

Rejecting the “Therapy vs. Enhancement Distinction”: An Ethical
Evaluation of Preimplantation Genetic Diagnosis Through Genetic Justice

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Abstract

The following work presents the ongoing philosophical debate regarding the use of biotechnology to improve human capabilities and attempts to apply the insights drawn from these debates to the regulation of non-medical uses of reproductive technology. After presenting the criticisms towards a hardline approach that would ban all attempts to enhance humans, we evaluate various alternative frameworks and adopt a framework called Genetic Justice, which can be understood as an application of Rawlsian distributive justice to biological assets. After improving on this moral framework by incorporating various institutional considerations into it, we apply it to the evaluation of non-medical uses of a screening technique called preimplantation genetic diagnosis and propose recommendations for its regulation.

A los que siempre están

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Abbreviations

IVF: *in vitro* fertilization

PGD: Preimplantation Genetic Diagnosis

IDA: Institutional Design Approach

HLA: Human Leucocyte Antigen

DRM: Disability Rights Movement

HIV: human immunodeficiency virus

Introduction

On November 25th 2018, the biophysics researcher He Jiankui announced the birth of two non-identical twin girls whose genes had allegedly been modified through a CRISPR construct with the aim of providing them with protection from HIV (Cyranoski, 2019). The experiment was immediately condemned by the scientific community as reckless and immoral, due to the experimental nature of this procedure and the lack of understanding of its potential side-effects (Greely, 2019). Beyond critiques of the actual experiment and the premature use of this particular technique, the news rekindled a more fundamental debate about the place of science in reproduction. Not unlike the birth of the first cloned mammal or that of the first child conceived *in vitro*, the birth of these twins was met with much apprehension, because it challenges some of our core beliefs about what it is to be human.

While the development of new medical interventions is celebrated as progress and given generous funding, any attempts to use such technologies to improve on human nature are seen as a dangerous attempt to ‘play God’ and are quickly prohibited. These non-medical uses of biotechnology are commonly referred to as *biological enhancements*, or simply enhancements, and they have been greeted with a mix of confusion, excitement, disgust, fear, and hope. Nevertheless, a consensus seems to have formed both in public

discourse and most legislations around prudence and suspicion.

This sharp distinction in the way these two types of biotechnological interventions —therapies and enhancements— are treated, particularly in the field of reproduction, will be the subject of this text. Over the next four chapters, we will explore the ethics of biological enhancements, with a focus on attempts to improve the genetic make-up of future generations through novel reproductive techniques. While there is much to be said about the ethics of reproductive techniques, we will attempt to approach concerns through the lens of the Enhancement Debate. This means that we will be chiefly concerned with the wider social and political impacts that the widespread adoption of these techniques may bring about, rather than their permissibility at the individual level. With many reproductive techniques already allowing for the selection of our progeny's genes and many more in the horizon, there is a consensus among philosophers (Agar, 2005; Buchanan, 2011a; Parens, 2015; President's Council on Bioethics (U.S.) & Kass, 2003) that it is crucial to discuss how —and whether— these technologies will be introduced and regulated as early as possible. In the absence of such a debate, we risk both having these techniques impose themselves in detrimental ways and see them unnecessarily restricted through reactionary regulation.

The text will be divided into four chapters. The first chapter will consist of a brief

history of the philosophical debates surrounding the use of technology to biologically improve human beings. After briefly introducing the discussions surrounding eugenics that took place towards the end of the nineteenth century, we will move on to explore in detail the *contemporary enhancement debate*. We will describe the historical formation of the three factions that took part in this debate: (1) the transhumanists, an enthusiastic faction that ardently defended the use of science to improve human biology (2) the bioconservatives, a more cautious faction that opposed the idea of biological enhancement in principle or was skeptical about the ability of enhancements to increase wellbeing and (3) the bioliberals, a group of thinkers that proposed to allow enhancements as long as they are safe and well regulated.

Chapter 2 will present the philosophical distinction that gathered the most attention during the debates of the last 15 years: the bioconservative idea that there is a morally significant difference between interventions that seek to cure a disease and those that attempt to improve on natural human abilities. This so-called Therapy-Enhancement Distinction (TED) was harshly criticized by both bioliberals and transhumanists. The chapter will first present the bioconservative arguments in favour of the TED as well as critiques of these arguments. Having casted doubt on the strength of the arguments supporting the TED, we will then move on to bioliberal and transhumanist arguments for

rejecting the TED.

After showing that the TED is unlikely to be the ideal standard for evaluating the morality of non-medical uses of biotechnologies, Chapter 3 will present four different alternative frameworks: (1) Classic Eugenics, (2) Procreative Beneficence, (3) Procreative Liberty, and (4) Genetic Justice. After showing the shortcomings of the first three frameworks, we will show how Genetic Justice is able to overcome all of the issues found in other frameworks by using the concept of justice to balance concerns about social welfare, individual welfare, and reproductive freedom. We will then develop on how Genetic Justice can be applied by expanding on some of its core components and showing how its application requires particular interest in the kind of institutions set up to regulate reproductive techniques.

Chapter 4 will introduce a specific reproductive technique that is currently available and seems most likely to make genetic enhancement a reality: Preimplantation Genetic Diagnosis (PGD). We will first start by introducing this technique and explaining its potential and limitations. Once we have a better understanding of it, we will move to exploring ethical considerations specific to this technique and other pre-natal screening methods. This includes criticisms of the technique on grounds of the moral status of the fetus, and various arguments relating to the rights of disabled people. We will attempt to

show that Genetic Justice is able to overcome these criticisms while integrating their core preoccupations. Having shown that PGD can be used ethically for selecting for non-medical enhancements, the final section will bring together the conclusions derived throughout the whole work by using them to sketch a set of recommendations for the regulation of PGD.

Chapter 1 – A Brief History of the Enhancement Debate

As mentioned in the introduction, our main objective is to evaluate the non-medical uses of reproductive technologies, particularly Preimplantation Genetic Diagnosis (PGD). To do so, we will make use of the various philosophical frameworks that were developed from the 1970s to the 2010s in what is referred to as the contemporary enhancement debate. To better understand the themes, positions and the composition of the camps that make up the contemporary enhancement debate, we first need to familiarize ourselves with its history. This chapter will attempt to introduce the reader to some of the philosophical movements that took place over the last two centuries in response to new scientific and technological developments and the possibility of using them to improve natural human traits.

1.1 Darwin, Galton, and The Eugenics Movement

Debates on the possibility, desirability and necessity of genetic enhancement can be traced back to the period following the publication of *On the Origin of Species* by English biologist and geologist Charles Darwin in 1859. The idea of evolution was hardly original to Darwin, who was familiar with contemporary works in geological evolution such as those of Charles Lyell (Howard, 2001, p. 39). Theories of biological evolution were also already common in his time, especially in France, where Jean-Baptiste Lamarck's theory

enjoyed wide acceptance(Howard, 2001, p. 42). The importance of Darwin's work lied however in explaining biological evolution through the three concepts of variation, heredity, and selection.

Although Charles Darwin avoided extrapolating his theory to the evolution of the human species in this first book, the implications of his theory were clear to his readers, and it was not long before ideas of mastering the future of human evolution began to be discussed (Desmond & Moore, 1991, pp. 442–463). Inspired by Darwin's theories and the importance they placed on heredity and selection, Sir Francis Galton collected biographical data on the heritability of various traits to better understand how they were transmitted from one generation to the next (Gillham, 2009). Galton's main interest was intelligence and how it expressed itself in "eminent" families. From this research, Galton published a paper in 1865 (*Hereditary Talent and Character*) and the book *Hereditary Genius* four years later; both texts explored the relationship between ancestry and intellectual achievements. Galton was able to show that talent tended to be passed from one generation to the next and concluded that it must be transmitted biologically, dismissing the possibility of cultural and environmental factors playing a significant role.¹

¹ A later reevaluation of his data concluded that his results were also compatible with cultural explanations of success. (Morton & Rao, 1980)

Another important discovery of Galton's was to show the existence of "a negative correlation between social and reproductive achievement" (Levine, 2017, p. 27). In other words, Galton's research suggested that less eminent individuals reproduced in larger quantities than the naturally gifted ones. This realization led to fears of a slow but steady decay of human endowments over generations, as the best genes were crowded out by the lowly. Calls for improving the genetic stock of humanity by rationalizing the process of procreation, which had been left to run freely until then, became more common.

In the years that followed, studies of the inheritance of traits in humans greatly benefited from advances in biology and statistics. The rediscovery in 1900 of Gregor Mendel's 1865 paper *Studies on Plant Hybridization* as well as the development of germline theory gave these theories of inheritance the theoretic framework needed to cement it as an established science. Galton baptized this new science of human genetic stock *eugenics* (from the Greek 'good in birth') in 1883 (Watson, 2007, p. 16).

By the turn of the century, the prospect of a healthier, smarter and a more moral society, as well as the fear of degeneration brought about by the over-reproduction of the lower classes, attracted the philanthropy of civically minded moguls such as Andrew Carnegie and John D. Rockefeller as well as dozens of other industrialists and families of fortune (Levine, 2017, p. 16). This influx of resources towards the advancement of

eugenics led to the proliferation of associations for research and education of eugenic principles. By the 1910s, eugenics was no longer considered an obscure academic curiosity and in 1912, one year after Galton's death, the First International Congress of Eugenics was held in London, where attendance included important political figures such as former British Prime Minister Arthur Balfour, future prime minister Winston Churchill and ambassadors of various European countries ("First International Eugenics Congress," 1912). Eugenics seemed at the time as the science of the future and government representatives from all over the world gathered at the Hotel Cecil for 5 days of speeches and presentations. Leonard Darwin, the son of Charles Darwin, opened the 1912 congress with a speech arguing for a reorientation of public health policy. Up until the modern era, he claimed, natural selection had driven progress by selecting the fittest to pass on their genes to the next generation, but in recent times welfare measures had "prevent[ed] progress being made by these means" ("First International Eugenics Congress," 1912, p. 5). The presentations given on the following days echoed Leonard Darwin's idea that sympathy towards the worse off is short-sighted and the only way to truly help future generations of "undesirables" is to rid humanity of their genetic material. Speakers defended measures like strict segregation of the feeble-minded and forced sterilization of degenerates.

