objections, which sometimes overlap to reinforce each other, are not convincing enough to deny the importance of doing ethics about future enhancement technologies. At best, they could make the case for paying *less* ethical attention to these potential technological interventions. After overcoming these objections, I will briefly offer four reasons for doing and funding human enhancement ethics.

3.1. Time preference objection: the present goes first

The *Time Preference Objection* holds that ethical analyses should mainly focus on the most current (or imminently) pressing problems. Because we *now* have other more demanding challenges, the argument runs, devoting attention to future enhancement technologies is objectionable. For instance, Zohny claimed that academics in ethics have placed a “disproportionate focus on the future” (Zohny, 2021, 4). The argument that contemporary issues require more attention has been quite extensive, taking mainly two formulations.

Firstly, analyzing future problems of emerging technologies may divert attention from the current or nearby problems of these *same* technologies (Jones, 2006, 80; King and Jones, 2011, 147; Nordmann and Rip, 2009; Schermer et al., 2009). That is, it is problematic to attend to futuristic aspects of technologies if this causes us to neglect more likely unnoticed aspects of these very technologies.

Secondly, ethical evaluations of future enhancement technologies neglect *other* more pressing social issues unrelated to these technologies (Nordmann, 2007). As mentioned by Michael King and colleagues, other competing priorities also need ethical scrutiny, such as “demands made by suffering due to famine, environmental disasters, or war, the needs of the infertile, the chronically sick or the terminally ill” (King and Jones, 2011, 147). Undoubtedly, this list could be much longer, including extreme poverty and malnourishment, widespread preventable diseases, ecocide, gender and racial oppression, basic human rights violations, gross socioeconomic inequalities, violent armed conflicts, dictatorships, or massive animal slaughter, to name a few.

This objection has some obvious appeal. Almost everyone is concerned about the present. However, this objection is philosophically weak. To begin with, both formulations have shortcomings. On the one hand, when ethically evaluating emerging technologies, it is often their future developments, not their present ones, that are most important (Johnson, 2007). An emerging technology is a radically novel, relatively fast-growing technology that is still in development and that may have a large (although uncertain) socioeconomic impact in the future (Brey, 2017, 175; Rotolo et al., 2015). By definition, technological emergence refers to the fact that the future impact is presumed more important than the current or imminent one. Then, if we are analyzing the ethical aspects of emerging enhancement technologies, their future impacts can require more ethical attention than their present ones. On the other hand, many of today’s pressing problems not related to enhancement may in the future be affected by enhancement technologies. For example, it is not difficult to imagine wars with enhanced soldiers, the existence of greater inequalities because of the enhancement gap, or more sophisticated domination of non-human animals due to animal disenchantment. So, if we are concerned about these issues, we should also consider how they may be affected (or increased) by enhancement technologies in the future.

There is another criticism of this objection that I believe is even more devastating. Present problems are not important simply because they occur in the present.⁹ Problems should primarily be considered for their magnitude and intensity, not simply because they take place in the present or the future. Undoubtedly, the temporal moment in which problems occur is something to be taken into account. But this does not imply that we should always give greater preference to present problems than to future ones. Having a headache today is less worrisome than having an advanced stage of cancer one year from now. As already warned by Rebecca Roache (2008), some currently pressing issues may also be distracting or less important than future problems. Therefore, in order to assess the priority of one societal problem over another, we must be concerned primarily with the content and dimension of the problem itself. Some of those who support this objection would likely agree with what I have just said. In fact, what they may mean is that those socially ‘pressing’ problems are more important than other ‘less pressing’ challenges related to future enhancement and that we should

⁹ Preferring something just because it happens in the present would constitute a pure time preference. In cost-benefit analysis, the term ‘pure time preference’ refers to a preference that derives only from when something happens. Time preferences in general, by contrast, consider other factors beyond the temporal moment in which something happens. Applied to our discussion, general time preferences should take into account the different degrees of certainty between the present and future problems, the relative urgency of these challenges and our ability to solve them, among other things. I thank Sven Ove Hansson for bringing this important distinction to my attention.

Table 1
Comparison between speculative and anticipatory methods in the ethics of human enhancement.