By the early 1920's, governments across the world started creating agencies in charge of promoting eugenics. However, after decades of wide public acceptance, eugenics lost much of its appeal following the discovery of the mass murders committed in the name of racial purity by Nazi Germany and the subsequent rise of the concept of human rights (Levine, 2017, p. 97). Eugenic institutions remained however active in many countries, including Canada, well into the last decades of the twentieth century. What is more, the case has been made that once overt eugenic practices were banned, they were replaced by a mix of policies encouraging reproduction among certain social classes and curbing it in others, continuing eugenic policy, albeit in a tacit form (Levine, 2017, p. 103). It is still true however that overt attempts to modify genes for the common benefit of society became synonymous with cruel authoritarianism, particularly in Europe, where talk of improving human nature is still met with much distrust (Ranisch, 2019). Regardless of whether one believes that the post-war era was a dormant phase of eugenics or simply its continuation in less explicit ways, it is undeniable that the period between the 1950s and 1980s saw a lull in serious discussions about the improvement of our naturally endowed genetic make-up.

1.2 The Contemporary Enhancement Debate

1.2.1 The Post-war Era: Techno-optimists, Theologians and Rawlsians

As mentioned above, the post-war period saw a distancing by serious thinkers from

eugenic ideas. At the same time, developments in genetics during the first half of the century, culminating in the elucidation of DNA's structure and its role in heredity, stimulated the imagination of many. The dream of using technology to radically modify people enjoyed as much interest as it did in Galton's time, but now saw itself relegated to the fields of science fiction and the speculative essays of small groups of obscure writers (Hughes, 2004, p. 159). Two of these groups are worth our attention due to the influence they had in shaping the contemporary enhancement debate: the Upwingers and the Extropians.

1.2.1.1 The Transhumanists

The UpWing philosophy is described by its founder, FM-2030, as an alternative to right-wing and left-wing ideologies. It is based on the idea that technology is the answer to all political impasses of our time. By the early 1970s, Upwingers were already arguing for electronic direct democracy, the complete elimination of money and labor, and biomedical interventions allowing for centenary lifespans and superintelligence (Hughes, 2004, p. 161). The movement was as ambitious as it was speculative, and one may even label it as escapist. It is this disengaged attitude towards the realities of the technology of their time that limited the influence of Upwingers to a clique of techno-optimists and daydreamers. The writings of the Upwingers did however influence a bigger and more pragmatic movement that originated in the late 1980s called Extropianism, which took

the techno-optimism of the Upwingers and combined it with an anarcho-capitalist political ideology. A generation of biohackers and cybercitizens, usually associated with the writings of Max More, T.O. Morrow and The Extropy Institute, forged a lasting link in public and academic discourse between the desire to use technology to improve human nature and the complete refusal of its political regulation (Hughes, 2004, p. 167).

The radically individualistic extropians were eventually supplanted by a more moderate group of techno-optimists called the transhumanist movement. Spearheaded by philosophers Mark Walker, Nick Bostrom and James Hughes, the transhumanists originated from a European faction of extropians disenchanted with its sexist, Bay Area, Libertarian aspects and wanting to return to the Upwinger emphasis on democracy and allowing every person (human or otherwise) to achieve its full potential (Hughes, 2004, p. 181). By the 1990's, transhumanist thought had established itself as one of the three main schools of thought in the emerging enhancement debate (the other two, the bioconservatives and the bioliberals, will be introduced below), and contributed with books and articles as well as through their famous manifesto, *the Transhumanist FAQ* and the founding of their own academic journal, *The Journal of Transhumanism* (later renamed as *Journal of Evolution and Technology*).

One of the most important voices for transhumanism in the contemporary

academic debate on enhancement was found in Julian Savulescu, who codified the transhumanist ideals into a philosophical framework for the evaluation of novel reproductive techniques and their use for trait selection: Procreative Beneficence. Savulescu (2001) defines the concept in his paper *Procreative Beneficence: Why we should Select the Best Children* as the moral obligation of prospective parents to “select the child, of the possible children they could have, who is expected to have the best life, or at least as good a life as the others, based on the relevant, available information”(Savulescu, 2001, p. 413). In other words, new reproductive technologies should be pursued, and their use morally required in order to provide children with the best possible lives. The concept of Procreative Beneficence and its relationship to classical eugenics will be discussed in detail in chapter 3.

1.2.1.2 The Bioconservatives

Little attention was paid by academic philosophers to questions of new biomedical technologies or the prospect of human enhancement during the 40 years after WWII. It was only through the development and dissemination of *in vitro* fertilization (IVF) in the 1980's and the prospect of human cloning in the early 1990's that the possibility of mastering human reproduction and its potential consequences caught the eye of two major groups of thinkers. The first of these two groups would grow to be the contemporary “bioconservatives”, who can be described as a group of thinkers that judge attempts at

improving ourselves through biomedical technology to be dangerous, wrongheaded and immoral. The second one grew to become the contemporary “bioliberal” camp, which is open, if less enthusiastic than the transhumanists, to the evaluation, regulation and potential implementation of biomedical technologies for the improvement of natural endowments.

The first of these two groups was formed, in the words of transhumanist philosopher James Hughes, by “[m]any of the theologians in the emerging field of bioethics [who] were appalled at IVF and the prospects for cloning and genetic enhancement” (Hughes, 2004, p. 162). Although this may be an unfair description, it is true that, motivated by religious considerations relating to intrusions into human reproduction, some thinkers associated with the religious wing of the political right began writing on the moral dangers of these technologies. This new conservative faction eventually rallied behind Leon Kass, a scientist turned philosopher, who, although undoubtedly religiously motivated, was able to secularize the anti-enhancement discourse by appealing to concerns over the risks associated with these technologies and their dehumanizing character.

A pioneer in the field of bioethics, Leon Kass saw the post war period as marked by unbridled optimism in science and complete deference to scientists in regard to the

proper use of these new technologies. In his seminal 1971 article *The New Biology: What Price Relieving Man's Estate?*, Kass argued that the great scientific successes of the era had blinded us to the potential dangers associated with these technologies, particularly issues concerning the fundamental role of science and the desirability of new biomedical technology. In a context where most discussion on the ethics of science dealt with risks of bodily harm, Kass took the then unusual stance that “questions of use of science and technology are always moral and political questions, never simply technical ones”(Kass, 1971, p. 781). Kass raised broad concerns about the effects such technologies could have on demographic distributions and questions of distributive justice, as well as more symbolic issues such as the sanctity of man, and changes in the relationship between parents and children. This is, to my knowledge, the first explicit mention of such concerns in the context of the contemporary enhancement debate²; concerns that took the centerstage of the enhancement debates in the decades that followed. One last crucial point raised in Kass’s article is the importance of having a thorough and substantial debate on the necessity and proper use of biomedical technology at that time. The debate must, according to Kass, take place before these technologies become available. “If attempts

² Previous contemporary explorations of these themes were done less systematically in novels such as *Brave New World* or C.S Lewis 1943 book *The Abolition of Man*

are not made early to detect and diminish the social costs of biomedical advances by intelligent institutional regulation, the society is likely to react later with more sweeping, immoderate, and throttling controls” (Kass, 1971, p. 787), he commented. Indeed, contrary to transhumanists, who generally believe that we will easily be able to tackle most issues related to new technologies as they arise, both bioconservatives and bioliberals rightly continued to argue over the following years for the importance of this debate to happen before ‘the genie is out of the bottle’. This concern is most prevalent in the writings of bioconservatives, who are much less confident in society’s ability to deny itself a new technology once it becomes available, regardless of repercussions.

1.2.1.3 The Bioliberals

A third group of thinkers began their forage into the enhancement debate in the late 1980s: philosophers of law and philosophers of medical ethics. As decried by bioconservatives such as Leon Kass, this group of philosophers was more amenable to technological progress and originally did not offer an analysis as rich as the one of bioconservatives, with their main concerns revolving around questions of risk and consent. These academic philosophers soon developed more robust and richer theories along two different principles. The first branch of bioliberalism that we will explore is based in philosophy of law and arise out of a concern for the future of reproductive rights following the development of novel reproductive technologies. The second branch of

bioliberalism, which we will introduce further below, was developed by political philosophers and arose from an attempt to understand the enhancement debate through the lens of distributive justice.

In 1994, John A. Robertson published *Children of Choice* in response to the legal challenges and lack of coherent response that followed the implementation of new reproductive technologies such as pre-natal diagnosis, IVF, and surrogacy. Robertson describes it as the first book to provide a full and systematic exploration of what he termed *procreative liberty*, or the right to have (or not to have) children, as well as a right to the appropriate medical interventions when necessary for procreation (Robertson, 1996, p. 4). Robertson describes procreative liberty as a fundamental, if implicit, freedom, due to it being “central to personal identity, to dignity, and to the meaning of one’s life” (Robertson, 1996, p. 24). As we will explore in detail in Chapter 4, Robertson concludes that procreative liberty can be extended not only to having children, but also to *what kind* of children one has. Although the ethical framework he developed did not allow him to properly evaluate many of the issues raised by enhancement technologies. *Children of Choice* is considered the first contemporary systematic analysis of the ethics surrounding reproductive techniques, and greatly influenced the work of subsequent liberal theories that emphasized the primacy of reproductive rights over other considerations. This is the

case of the most important subsequent work in this tradition, Nicholas Agar's 1998 article *Liberal Eugenics* as well as his 2004 book by the same title. In this book, Agar expands and applies the framework presented in *Children of Choice* to the emerging field of reproductive techniques used for choosing non-medical traits (i.e., enhancements) for children. A full discussion of this book and its role in the second stage of the enhancement debate will be the subject of chapter 3.

The origins of the second branch of bioliberalism can be traced back to a few years before the publication of *Children of Choice*, when in 1985 the medical ethicist Norman Daniels (1985) published *Just Health Care*, a book where he attempted to expand the framework of Rawlsian distributive justice to healthcare. According to Daniels, due to the major role that health plays in our ability to productively participate in society, there is a strong case to be made on the importance of just access to healthcare as a means to promote equality of opportunity. With advances in biotechnology increasing the range of available procedures, including novel reproductive techniques and the prospect of genetic testing and (eventually) genetic modification, it was not long until the work of Daniels had to be expanded. These concerns were made more prescient with the establishment of the Human Genome Project in 1990, an international scientific endeavor to sequence a full human genome for the first time in history, with the aim to help elucidate the link

between specific genes and the traits for which they code. If the 1970s were ostensibly marked by the uncritical submission to the scientists' opinion, by the 1990s public opinion was undoubtedly much more critical of the prospect of genetic manipulation and a philosophical justification for the continuation of this research became more pressing. As Francis Collins, the second director of the Human Genome Project, said, "concern over ethical issues, not the remaining scientific and technological hurdles, were the greatest threat to the success of the project" (Buchanan et al., 2000, p. 27). This change in the social outlook led to "a significant share of funds allocated to the project [being] devoted to studies of the ethical, legal, and social issues it raises"(Buchanan et al., 2000, p. 27). A few years later in 1999, Daniels and three of his colleagues, Allen Buchanan, Dan W. Brock, and Daniel Wilker, used this opportunity to expand Daniels's work into a more general book, which provided a highly detailed philosophical framework for the evaluation of new genetic technologies and their use for enhancement. This book, *From Chance to Choice*, focuses on the movement of genetic differences between citizens from the realm of fortune to the realm of justice. In other words, these authors focus on the novel possibility of intervening in "the natural lottery" and how principles of distributive justice can now be applied to rectify differences in natural endowments. As with the Procreative Liberty branch of bioliberalism, the works of this so-called "Genetic Justice"

branch of bioliberalism will be further explored in chapter 3.

The postwar period was thus marked by a lull in the Enhancement Debate due to the shadow of Eugenics, followed by the slow formation of the three main camps of the contemporary enhancement debate as a reaction to the technological developments of the 70s and 80s. The word “reaction” is particularly apt since the texts of this first phase of the enhancement debate tended to be commentaries on technologies as they became available. Indeed, although we see the first sketches of some principles that later became central to various theories, there is no attempt to form full conceptual frameworks that would allow for a coherent evaluation of enhancements until the late 90s. It is around the turn of the millennium that these three factions clarified and solidified their respective justifications for the acceptance, rejection, or toleration of enhancements.

1.2.2 The Rise and Fall of Bioconservatism

By the early 2000s, the contemporary enhancement debate entered a second phase. With the three camps now presenting complete and antagonistic philosophical frameworks for the evaluation of enhancements, the debates of this era are marked by their philosophical richness. As we will see, the debates of this second phase provide more philosophical depth than the first (reactionary) phase, and more realistic discussions than the third (more speculative) phase of the Enhancement Debate.

1.2.2.1 The Hastings Center and The President's Council On Bioethics

Leon Kass continued to develop his ideas in books like *Toward a More Natural Science: Biology and Human Affairs* (1985), and more forcefully through various articles throughout the 90s during the heyday of debates regarding the morality of cloning (L. R. Kass, 1998, 1999; L. Kass & Wilson, 1998). However, he was mostly ignored by medical ethicists, who quickly gravitated towards the new bioliberal consensus. However, four major changes would lead to the strengthening of the bioconservative movement.

The first of these changes began in 1969 with the founding of the Hastings Center. The first of its kind, the center was created in order to tackle the kind of questions that we would now associate with bioethics, a nascent field at the time. Most importantly, contrary to most medical ethics of its time, the approach taken by the center was the same as Leon Kass's (one of its founding fellows); that is, their analysis did not originate or limit itself to the benefits or harms associated with new technologies (at least not in the narrow conception of benefit and harm). Rather, "big questions about the meaning of being human and about how we ought to live" (Parens, 2015, p. 3) were central to the evaluation, not only of particular novel technologies, but the modern scientific program as a whole. The success of the center and its establishment as a hub for 'bioethics', a new way of doing medical ethics, greatly solidified the reputation of Leon Kass and the

bioconservative movement and provided them with a platform to voice their ideas.

Second, the bioconservative movement greatly benefited from the growth and incorporation into their ranks of the Disability Rights Movement (DRM). For reasons that will be explained in detail in Chapter 4, the DRM put into question not only non-medical applications of biotechnology, but also their use to ‘cure’ people. As this movement grew during the last two decades of the 20th century, so did the influence of the bioconservative position.

Third, as mentioned previously, the exponential growth of technological development in genetics and the biomedical field piqued the interest of many renowned political philosophers. Although many of them are at the origin of bioliberal theories of enhancement, many others joined the bioconservative ranks, providing some of the most eloquent and convincing bioconservative works (e.g., Francis Fukuyama (2001), Jürgen Habermas (2003) and Michael Sandel (2007), whose works will be presented in more detail in Chapter 2).

Fourth and most importantly, the establishment in 2001 of *the President's Council On Bioethics* by former United States President George W. Bush gave bioconservatives a prominent role in shaping public discourse and influencing policy making of novel reproductive techniques and enhancement. As the first chairman of this newly appointed

council, Leon Kass was able to handpick his collaborators in order to push forward a specific position towards enhancement, which crystallized in the form of the 2003 bioconservative manifesto, *Beyond Therapy: Biotechnology and the Pursuit of Happiness*. Indeed, the council was heavily criticized for having its members selected so as to provide the Bush administration with a conceptual buttress for their concessions to the religious wing of the republican party (Hughes, 2004, p. 211). Two former members of the council, Elizabeth Blackburn and Janet Rowley, whose dismissal has been associated to their position on embryonic stem cell research, published an essay in which they explain how their recommendations were systematically ignored, allowing the council to paint an unrealistic picture of reproductive technology that was more amenable to the bioconservative position (Blackburn & Rowley, 2004). Regardless of any reservations one may have towards the work of this council, it is undoubtable that it forced bioliberals to seriously engage with the bioconservative position, for the simple reason that it was now being used as the basis of policy making (e.g., the decision to ban federal funding of embryonic stem-cell research).

1.2.2.1 The Bioliberal Reply

The decade between 2004 and 2014 saw a shift in the Enhancement Debate. Reacting to the pre-eminence of bioconservative discourse and its rejection of biomedical

enhancement, bioliberals and transhumanists focused their attention on attacking the bioconservative position. A series of books and articles were published with the main purpose of discrediting the position of bioconservatives, particularly the works of Fukuyama and Sandel, although some attention was also given to *Beyond Therapy*. These bioliberal and transhumanist critiques of bioconservatives will be presented and analyzed in detail in Chapter 2, where we will introduce the cornerstone of bioconservative thought, the therapy-enhancement distinction (TED), and its conceptual issues. Although this period is defined by the resistance to bioconservative hegemony, it would be inaccurate to describe this period as composed solely of negative philosophy. Indeed, in the process of arguing against the bioconservative position, bioliberal ideas matured into fully fleshed frameworks. Three of the frameworks developed during this period as alternatives to the bioconservative approach, Procreative Liberty, Procreative Beneficence and Genetic Justice, will be discussed in detail in Chapter 3.

1.2.3 The Transhumanist-Bioliberal Split

1.2.3.1 The Bioconservative concession

As mentioned above, the first half of the 2000s was marked by a torrent of publications by transhumanists and bioliberals decrying the bioconservative position and their inflexible rejection of all enhancements. Most bioconservative authors chose not to

respond to this systematic dismantling of their arguments, choosing to focus their attention on other subjects, and those who continued to participate in the debate tended to mollify their position to a skeptical bioliberalism (as shown most famously by the bioconservative Erik Parens (2015) in his book *Shaping Ourselves*). It is rare that debates in philosophy can be said to be finished, and although a few new bioconservative authors have published articles where they express skepticism towards the bioliberal approach, it would not be an exaggeration to say that the strong bioconservative position (i.e., that all biomedical enhancements are immoral and dangerous, and should be banned) is no longer considered defensible. The retreat of bioconservatism led to a fruitful growth in bioliberal and transhumanist literature seeking to go beyond discussions about the permissibility of enhancements to the benefit of more detailed discussions of how interventions should be evaluated and regulated. However, the decade-long partnership between transhumanists and bioliberals quickly dissolved, as fundamental differences regarding the regulation of enhancements became more prominent. As the bioliberal Nicholas Agar explained, “[t]ranshumanists differ from liberals in having definite views about the kinds of procreative choices that prospective parents should be making —[according to transhumanist, parents] should be taking the first steps toward posthumanity, choosing, if possible, to have children who are much smarter, healthier, and longer-lived than ordinary

humans. While liberals would protect the choices of prospective parents with posthuman values, they also want to protect the choices of parents who lack such values” (Agar, 2007, p. 14). This distinction between arguing for the implementation of enhancements and arguing for a (circumscribed) right to enhance was not important when the target of opposition was the bioconservative rejection of all enhancement, but it now pitted these two former allies, transhumanists and bioliberals, against each other. This rift marks the beginning of a third, more speculative stage of the enhancement debate, which revolved around two main subjects: radical enhancement and moral enhancement. The two following sections provide a brief overview of these two debates.