Type of approach	Description	Advantages	Disadvantages	Methods
<i>Speculative ethics</i>	<ul style="list-style-type: none"> • An argument-derived methodology to defend a particular philosophical or normative position. • It is triggered by questions like “what if” that build mainly on empirically ungrounded scenarios 	<ul style="list-style-type: none"> • Valuable for creating theoretical or conceptual knowledge • Helpful for abstract philosophical arguments • Valid method for ethical theory or foundational moral philosophy 	<ul style="list-style-type: none"> • Lower degree of realism • Unhelpful for practical or policy recommendations • “If-and-then syndrome” 	<ul style="list-style-type: none"> • Thought experiments • Mere possibility arguments • Possible worlds counterexamples
<i>Anticipatory ethics</i>	<ul style="list-style-type: none"> • A foresight-derived methodology to discuss the normative elements of future scenarios in order to influence technological trajectories • It is triggered by interdisciplinary approaches beyond philosophy that may combine foresight and the stakeholders’ perspective to build future scenarios 	<ul style="list-style-type: none"> • Reinforcement of interdisciplinary work • More detail in the scientific premises • Improvement of public deliberation through responsible representation • Facilitates governance and regulatory efforts 	<ul style="list-style-type: none"> • Risk of scaremongering when bad effects are disproportionately stressed • Risk of uncritical legitimization of technological futures • Uncertainty is still unavoidable 	<ul style="list-style-type: none"> • Anticipatory technology ethics • ETICA approach • Ethical impact assessment • Ethical technology assessment • Methodology of translation from discourse ethics • Moral plausibility approach • Techno-ethical scenarios approach

therefore pay more professional ethical attention to them. However, if we observe carefully, this more qualified reformulation decentered from the ‘present’ would be another different objection, a reason why I will analyze it in detail later on.

Finally, we do not only have duties towards present people but also obligations towards future generations. Extending our concern beyond the present to the future is another reason to worry about emerging enhancement possibilities. In this sense, intergenerational justice requires, on some accounts, distributing impartially ethical attention beyond present issues, also considering the burden and benefits that we bequeath to future generations. At the professional level in ethics, this allows for a division of labor between those who deal with more imminent issues and those who deal with longer-term issues (Glover, 1984, 15). Furthermore, some even argue that the long-term future is much more important than the present. Strong longtermism claims that the way we affect the far future is the most relevant consideration of our current actions (Greaves and MacAskill, 2021).¹⁰ However, there is no need to support this strong longtermist view to recognize that the future of humanity is morally salient. For better or worse, our future can be vast (MacAskill, 2022; Ord, 2020). So, how we influence the future with enhancement technologies is ethically significant.¹¹ Thus, the present does not always come *ethically* first.

3.2. High-tech Fetishism Objection: The lure of emerging technologies

The *High-tech Fetishism*¹² Objection claims that ethical analyses tend to misleadingly prioritize some issues by the very fact that they are related to cutting-edge technologies. The lure of emerging technologies can be dangerous if it causes us to neglect other societal issues that are considered less glamorous just because they are not related to innovative technologies. Several authors have used this objection. Too frequently, (bio)ethicists have been obsessed with “brave new fantasy technologies” and their related “easy, sexy, trivial subjects” (Guyer and Moreno, 2004, W16–17), or with “flashier topics” about emerging technologies (Fabi and Goldberg, 2022, 4), at the expense of “less spectacular, more familiar technologies” (Nordmann, 2007, 44), often with the cost of disregarding research aimed to bring structural societal change (Dorothy Roberts in National Academies of Sciences, Engineering, and Medicine, 2020, 54).

This objection serves as a valuable warning. Technological advances can generate greater attraction for reasons that may not always be adequately justified. Some novelty bias may occur. Needless to say, the fact that something is novel does not imply that it necessarily requires greater ethical attention. Another reason may be that our funding ecosystems tend to prioritize research related to emerging technologies (Fabi and Goldberg, 2022). If this objection leads us to realize that other more important and more deeply rooted non-technological issues require further investigation, it may be beneficial.

However, this objection has inconclusive elements. What is important is not simply the origin of the problem in question, whether related to cutting-edge technologies or deep-rooted socio-structural factors, but, again, the intensity and magnitude of the problems

¹⁰ A long-term view is also important regarding technological developments. According to *Amara’s Law*, “(w)e tend to overestimate the effect of a technology in the short run and underestimate the effect in the long run” (in Enriquez 2021, 228). It is important to consider this tendency in human enhancement debate.