1.2.3.2 Radical Enhancement

In 2007, Nicholas Agar, the author of *Liberal Eugenics*, published an article in the bioconservative flagship journal *The Hastings Report* arguing that the kind of enhancement pursued by transhumanists is inimical to the interests of humanity. Agar’s argumentation is based on the difference between local and universal values. Agar claims that enhancements leading to posthumans —i.e., humans so radically enhanced that they can be considered to be a different species— does not take seriously the local value that we confer to our humanity. In order to explain why we should cling to our humanity, he uses the analogy of supporting a sports team, even if keeps losing. To embrace post-humanity may seem rational when seen from the perspective of a being with no previous

affiliation, but our continued participation in humanity would, according to Agar, tip the scale towards a rejection of any enhancement that would turn us into something else. In his books, *Humanity's End: Why We Should Reject Radical Enhancement* (2010) and *Truly Human Enhancement* (2017), he expands on this idea by showing that radical enhancement would not lead to the improvement of humanity, but their replacement. As an example, he takes the position of futurist Ray Kurzweil, who would want humans to slowly replace our 'inferior' body parts with mechanical counterparts. In an argument reminiscent of the ship of Theseus, Agar denies that there is no fundamental difference between an eventual transformation into robots and a robot invasion that wipes out humanity. Since the extinction of humanity by a robot attack would be considered a tragedy, our slow transformation into robots should be treated in the same way. The response from transhumanists such as Nick Bostrom is to appeal to the importance of personhood over humanity. As long as we remain persons, a transformation away from humanity and into something 'better' should not be considered a loss (Bostrom, 2005).

These issues are even more pronounced when the changes occur to individuals who choose to undergo these radical enhancements instead of having these changes occur over many generations. Inspired by the 1956 movie *Invasion of the Body Snatchers*, Agar shows that it is not clear that we would remain the same person should we accept radical

interventions such as super intelligence. In the movie, a race of alien parasites changes the brains of their victims (or patients, depending on your moral intuitions), leaving them feeling ‘better than ever’ and urging their friends to undergo the process and join the hive. Agar does not doubt that the infected human is happier, or that he really believes his friends would be too, if infected. Agar doubts that identity is maintained throughout this process, that *I* would be better off if infected. *Someone* will be better off, but it will not be *me*. In the same way, we may very well desire radical enhancements, and even appreciate the process afterwards, but the risk of ‘dying’ in the process would be too great to be worth undergoing the process.

Other than the ‘accidental extinction’ of humanity, radical enhancement has also been criticized on the grounds that it may lead to the creation of post-persons. Not to be confused with post-humans, which we have defined as humans so radically enhanced that they would belong to a different species, post-persons would be beings with a new and higher moral status. This debate began with an article by Allen Buchanan where he reflects on the concerns raised by Francis Fukuyama that enhancements would lead to the demise of liberalism by creating a natural aristocracy (Buchanan, 2009). Buchanan agrees that it is conceptually possible to imagine beings with superior characteristics to ours, but that it is not clear how their moral status could become superior to that given to persons.

By treating personhood as a threshold concept based on the capacity for practical rationality, Buchanan explains that no increase in intelligence or ability to participate in society would make us ‘more of a person’, in the same way that being older does not make us more of a legal adult than when we turned 18. Other bioliberals (Agar, 2013, 2014; DeGrazia, 2012) were quick to disagree, offering a variety of potential ways in which increased cognitive abilities may make post-humans judge our ability to cooperate similarly to how we judge that of other animals. Even if the post-human assessment of our moral status was inaccurate, this belief could lead them to deny us an equal moral status. For this reason, Agar and DeGrazia argue that we should not pursue radical enhancement.

1.2.3.3. Moral Enhancement

The second point of disagreement between transhumanists and bioliberals concerns the possibility and desirability of moral enhancement. There is now rich and extensive literature on the idea of enhancing our moral capacities through biomedical means, which seems to have originated in an article by Julian Savulescu and Ingmar Persson called *The perils of cognitive enhancement and the urgent imperative to enhance the moral character of humanity* (2008). This article was followed by a chapter in *Enhancing Human capacities* (Savulescu et al., 2011) called *Unfit for the Future* and a short book by the same name in 2012 (Persson & Savulescu, 2012). The argument presented in all three

publications is the following: Through technological advancement, humanity has greatly increased its productive capabilities, including for war making, where current nuclear and biochemical weapons are more effective than earlier weapons, to the extent that they could easily bring about the annihilation of humanity. In contrast, this advance in our ability to destroy ourselves has not been accompanied by an equally important increase in our moral sentiments and moral reasoning that would allow us to handle these weapons responsibly. Therefore, in order to avoid the existential threats that we face as a species, we should consider all possible avenues of moral enhancement, including (and favoring) biomedical moral enhancement.

We will not explore the various proposals, discussions and critiques of moral enhancement, its necessity, desirability, and permissibility, due to the complexity of the issue and the tenuous relation it has to the regulation of non-medical uses of reproductive technologies.³

1.2.4 Back to the Basics

In recent years, the Enhancement Debate could be said to have reached a fourth stage. As

³ The reader might be interested in consulting the following articles on this subject: Archer, 2016; Casal, 2015; Danaher, 2019; Douglas, 2008; Dubljević & Ranisch, 2018; Persson & Savulescu, 2016, 2017, 2019; Schlag, 2019; Simkulet, 2016; Specker et al., 2017. We also strongly recommend the bioliberal responses offered by Allen Buchanan and R. Powell in their book *The Evolution of Moral Progress* ([Buchanan & Powell, 2018](#)) and by John Harris in his book *How to be Good* ([Harris, 2016](#)).

mentioned previously, most bioconservatives did not reply to the wave of critiques they faced during the early 2000s, choosing to write instead on other issues. The main bioliberal thinkers have also switched their attention to other topics, which has allowed a growing group of younger authors to refocus the debate on more practical concerns than those associated with the third wave of the enhancement debate. This is seen for example in the work of Bryan Cwik, who in 2019 published an article called *Moving beyond 'therapy' and 'enhancement' in the ethics of gene editing*. In this article, Cwik criticizes how philosophical discussions emphasize future potential enhancements to the detriment of making sense of currently (or shortly) available ones. He explains how the problem with these debates is not that they are premature, but that they are so divorced from the reality of ongoing medical research as to make them irrelevant. Although our decision to evaluate the non-medical uses of a specific and currently available reproductive technique (i.e., PGD) arises from similar concern as Cwik's, we do not share his appreciation of the Enhancement Debate, since it would be impossible to judge novel techniques without the philosophical frameworks developed during the second phase of the enhancement debate. For this reason, in the following chapter we turn ourselves to the critical presentation of the bioconservative framework, followed by an evaluation of the various bioliberal alternatives in Chapter 3.

Chapter 2 – The Therapy-Enhancement Distinction

Having spent Chapter 1 overviewing the main issues raised by the enhancement debate as well as the various actors involved in the debate and their positions, we now move on to exploring in detail the second phase of the debate, which took place at the beginning of the century as a face-off between bioconservatives on one side and transhumanists and bioliberals on the other. More specifically, we will look at discussions surrounding the core principle of the bioconservative position, the Therapy-Enhancement Distinction (TED), according to which using biotechnology to heal is acceptable, while using it to enhance human beings is an immoral practice that will lead to horrible outcomes. The first part of this chapter will consist in the further clarification of the bioconservative position by briefly introducing four of its principal voices, Leon Kass, Michael Sandel, Jürgen Habermas, and Francis Fukuyama, and their respective rationale for adopting the TED. We will then move on to an exhaustive presentation of arguments in support of the TED as well as the bioliberal and transhumanist counterarguments for each of them. Having shown the dearth of arguments in support of the TED, we will finish the chapter by exploring reasons to actively reject the TED and look into other practical considerations related to this concept.

2.1 The bioconservative position

2.1.1 Kass: flourishing and the risk of dehumanization

Leon Kass is undoubtedly the most prominent and ardent critic of enhancement. As mentioned in Chapter 1, his role as the founding figure of the bioconservative movement meant that his contributions to the enhancement debate stretched over many decades. As the bioconservative position gained ground towards the end of the century, we can see that Kass's views on certain issues became more radical and assertive. Indeed, while the early Kass of 1971 attempted to tame the wave of technological optimism of his time by maintaining that “[e]ach development should be considered on its own merits”(Kass, 1971, p. 786) and that “the question is not control versus no control, but rather what kind of control, when, by whom, and for what purpose” (Kass, 1971, p. 787), the later Kass clearly rejected all enhancements on moral grounds, lamenting that “the powers made possible by biomedical science can be used for non-therapeutic or ignoble purposes, serving ends that range from the frivolous and disquieting to the offensive and pernicious”, (Kass, 2003, p. 10). These two factors, the length of his career and the radicalization of his thought, make the ideas of Leon Kass the most complex to summarize out of all bioconservatives. We can, however, identify the core principle he presents in support of the TED: dehumanization.

For Kass, and for many of his colleagues at the Hastings Centre, the central

question that should be asked when facing a new technology is not ‘what are the risks?’, but ‘does it help us lead a good *human* life?’. While Kass is convinced that new cures help those afflicted by disease lead fuller lives, he also suspects that attempts to improve on human nature will inevitably lead to inauthentic, empty, inhuman lives. Indeed, the concept of dehumanization is central to an understanding of Kass’s position and his rejection of enhancements. Kass believes that the hedonistic pursuit of ‘ageless bodies, happy souls and perfection’ would lead “to the humanly diminished world portrayed in Aldous Huxley’s novel *Brave New World*, whose technologically enhanced inhabitants live cheerfully, without disappointment or regret, ‘enjoying’ flat, empty lives devoid of love and longing, filled with only trivial pursuits and shallow attachments” (President’s Council on Bioethics (U.S.) & Kass, 2003, p. 6).

Another way in which enhancements are dehumanizing according to Kass is in the *mode* in which they operate. Contrary to non-biomedical enhancements (e.g. literacy, fire, shoes, etc.), biomedical enhancements are a form of self-degradation for three reasons: They affect our body directly, making us the *object* of the enhancement, they are an attempt on our dignity by circumventing reason (contrary to enhancements such as education, which require the enhanced person to engage with it), and they are irreversible (Kass, 1971). In this way, to resort to enhancements would be a dehumanizing endeavor,

because they fail to improve on those attributes that make us human or in a way compatible with said attributes.

2.1.2 Sandel: giftedness and hubris

Best known for his contributions in political philosophy as a critic of John Rawls (Sandel, 1998), Michael Sandel found his way into the Enhancement Debate through “an unexpected invitation, in late 2001, to serve on the newly formed President’s Council on Bioethics” (Sandel, 2009, p. vii). His influence on the council can be felt in the focus given by the 2004 report to the impact that new biotechnologies might have on the attitudes surrounding parenthood. Indeed, at the core of Michael Sandel’s bioconservative position is the idea that biotechnologies might invite ‘ugly attitudes’ from parents and prospective parents, such as treating one’s children as personal projects instead of independent human beings. In addition to the council’s report, Sandel treated these ideas in his 2004 article *The Case Against Perfection* and later expanded on them in his 2007 book of the same name. These ‘ugly attitudes’ originate from the erroneous belief that we can become complete masters of our destiny, which leads to hubris and a lack of humility (Sandel, 2009, p. 86). Sandel argues that our ability to *manufacture* children according to our specifications draws away from the sense of giftedness that one should feel towards the creation of new life. Instead of accepting children as they are, the use of biotechnology

to enhance them will make us believe that they are products of our will. This will exacerbate the “frenzied drive by parents to mold and manage their children’s [lives]” (Sandel, 2009, p. 54), leading to unhappy and subservient lives for the children, and depriving parents of a fulfilling relationship based on gratitude and acceptance.

In a recent book, Sandel (2020) explores the pernicious social consequences of hubris and the myth of the ‘self-made man’, particularly how these attitudes translate into an erosion of social cohesion and the empathy needed for pluralistic liberal democracies to function. This explicitly political angle is missing from Sandel’s writings during the 2004-2014 period, which focus almost exclusively on the changes to the relationship between parents and their children. In hindsight, many of Sandel’s numerous critics may have been more receptive to his ideas if the greater socio-political consequences of hubris had been made explicit.

2.1.3 Habermas: Autonomy

The contributions of political philosopher Jürgen Habermas to the enhancement debate offer a third basis for a rejection of enhancements. Just as with Sandel’s critique, Habermas’s arguments aim specifically at the relationship between parents and their children. His critique of enhancement, however, does not deal with the attitudes that enhancement may bring about, but with the very act of deciding the genetic destiny of

another human being. According to Habermas, to impose these choices on future generations is to rob them of “an equal right to an autonomous conduct of life” (Habermas, 2003, p. 66). The rationale of Habermas’s argument is based on three claims: (1) genetic modifications are imposed on children without their consent, (2) they are irreversible and (3) they greatly restrict the range of possible life plans available to the child. This would bond future generations to our will, severely limiting their autonomy. It is out of fear over this genetic tyranny towards future generations that Habermas rejects enhancements as being immoral.

2.1.4 Fukuyama: human nature and political stability

Another major voice for bioconservatism in the second phase of the Enhancement Debate was found in Francis Fukuyama, an author better known for his works in political and economic thought than bioethics. Fukuyama explains this shift in interests in an article titled *Second thoughts: the last man in a bottle*, written on the 10th anniversary of the publication of his famous book *The End of History and the Last Man*. Of the many critiques and commentaries he received following the publication of this book, he identified only one as being truly problematic: that “there could be no end of history unless there was an end of science” (Fukuyama, 2003, p. xii). Fukuyama admits that he failed to take into consideration what he calls the ‘second motor of History’, modern

natural science, which may eventually allow for the mastery of human nature itself and its modification according to our will. Fukuyama fears that advances in biotechnology will “accomplish what the radical ideologies of the past, with their unbelievable crude techniques, were unable to accomplish: to bring about a new type of human being” (Fukuyama, 1999, p. 15). In other words, Fukuyama worries that biotechnologies will allow for the radical modification of humans, opening a new horizon of possible political systems, all of which we should reject as immoral.

In contrast with Leon Kass, for whom the question of biomedical enhancement is primarily related to concerns about the good life, Fukuyama approaches this issue primarily through the lens of politics and how enhancement could destabilize societies and endanger the very concept of human rights. These themes are explored in detail in his book *Our Posthuman Future: Consequences of the Biotechnology Revolution* (Fukuyama, 2003), where Fukuyama attempts to show that biomedical enhancements will necessarily modify human nature, undermining the basis of modern human rights and leading to disastrous consequences.

2.2 Arguments in favor of the TED and their critiques

Through this short presentation of the four main authors associated with the bioconservative movement the main underlying principles for adhering to the TED have

been pointed out: (1) Fears of dehumanization, (2) pernicious changes to parent-child relationships, (3) loss of autonomy of future generations, (4) political instability and the dismantlement of human rights. In the following section, we will look more systematically at individual bioconservative arguments put forward to support the TED as well as bioliberal and transhumanist critiques for each of them.

2.2.1 Playing God

The main concern expressed by bioconservatives, which is also a recurrent point in public discourse, is that seeking to enhance natural human capabilities would be equivalent to ‘playing God’, and that this would be a bad thing. First, let us clarify that this argument does not rely on the belief in the existence of a supernatural being. Although sometimes used literally and motivated for religious reasons (e.g. the Vatican directives of 1987 (*Instruction on Respect for Human Life*) and 2008 (*Instruction Dignitas Personae on Certain Bioethical Questions*)), the argument has been expressed in secular terms as judging enhancement to ‘go against nature’. The idea that enhancement is wrong because it is unnatural suffers from two fundamental issues. First, the term natural is inherently problematic. On the one hand, if nature is understood as excluding all human intervention, then biomedical enhancement would be as morally impermissible as antibiotics, computers, or shoes. On the other hand, if human beings are seen as a naturally creative

species that is constantly adapting their environments, nature would then also encompass human inventions, including biomedical enhancements. Some authors have followed Kass in retorting that what is different with biomedical enhancements is that they treat the human body directly. Not only is it unclear why this would be morally relevant, but this claim disregards the myriad of technological inventions that have fundamentally modified our biology, such as fire and literacy, with their enormous impact on our digestive system (Wrangham, 2009) and our brain (Buchanan, 2011b, p. 11) respectively. Second, the idea that enhancement is bad because it is unnatural is a clear example of the naturalist fallacy. It does not follow logically that because something naturally is a certain way it *ought* to be that way. In *Liberal Eugenics*, Nicholas Agar brings up the unpleasant fact that rape has been prevalent in all societies throughout history, a behavioral trait that can be easily explained in males through evolutionary theory (Agar, 2005, p. 91; Palmer & Thornhill, 2000). This, however, does not mean that we should resign ourselves to accepting our nature, and even less to condemn attempts to overcome it.

2.2.2 Enhancement is inherently risky or superfluous

An argument closely associated with the previous argument is the idea that we cannot improve on the work on our creator, or that we lack the knowledge to do so. As shown by Allen Buchanan in his book *Beyond Humanity*, implicit in the bioconservative position is

the idea that the human body has been molded by evolution (or created by God) in such a way that (a) it would prove hard to improve on millions of years of natural evolution and (b) the body is so highly interconnected that all changes would produce disastrous consequences.

2.2.2.1 We cannot improve on evolution

The idea that evolution has created human bodies just as they should be is based on a common misunderstanding of how evolution works. Evolution is not a linear process through which ever more perfect beings are created, but a dynamic process through which random modifications to organisms, most of them innocuous, sometimes provide *reproductive* advantages. In contrast to the bioconservative understanding of evolution as a master watchmaker, Buchanan offers a modified version of Richard Dawkins's allegory of evolution as a blind watchmaker by describing evolution as the work of "a morally blind, fickle, and tightly shackled tinkerer"(Buchanan, 2011a, p. 192). This analogy better captures three key attributes of natural evolution: selected traits are (a) not necessarily optimal, but simply superior to the alternative, (b) selected *solely* on their impact on reproductive fitness (c) for a particular time and place. In other words, our current genetic make-up provides us with a marginally superior ability to have offspring than the species that competed with us for the same resources back in the Pleistocene, not with the genes needed for the best, happiest or most moral lives. Once we understand this, the argument

that we are perfect the way we are (due to the process that created us) loses much of its force.

A further reason to doubt the ability of evolution to find optimal traits was succinctly explained by transhumanist Nick Bostrom in a 2006 article. “[E]ven if some trait would have been adaptive for our Pleistocene predecessors, there is no guarantee that evolutionary trial and error would have discovered it. This is especially likely for polygenic traits⁴ that are only adaptive once fully developed but that incur a fitness penalty in their intermediary stages of evolution” (Bostrom & Ord, 2006, p. 666). In other words, although the evolutionary process tends to easily find advantageous traits that are linked to a single mutation, evolution cannot “look ahead” and choose a *set* of mutations that would be advantageous. Since many advantageous traits are linked to many genes (i.e. they are polygenic), their development through evolution is unlikely if each mutation that is part of the needed set is not advantageous by itself.