¹¹ Elsewhere I have argued that a long-term perspective is particularly important regarding the ethical analysis of genetic enhancement technologies and our possible duties towards posthumanity (Rueda, 2022a).

¹² Belén Liedo and I used this “high-tech fetishism” expression elsewhere (Liedo & Rueda, 2021).

themselves. A problematic underlying reason for this objection is that sometimes we should further investigate the methods of social change because they are preferable to changes by biotechnological interventions. In fact, some formulations of this objection in biomedical research imply that, in order to improve human condition, societal structural changes are preferable to biotechnological ones (National Academies of Sciences, Engineering, and Medicine, 2020, 54). These intuitions reproduce a classic question in the ethics of enhancement, namely, whether means matter morally (Cole-Turner, 2000). Although some have argued that conventional non-technological methods of improvement are preferable to biotechnological methods (Gheaus, 2017; Habermas, 2003; Heinrichs, 2021), this is not the only option. The ethical irrelevance of the distinction between conventional-environmental and biotechnological methods has been supported by various arguments, such as consistency (Buchanan, 2011b; Harris, 2007; Savulescu, 2009), the nurture principle (Agar, 2004), or the parity principle (Levy, 2007; Pugh, 2019). The only clear thing is that there is no expert consensus on the matter.

Therefore, this objection is valuable if it indicates that there may be other non-technological social problems of greater scope, and problematic if it implies that we should investigate these problems first just because they are non-technological social problems. Contrasting social solutions with technological solutions in a hierarchical manner leads, moreover, to a misrecognition of the social dimension of technologies in terms of access factors and adoption dynamics. Indeed, if emerging enhancement technologies can create large-scale societal challenges, which undoubtedly will be social ones, these should also motivate the research on their ethical aspects.

3.3. *Wrong priorities objection: fairly distributing scarce ethical attention*

The *Wrong Priorities Objections* states that, as long as professional ethical attention is a scarce resource, we should fairly distribute research in (bio)ethics without over-prioritizing investigations about future enhancement technologies if this is done at the expense of other, higher priority issues. This objection starts from a very reasonable premise. In a way, (bio)ethics—i.e., what professional (bio) ethicists do—is a limited and scarce resource. If ethicists exhaustively focus their research on particular troubles, they can hardly deal with other matters. The critics of speculative ethics have been very acute in noting this fact when claiming that speculation can become a distractive effect and even a waste of time (King et al., 2012, 148; Nordmann, 2007, 34; Racine et al., 2014, 327). Also, the opportunity cost (i.e., the value of the foregone alternative) can be high if other more important issues are left unresearched (Nordmann and Rip, 2009). This view is appealing since squandering scarce ethical attention on considerably uncertain outcomes of future technologies may be an ethically questionable strategy.

Hence, this objection frames the debate on the ethics of human enhancement in the realm of distributive justice. Indeed, in (bio) ethics, the selection of research topics is a matter of just resource allocation (King et al., 2012, 148; Zohny, 2021). But how to fairly distribute the sparse specialized ethical research is itself a puzzling ethical problem. Those who have used this objection often overlap it with the two objections we have previously discussed. In particular, the *Wrong Priorities Objection* is often reinforced by the *Time Preference Objection*, showing that we should focus first on “ongoing developments” (Nordmann, 2007, 34), “more pressing ‘here and now’ ethical issues” (Nordmann and Rip, 2009, 273), “ongoing moral problems” (King et al., 2012, 148), or many contemporary technologies that are relevant in less prosperous countries such as automobiles, agriculture sanitation, or water-supply (Hansson, 2017b, 239).

No doubt, the controversy around research allocation is increasingly becoming more important in (bio)ethics. In part because funding priorities may perpetuate existent social injustices (Fabi and Goldberg, 2022). For example, the investment disparity is sometimes glaring. Global health suffers from the so-called “10/ 90 gap”. This refers to the phenomenon that only 10 % of funds in global health research is spent on conditions that account for 90 % of the global burden of disease (Vidyasagar, 2006; Luchetti, 2014). In this context, what is the kind of priority that the ethics of enhancement should deserve in allocating research funds? Emerging enhancement technologies might be seen as a predominant research interest of high-income countries. More worryingly, the visionary nature of human enhancement may have influenced research agendas and the allocation of funding resources (Ferrari et al., 2012). If future enhancement benefits are quite uncertain, allocating resources to their ethical investigation is problematic if we aim to prioritize “those areas of most (genuine) promise and moral relevance” (King et al., 2012, 150)—although it is often difficult to know which lines of research are going to be more fruitful (Bostrom, 2007, 134–5).