Bostrom also mentions another way in which evolution may fall short of the bioconservative ideal: the inability for evolution to solve collective action problems. Because the basis of selection is ability to pass on one’s genes, many traits may increase reproductive fitness for individuals, while decreasing the reproductive fitness of other

⁴ A polygenic trait is a trait that arises through the interaction of multiple genes

members. This could be the case of a biological predilection for “rape, plunder, cheating, and cruelty [which] might well have been evolutionarily adaptive” (Bostrom & Ord, 2006, p. 667). Although Bostrom’s position that evolution will favour anti-social behaviour if it benefits the individual used to enjoy wide acceptance, it has recently come under major scrutiny, and the current consensus of evolutionary psychologists is that, in a context of repeated interactions where cooperation leads to significantly better outcomes, and where anti-social behaviour can be punished (either through direct penalties or termination of cooperation), evolution will favour the spread of altruism (Boehm, 2012; Bowles & Gintis, 2013; Tomasello, 2016). This does not mean that bioliberals are wrong to say that evolution is not a process that provides us with the best genes for leading happy lives. Although their case is slightly weakened when looking at recent developments in evolutionary psychology, it is still true that (a) evolution seeks to maximize reproduction, not flourishing, (b) that it did so at a time where the natural world and our social groups were radically different, (c) and that it did so sub-optimally, since many complex traits remained beyond its reach.

2.2.2.2 Interconnectedness makes improvement impossible

The second bioconservative argument related to evolution can be found in the idea that as biological systems, the various organs and systems that compose us are so highly interconnected that all changes would produce disastrous consequences. This belief has

been described by bioconservative Erik Parens as emanating from understanding humans through the “ecological” lens, which invites us to “see human beings as organisms: staggeringly complex and fragile systems, which, like the rest of the natural world, are easy to harm and devilishly hard to improve” (Parens, 2015, p. 67). Those who embrace this conception of humans fear that attempts to enhance come with a high probability of unintended (disastrous) consequences, because changes to one part of the system will probably lead to catastrophic effects down the line. However, an alternative conception of humans is possible. According to Allen Buchanan, evolutionary biology supports a modular conception of humans, where we would be composed of a variety of systems and sub-systems that operate in a relatively independent way. Indeed, if that was not the case, evolution of complex organisms would prove to be impossible since the slightest change would need to be compatible with all parts of the organism. Buchanan’s view is vindicated by the pervasiveness of redundancy in biological systems, that is the phenomenon where multiple sub-systems handle the same task, providing the organism with robustness, since the failure of one sub-system will not induce the failure of the organism (Buchanan, 2011a, p. 160). Erik Parens criticizes the approach of Buchanan and other bioliberals by claiming that “[t]he enthusiasts’ confidence in our ability to engineer such traits seems to me actually out of step with many recent advances in the genetics and neuroscience of

complex behaviors, but that is an empirical question” (Parens, 2015, p. 68). Parens is right to point out that evolutionary biology can be used to support the interconnected conception of organisms as well if not better than the modular one. In a recent book, Nicholas A. Christakis (2019) presents the work of biologists Belyayev and Trut, who selectively bred foxes for docility. After six generations of only allowing the most docile foxes to mate, the offspring obtained were not only extremely docile, but “morphological changes accompanied the behavioral changes; the foxes acquired floppy ears, rolled tails, short legs, feminized cranial features, and novel coat colorations. Likewise, the domesticated cohort reached sexual maturity earlier, followed different mating patterns, and showed alterations in hormonal and neurochemical processes” (Christakis, 2019, p. 375), giving credence to the skepticism of bioconservatives on the question of unintended consequences. After all, if the genes for docility were simply connected to the neural structures that generate this behaviour, morphological changes would not be observed.

Once again, the bioconservative victory is only partial. Although we can expect many traits to be highly interconnected and their modification to carry great risk, this does not mean that all of them will, or that an estimate of the risk involved is impossible. By identifying the factors that lead to increased interconnectivity, we may be able to estimate the risk of unintended consequences for particular enhancements. Even when considering

enhancements likely to bring about unexpected consequences, we need not resign ourselves to a complete abandonment of such enhancement, but simply pursue a careful understanding of the target gene(s) and its functioning before moving to human patients.

Put simply, although bioconservative critics make some valid remarks regarding the risk of unintended consequences, the argument suffers from being too broad. As mentioned above, an awareness of potential risks entails their adequate consideration when evaluating potential enhancements, not the abandonment of the enhancement project altogether, or its prohibition. The main problem with the bioconservative position on risk, as pointed out by bioliberals, is that their cost-benefit analysis completely disregards the benefits side of the equation. If the potential benefits for a particular enhancement are higher than its expected cost (i.e., the cost of the bad scenario times the probability it has of occurring), we should consider pursuing it. How to appropriately measure benefits and risks will be explored in chapter 3, but even in the absence of a clear framework for cost-benefit analysis, we cannot avoid taking both factors into consideration.

2.2.3 Consent of enhanced children

Even if the benefits outweigh the risks, bioconservative authors (Habermas, 2003; Kass, 1998) are quick to point out the uncomfortable reality that we would be treating our

children as guinea pigs. Even with fully developed technologies, biomedical intervention entails a certain level of risk that we impose on children without their consent. This argument falls however to what we might call the *fallacy of biomedical exceptionalism*. Variations of the fallacy of biomedical exceptionalism have been ascribed in the works of most bioconservative authors. This fallacy consists in the (correct) assertion that a biomedical intervention is problematic in a particular way, followed by the peremptory claim that it should lead to its prohibition, even if other widely accepted practices are equally problematic. To impose risks on children without their consent with the hope that it will provide them a greater benefit may or may not be a problematic practice, but it is certainly a ubiquitous one. As John Harris shows in *Enhancing Evolution*, we routinely expose children to risks by choosing what to feed them or in what activities they will participate (e.g., sports, school trips, unsupervised bike rides with friends), but we do so under the assumption that the benefits will be greater than the risks. As Harris writes, “If decisions could not be made for children unless and until they could consent to those decisions themselves, they would never grow up not to be children. Indeed, they would not live long at all” (Harris, 2007, p. 81). Thus, the apparent dilemma is resolved by realizing that choice (and imposing the risks associated with it) is unavoidable. To simply consider the risks of our actions is to miss the risks that our lack of action would impose.

For example, it is true that sending our kids to school exposes them to a myriad of risks (e.g., catching a cold, getting bullied, breaking a bone during recess). However, not sending them to school also entails a variety of risks, such as the underdevelopment of their social abilities or the lack of intellectual stimulation needed for their healthy development. In the same way, to not provide our children with the genetic modifications that (for example) would grant them a superior immune system exposes them to a variety of risks that may be greater than those involved in the procedure. This is not to say that we should then accept all enhancements regardless of risk, but rather that the presence of risk in enhancement is not a reason to disqualify the procedure. Instead, we must look at the risks (and benefits) associated with the technique and compare them to forgoing it.

Of course, if the techniques can be postponed until children come of age, then presumably a respect of their autonomy requires that we wait to undergo enhancement until we can obtain their consent. Erik Parens provides some very thoughtful discussion on the importance of involving children in the process of choosing to undergo corrective plastic surgery and the duties of parents to try to incorporate the (undoubtedly not fully mature) opinions of their children into their deliberation (Parens, 2015, pp. 147–149).

2.2.4 Gratefulness

The arguments discussed so far deal with direct and concrete risks involving

enhancements. Yet, many of the strongest bioconservative challenges have to do with the symbolic and long-term social repercussions of enhancements. This is the case of the argument for gratefulness, most associated with Michael Sandel. The argument is quite simple: to seek enhancements reveals and encourages a disposition of mastery towards ourselves and nature. This would in turn undermine our ability to cope with the aspects of life that we cannot control, making us less prone to be grateful for what we have, and tainting many of our most cherished relationships. Therefore, we should avoid enhancement. This argument is probably the most discussed (and reviled) in all of the bioliberal literature, with many authors devoting sections or whole chapters arguing against Sandel. The first and strongest counterargument is to accuse the argument for gratefulness of falling prey to the *fallacy of biomedical exceptionalism*. That is to say that even if it is true that biomedical enhancement gives rise to these ‘ugly attitudes’, so do other non-biomedical interventions, and we do not ban those. This lack of consistency is most egregious when considering that the biomedical enhancements currently available (e.g. pharmacotropes for moderate improvements in concentration, embryonic selection of eye-color) are much less likely to change social dynamics or encourage hubris than commonly accepted practices such as subjecting one’s children to the gruelling training regime needed to become an Olympian or a professional violinist.

A second problem with this argument is that it is not clear that we should accept any of its premises. A desire to be stronger, smarter, or healthier does not necessarily entail an unbridled desire for mastery. Indeed, to make psychological assumptions about the subjacent desires of defenders of enhancement is inherently problematic. Allen Buchanan (2008) shares the personal example of casually accepting for over-correction (i.e., better than natural vision) when undergoing a laser eye-surgery for correction of myopia. This is one of many possible examples of pursuing “biomedical enhancements, without exhibiting a ‘drive for mastery’ that is incompatible with any sense of ‘giftedness’ that could plausibly be construed as a central human good” (Buchanan, 2008, p. 24). Additionally, we may reject the second premise by denying that the desire for mastery necessarily leads to hubris. A partial mastery of our biology will still leave us with many (unfortunately too many) reminders of our fragility and impotence. As Buchanan concludes, “opportunities for a sense of ‘giftedness’ would not be lacking in a world replete with biomedical enhancements. In such a world it would not be the case that “there would be nothing left to affirm or behold outside our own will” (Sandel 2004, p. 62)” (Buchanan, 2008, p. 25).

We may also reject the argument for gratefulness in its entirety, either by attacking the idea that a sense of giftedness is a valuable good. As John Harris says: “illnesses are

unbidden, as are accidents, invasions by parasites and viruses and for that matter terrorists and foreign forces. I cannot see any obvious, or even subtle, merit in openness to the unbidden” (Harris, 2007, p. 116). One can even describe this purported humility as the rationalized fear of taking charge of own’s destiny. On this point, Harris is unequivocal: “I do not recognize finitude, only the limitless possibilities of the human spirit and of human ingenuity” (Harris, 2007, p. 137). Harris’s point is not, however, that we should all reject the importance of giftedness. Rather, he argues, against Sandel, that it is not self-evident that this is a good so great that we must *ban* all procedures that can be considered enhancements. Due to the possibility for reasonable disagreement, an open society should allow its members to choose for themselves which value, giftedness, or mastery, they prefer.

This point of balancing mastery and humility brings us to one last problem—and in our opinion the most important one— with the argument for an openness to the unbidden; the argument may sound quite intuitive but becomes inoperably vague upon reflection. This problem may be easier to spot when considering the recent reformulation of Sandel’s argument made by Richard Kim. Kim presents the argument for gratefulness in terms of Daoist philosophy. Put simply, Kim describes the Zhuangzi (one of the main written sources of Daoist philosophy) as teaching us to combine two different

perspectives: the heavenly perspective and the human perspective. While the human perspective is the one embraced by most people, where one holds strong beliefs, has marked desires, and strives towards their fulfillment, the heavenly perspective would “[prevent] narrow-minded obsessions over trivial matters by allowing us to see events and people from a wider, more cosmic point of view. It allows us to face difficulties with equanimity and also to see that the values and norms we endorse are not timeless truths, but a product of culture and society, resulting in open mindedness and receptivity toward finding value and worth in things and people that otherwise would have been neglected” (Parens & Johnston, 2019, p. 78). Kim applies this concept to declare that “by increasing our manipulation of the most profound and mysterious human events such as birth and death, we promote the disposition to seek greater control over nature—a disposition that lies in tension with the more detached attitude of the heavenly perspective” (Parens & Johnston, 2019, p. 80). Kim makes great efforts to clarify that he is not advocating for a rejection of the human perspective, since it would lead to an inhuman life of detachment from oneself and one’s community. Rather he urges to find a better balance between it and the heavenly perspective. The problem with Kim’s position is that no potential process or end-state is given that would enable us to know at what point equilibrium has been reached. The point made by Kim and Sandel about being grateful for what we have

and not falling prey to hyper-mastery is well taken, but in the absence of some kind of parameter that would allow us to make the difference between hyper-mastery and just-enough-mastery, most bioliberals have correctly replied that a case could be made that seeking biological enhancements is not hyper-mastery, but just mastery. Moreover, it is very unclear why, in the absence of a parameter that would allow one to discriminate between acceptable and excessive levels of mastery, bioconservatives can confidently and systematically assess *all* biomedical enhancements as being of the excessive kind. This realization supports the view that the argument for gratefulness and its application to biomedical enhancements may be nothing more than a rationalization of bioconservative biases and religious convictions.

2.2.5 Unworthy lives

As mentioned in the introduction of this chapter, a critique of enhancements most associated with Leon Kass (and Erik Parens) is that enhancements are incompatible with fulfilling lives, leading to a stunted existence, not unlike those of the denizens of *Brave New World* (President's Council on Bioethics (U.S.) & Kass, 2003, p. 7). Francis Fukuyama echoes this idea by bringing our attention to the lives of the characters of this work of fiction, who “no longer struggle, aspire, love, feel pain, make difficult moral choices, have families, or do any of the things that we traditionally associate with being

human” (Fukuyama, 2003, p. 6). However, it is not clear that enhancements will inexorably lead us to a Huxleyan future. As Mark Walker points out in his defense of the use of pharmacotropes to enhance moods, *Happy-People-Pills for All*, reliance on works of fiction can confuse our moral intuitions by surreptitiously including “extraneous factors”, “such as alcohol stunting, indoctrination via hypnopaedia, ectogenesis, suppression of ideas and dissent” (Walker, 2013, p. 33), in the case of *Brave New World*. By presenting all of these elements together, the moral sentiment generated by the work of fiction is associated instead to a particular enhancement, even if that enhancement is not the cause for our negative assessment. Indeed, Walker shows that it is possible to think of an alternative fiction, *Mark’s Braver New World*, where citizens have the option to consume a pill in the morning that gives them a sunny disposition throughout the day, not unlike what a cup of coffee may do for our alertness. This sunny disposition would not be an apathetic stupor, but rather the equivalent of waking up in a good mood or feeling more like people with a naturally sunny disposition (Walker, 2013, p. 39). Under the influence of such a drug, one would still be able to “struggle, aspire, love, feel pain, make difficult moral choices, have families” (Fukuyama, 2003, p. 6) and partake in typically human activities. In fact, thanks to their pill-induced positive moods, people could achieve the emotional stability needed for engaging in meaningful activities, leading to

more fulfilling lives.

This fictive “good mood pill” is no more real than the soma of Huxley (although studies on the anti-depressant Reboxetine seem to show that pills that make healthy people feel “better-than-good” may already be available (Walker, 2013, p. 171)). However, just as with Harris’ point on gratefulness, Walker’s point is not that mood-enhancing pills will necessarily lead to more fulfilling lives, but that we can both imagine the pills leading to either more or less flourishing. As with all technologies, biomedical interventions will present good and bad uses, new tools to enrich life or to shirk from human activities, not unlike cellphones or social networks. As bioliberals have repeatedly pointed out, if a technology has the potential to facilitate anti-social behaviour, we must create the right regulatory framework to foment its beneficial uses while limiting its potential to encourage anti-social behaviour and the impacts of such behaviour. To demand for the outright ban of a technology out of fear that it may make human life void is to both miss its potential to enrich life and to underestimate our ability to counteract its negative aspects.

2.2.6 Getting results like magic

A variation on the argument that enhancements will lead to empty lives is the contention that enhancements will improve our capabilities to an extent that achievements will

become meaningless. This argument is one of the main ones explored in *Beyond Therapy*, the 2003 report of the President's Council on Bioethics. Although the argument is often presented in the context of athletic endeavors and competitions, in its more general form the argument starts by claiming that "aspiration, effort, activity, achievement, and excellence [...] are essential [...] to many aspects of the good human life" (President's Council on Bioethics (U.S.) & Kass, 2003, p. 105). Most bioliberals grant this premise, but one may even question the sweeping nature of this claim. John Harris comically challenges this conception of human being-at-work-in-the-world as follows: "[o]ne feels inclined here to say 'well, whatever turns you on Leon [Kass],' but there does not seem to be a compelling value engaged here. *Au contraire*, many favor 'human being-at-rest-in-the-world' or 'human being-having-a-good-time-in-the-world'" (Harris, 2007, pp. 133–134). Although I believe that Harris raises an important challenge concerning the monolithic view of the good life defended by bioconservatives, we might accept, even if only for the sake of argument, that pursuing meaningful challenges is essential to a fulfilling human life. The bioconservative argument then claims that by using enhancements (e.g. drugs that stimulate muscle growth), one "improves as if by "magic," without the self-conscious or self-directed activity that lies at the heart of better training" (President's Council on Bioethics (U.S.) & Kass, 2003, p. 126), thus taking away the

struggle needed to improve and with it all its merit. Achievement would then become universally available, and therefore meaningless. This argument suffers from two major flaws. First, it is not true that enhancements rob us of the chance to struggle. Quite the contrary, some performance enhancing drugs work by making it possible to exert more effort, for example by allowing for a faster recovery of muscles, allowing athletes to train more days a week (Buchanan, 2011a, p. 97). Second, even if enhancements immediately and effortlessly increased our physical or cognitive abilities, this would not abolish struggle and competition, but raise its level. One may imagine the invention of a pill that would immediately increase one's finger dexterity to the level of a master pianist, allowing for everyone to play the most complex concertos effortlessly. This would not lead to the stagnation of classical music, but quite the opposite. More complex and interesting pieces would become possible to play, but only to those that hone their abilities even further than what the pills provided. We may call this the *new plateau counterargument*, which is simply the idea that any enhancement to our capabilities will lead to a greater availability of challenges by opening new frontiers as to what is possible. To paraphrase an example given by Nick Bostrom (2006), one could imagine a tribe of Australopithecus deciding whether to enhance their intelligence to the level of modern humans and desisting from the idea out of fear that it would lead to intellectual stagnation,

since basic additions would become possible to do even by children. Ironically, one could accuse the bioconservative camp of hubris, since they believe that the only challenges available to us are those that we can currently imagine given our limited capabilities.

2.2.7 Authenticity

Another concern raised by bioconservatives is that enhancements, because they can radically change who we are, lead to inauthentic lives. This argument can apply to a variety of enhancements, but discussion on this subject has mainly taken place in the context of mood-enhancing drugs like Prozac. For bioconservatives such as Leon Kass, Carl Elliot and Erik Parens⁵, even if these drugs were to improve your personality and dispositions, they are not really improving *you*, but rather changing you into someone else, someone that is *not you*. Carl Elliot's main "concern is that such products will make us different from who we really are or separate us from who we really are; they will make us inauthentic" (Parens, 2015, p. 53). Bioliberals argue back that these enhancements are not only compatible, but often necessary in order to live fully authentic lives. In his article *Prozac, Enhancement, and Self-Creation*, David DeGrazia berates bioconservatives for embracing "a misleading image of the self as 'given,' static, something there to be

⁵ Erik Parens eventually changed his view on the subject, accepting that the conception of authenticity that the bioliberals put forward is complementary to the bioconservative one. See (Parens, 2015, pp. 47–59) and (Levy, 2011, p. 312).

discovered” (DeGrazia, 2000, p. 35). Instead, he supports an understanding of the authentic life as one of self-creation, where one decides one’s own values and tries to actualize them by all means available. This position is hardly original to DeGrazia and can be found in the work of Jean-Paul Sartre, for whom “the contrary of authenticity was bad faith, and the belief that one has an essence is the paradigm of bad faith” (Levy, 2011, p. 311), and Charles Taylor (1992), whose book *The Ethics of Authenticity* is a riveting exploration of the issues and benefits of conceiving authenticity as self-creation.