As we have seen, the *Wrong Priorities Objection* is challenging. We need to encourage more reflection on the reasons why a particular issue becomes a prominent candidate to be selected for ethical treatment (Hansson, 2017a). Regarding funding allocation, competing priorities need to be more carefully balanced. Thus, I consider this objection to be the most important, for one reason. It seems to me that it conveys an important fact: there may certainly be more important problems than those arising from future enhancement technologies, and that is why the study of the ethical aspects of the latter is not the highest priority. This is likely to be true. However, I believe that the consequences that follow from this objection are not radical.

When we talk about priorities, we mostly do so in relative terms. A priority is something that can be compared with other priorities and ranked by importance. Therefore, I do not think it can be derived from the objection that the ethical issues of future enhancement technologies are not a priority at all. This objection shows rather that there are other more important problems to which we should pay *more* attention because they have higher priority. The inference, then, is that we should devote *less* academic attention to the ethics of emerging enhancement technologies. This is a sensible and acceptable conclusion.

Finally, I shall clarify a key point. This objection must avoid becoming a false dichotomy. Investigating, for instance, the ethics of global health and the ethics of future enhancement technologies are not always mutually exclusive research agendas. In fact, many bioethicists that have researched enhancement have also investigated global vaccine distributions, patent regime inequities, or the prevention of infectious diseases. Although ethical attention is limited, research careers are generally long and the total number of researchers in (bio)ethics is growing. Therefore, the ethics of future enhancement may not be the highest priority, but it is an issue to

which time and resources can be devoted. I will give below the reasons for normatively justifying this aspiration.

3.4. *A normative defense for doing (and funding) human enhancement ethics*

The ethical evaluation of future enhancement technologies may be a suspicious priority in a world with several competing societal challenges. This section aims to respond to the Normative Problem. I have argued that the three objections discussed above are not strong enough to completely restrain us from investigating the ethical aspects of emerging enhancement biomedicine. In the following, I will give a more purposeful argumentation to affirm that proactive research in this field is ethically desirable and even socially necessary. I will briefly outline four arguments.

3.4.1. *The academic freedom argument*

Respecting and protecting academic freedom is important. Several researchers may be genuinely curious about ethical analyses in this area. Failure to respect these interests would be problematic (Hansson, 2017a). This could be the case even if such research does not produce major applied results to be transferred to society. Always approaching research funding in terms of its instrumental value is undesirable, since it could lead to defund meaningful areas of knowledge (such as basic science or humanities) that may have intrinsic value. In addition, the freedom of research is one of the factors that deepen plurality in science. Even research that initially appears to be of little benefit can lead to unexpected or serendipitous discoveries. In this sense, ethical research on future enhancement can lead to translatable arguments that enrich other ethical debates. Finally, future funding calls should give more opportunities to researchers who belong to minorities less active in the debate (such as women, people from low-income countries, or individuals from under-represented ethnic backgrounds). This could help to increase epistemic diversity and even to produce innovative analyses.

3.4.2. *Consistency with other concerns*

Considering the ethical impacts of emerging enhancement technologies is an attitude consistent with other concerns we already have. Although human enhancement may produce new-fangled questions, it reproduces and updates perennial controversies in the history of moral philosophy. For example, genetic enhancement surfaces issues related to justice, equality, personal identity, human nature, or parental responsibilities. As these questions have long been of interest to ethics, it is important to measure the impact of genetic enhancement technologies in these domains. Moreover, as studies on socially disruptive technologies (Hopster, 2021) and morally disruptive technologies indicate (Baker, 2013, 2019; Danaher, 2021; Danaher & Sætra, 2023; Enriquez, 2020; Hopster et al., 2022; Nickel, 2020; Rueda et al., 2023a,b), it is even possible that enhancement technologies could in the future transform prevailing views on these very issues. As long as future enhancement innovations may lead to social and moral change, addressing these possible transformations is consistent with our common ethical treatment of other problems.

3.4.3. *Maximizing the social utility of enhancement technologies*

More importantly, ethics can help to maximize the beneficial impacts and minimize the detrimental effects of emerging enhancement technologies. The instrumental value is thus palpable. The payoff is huge as far as funding these investigations is not so costly, and helps us to get the developments right (procuring their benefits) and avoid the very burdensome missteps. So, what can ethics help in this regard? Having a clearer idea of what goods we pursue and what wrongs we want to avoid may help us to intervene earlier to influence the development trajectory of these technologies. One of the main objectives of anticipatory ethical analyses should be to align these technological signs of progress with broad societal objectives and to try to achieve a positive impact for future generations (Johnson, 2011). This is an explicit commitment against technological determinism—the view that claims that technological advance is beyond societal control. Therefore, using anticipatory methods can help to influence early-stage technological developments in order to maximize their benefits and minimize their deleterious aspects.

Furthermore, many ethical debates about enhancement technologies cross academic boundaries and often reach the mass media. This shows that, beyond the academic interest in the topic, society values the discussion of the possible impacts of these innovations. In this way, neglecting the ethical debate on these future technologies risks leaving the discussion to euphoric propagandists (some with pecuniary interests in these developments) and intransigent opponents. It is therefore important to involve experts to assist in forming a reflective and empirically informed public opinion on the possible impacts of these technologies on society. Thus, ethics research in anticipating systematically and reflectively future enhancement scenarios would fit well with “mission-based science” approaches, which are increasingly important for many funding regimes (see Ankeny et al., 2021).

3.4.4. *Making progress in human enhancement debate*

A final argument is that perhaps we are now not only more legitimized, but also better qualified to make ethics of future human enhancement. After all, scientific disciplines evolve and refine their methodologies over time. The social and academic perception of scientific disciplines may also change. In a landmark article, Erik Parens (1998, S2) described how, in the early 1990s, talking about human enhancement seemed like “such a speculative, if not silly, issue” to many of his bioethicist colleagues. By the end of the last century, however, research into the ethical aspects of enhancement seemed more pressing. Needless to say, interest in this subject has exponentially catapulted in the last two decades. Few would now doubt that we need to take human enhancement seriously. Nevertheless, what is more arguable is whether the debate on human enhancement has changed or even improved.

Nick Agar (2021) has recently argued that the latest contributions in human enhancement show a move from the speculative examples that dominated the beginning of the debate (himself included), from ethical analysis more ingrained in cutting-edge empirical evidence. In Agar’s view, this constitutes progress. Similarly, John Harris (2007, 17) also acknowledged that his first

book (Harris, 1992) on the issue was “largely speculative”, mainly because “the technologies then envisaged were in their infancy”. Speculative ethics certainly seems to lose importance in the human enhancement debate. According to my previous discussion, the decrease in speculation in favor of anticipatory ethical approaches would indeed constitute a change for the better as long as we aim to strengthen the practical policies and regulations of human enhancement technologies. Therefore, improvement in research methods, knowing more thoroughly the advantages and disadvantages of them, is an added reason to continue doing human enhancement ethics, ideally with more sophisticated approaches.

4. Concluding remarks

In this paper, I have answered two meta-questions that can help us rethink the scholarship on human enhancement ethics. Regarding the Methodological Problem, I have clarified the role, advantages, and disadvantages of two methods commonly applied to debate. I have argued that, while speculative ethics is valuable for theoretical and conceptual approaches, anticipatory ethics has greater potential for addressing practical, regulatory, and governance issues of emerging enhancement technologies. Regarding the Normative Problem, I have presented three objections that, although important, do not detract from the legitimacy of conducting research on future applications of enhancement technologies. I have also argued that we should respect these investigations in the interest of protecting academic freedom, for consistency with our treatment of other problems, to maximize the social utility of these technologies, and because of methodological progress made in these analyses.

All in all, the ethics of human enhancement can benefit from thinking more carefully about the methods it employs to analyze future applications and also from considering the need for some of its research when they neglect other present, non-technological problems that may be socially more urgent. I hope that my inquiry on the Methodological and Normative Problems can reinforce a more fruitful academic dialogue. A hallmark of bioethics is that it has always dealt with problems related to nascent and future technologies. Thus, the history of human enhancement needs to continue to be written from research done in a more self-reflexive way. That would certainly be, in my view, a desirable progress worth pursuing.

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The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Data Availability

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