Having identified these two possible definitions of authenticity, one may be tempted to try to solve the question of whether enhancements are antagonistic or necessary to an authentic life by figuring out which conception of authenticity is the right one. The problem is, as Erik Parens rightly points out in his book *Shaping Our Selves*, that “[t]hough one side emphasizes that we are creators, and the other that we are creatures, [...] both sides share the moral ideal of authenticity and [...] we need both sides’ insights if we’re going to think deeply about the meaning of enhancement” (Parens, 2015, p. 7). Parens explains that there is no single answer, but that we all embrace both conceptions of authenticity and alternate through them in our daily lives: “reasons alone cannot account for why most of us feel more comfortable in one framework than in the other and that none of us feels comfortable only in one of them - we all move back and forth between

them, to some extent” (Parens, 2005, p. 34).

This allows us to solve the question of authenticity not unlike other impasses explored in this chapter. That is to say that since both the bioconservative view and its opposite can be defended, we cannot make the case for a strong bioconservative position (i.e., banning all enhancements) and should instead defer to the conception of authenticity embraced by those choosing to be enhanced. However, in the case of authenticity, it may be possible to go even further. Neil Levy (2011) attempts to convince the reader that “no matter which conception of authenticity is correct, enhancement technologies can be seen as a means to authenticity” (Levy, 2011, p. 308). Levy’s originality resides in not only pointing out how enhancements can be used for self-creation, but in offering a convincing explanation of how enhancements can also aid in self-discovery. To better understand Levy’s answer, we may take the case of transgenderism. Many people that choose to undergo sex reassignment surgery do not rely on the vocabulary of self-creation (e.g., “I want to become a woman”). Rather, some may appeal instead to the belief that their biological sex does not match their true gender (e.g., “I was born in the wrong body”). One could then understand the non-therapeutic biomedical interventions needed for a sex reassignment as an attempt “to bring inner and outer into harmony” (Levy, 2011, p. 316). Put simply, the alleged objective is not to be authentic by creating a new self, but rather

to uncover and bring out what they have always known themselves to be. Levy concludes that “self-discovery might require change from us, and to that extent it is entirely compatible with the use of various enhancements” (Levy, 2011, p. 316).

Thus, it is possible to reasonably disagree with the harsher bioconservative position and its stifling political implications in two ways. First, it is not clear that enhancement is incompatible with an authentic life because one can understand authenticity as self-creation rather than self-discovery. Second, even if we favor a self-discovery understanding of authenticity, enhancements may very well facilitate (or be required) for the process of self-discovery to take place.

As mentioned at the beginning of this chapter, a variation of the autonomy argument can be found in Habermas 2003 book *The Future of Human Nature*, which John Harris pithily describes as “excruciatingly complex and crushingly conservative” (Harris, 2007, p. 137). Habermas’s argument largely relies on the problematic nature of imposing genetic improvements on children without their consent. In addition to questions of consent, Habermas believes that enhancement of future generations is unacceptable because it undermines their ability to choose the kind of life they want to live. Contrary to non-biomedical interventions, the recipient of enhancements is unable to reject them, because they are biological instead of social. In the words of Habermas, “there is no

communicative scope for the projected child to be addressed as a second person and to be involved in a communication process. From the adolescent's perspective, an instrumental determination cannot, like a pathogenic socialization process, be revised by 'critical re-appraisal'" (Habermas, 2003, p. 62). In other words, biomedical interventions undermine autonomy, because they would determine the kind of life the child will live, and there is no way for the child to reject this imposed life-plan. Unfortunately for Habermas, this argument, as many bioliberal thinkers have pointed out, it is a clear example of *the fallacy of genetic determinism*. The fallacy of genetic determinism consists in the highly inaccurate belief that one's genes are the main, or only, factor involved in defining who one is, and that their effect is inescapable. When it comes to something as simple as height, not only is the number of genes involved very high and the way they interact too complex for us to currently understand, but their expression is highly regulated by environmental factors, such as nutrition (Agar, 2005, p. 117). More complex personality traits, beliefs and higher cognitive functions cannot be preprogrammed, because their origin is environmental to a much greater extent than genetic (Bouchard, 1994). This also means that recipients of specific genetic modifications will always maintain the ability to revolt against the choices of their parents, either by deciding to behave in certain ways, or by *choosing* to undergo pharmacological interventions that will allow them to change.

Even if it was not based in a clear misunderstanding of the role of genes and our current (and probably future) scientific limitation to manipulate complex traits, Habermas's challenge could be met by only allowing for those enhancements that increase the number of possible available life plans. For example, enhancements to multi-purpose attributes such as intelligence or self-discipline do not limit the autonomy of future children, but greatly increases it by providing them the attributes necessary to decide on a life plan and implement it successfully. As we will see in the next chapter, this is the approach most bioliberals embrace, favoring enhancements only as long as they respect *a right to an open future*.

2.2.8 Human nature, human rights and political stability

In *Our Posthuman Future*, Francis Fukuyama raises a very different kind of concern regarding the potential consequences of embracing enhancements. According to Fukuyama, enhancements should not be pursued, because they necessarily transform humans into something else: post-humans. These new beings, not being human, would automatically fall outside the jurisdiction of human rights, leading to the eventual collapse of the very concept of human right and the creation of a new hierarchy of moral status being created in place.

Fukuyama begins his exploration of the impact enhancement may have on human

rights by noting that whatever makes us human “cannot be reduced to the possession of moral choice, or reason, or language, or sociability, or sentience, or emotions, or consciousness, or any other [...]. It is all of these qualities coming together in a human whole that [make us human]” (Fukuyama, 2003, p. 171). Being unable to pinpoint a single attribute (or a set of attributes) that would serve as a buttress for human dignity, Fukuyama concludes that “[w]hat the demand for equality of recognition implies is that when we strip all of a person's contingent and accidental characteristics away, there remains some essential human quality underneath that is worthy of a certain minimal level of respect--call it Factor X” (Fukuyama, 2003, p. 149). This Factor X would be the source of our duty of respect towards each other. In Fukuyama's words: “in the political realm we are required to respect people equally on the basis of their possession of Factor X. You can cook, eat, torture, enslave, or render the carcass of any creature lacking Factor X, but if you do the same thing to a human being, you are guilty of a ‘crime against humanity’” (Fukuyama, 2003, p. 150). Indeed, not unlike the argument for extreme genetic interconnectedness encountered in section 2.2.2, Fukuyama warns us that not only can this polemical Factor X not be reduced to any particular characteristic, or to a set of them, but it is also extremely fragile, and the tiniest intervention into human biology may inadvertently destroy it, even if Factor X is the essence shared by the whole human race

in all its genetic diversity (Fukuyama, 2003, p. 172). From this, Fukuyama concludes that non-therapeutic biomedical interventions would be catastrophic, because they will create new beings that do not share in our human essence (by inadvertently destroying Factor X) and will thus not be protected by human rights. What follows is the impossibility of living together in mutual respect, and once the principle of equal dignity for all is destabilized, it will collapse entirely, leading to the catastrophic end of liberal societies.

Fukuyama's position has rightly been accused of being alarmist, unclear and incoherent by a variety of bioliberal and transhumanist authors ([Bostrom, 2005](#); [Buchanan, 2011a](#); [Buchanan, 2011b](#); [Harris, 2007](#); [Walker, 2013](#)). However, it may be the transhumanist response that better captures the fundamental issue with Fukuyama's reasoning. Nick Bostrom describes Fukuyama's position as denying that that dignity is something that a posthuman could possess (Bostrom, 2005, p. 209). According to Bostrom, this claim seems to be based on the implicit assumptions that if our sense of dignity is to expand so as to include a new kind of people, it must also contract by the same magnitude. This "purported conservation law of moral recognition" (Bostrom, 2005, p. 209), as Bostrom calls it, can be shown to be false by looking at the expansion of beings given moral consideration, as observed by changes towards further inclusivity over the last few centuries in various parts of the world in the moral and/or political status of a variety of

groups (e.g. people of color, women, animals). Given the major elasticity that our conception of moral status has shown over time, it is not clear why genetically modified persons should be treated differently from other human beings, even if they lacked Fukuyama's elusive factor X.

2.2.9 Inequality of access

A shared concern of bioconservatives and bioliberals is that the access that individuals will have to new enhancement technologies will be dependent on their economic standing, leading to major inequalities of access to these technologies. There is no single bioliberal answer to the problem of inequality of access, rather the different bioliberal factions present radically different ways of conceptualizing and addressing the problem. These bioliberal theories will be the subject of Chapter 3, where their relative advantages and disadvantages will be evaluated. However, while bioconservatives believe that enhancements will necessarily lead to the creation of two distinct groups, the gene-rich and the gene-poor, all bioliberal positions are based on the premise that it is possible to find some way to address this issue so that enhancements are advantageous to everyone.

For their part, transhumanists tend to disregard these concerns of access, believing that as the price of these new technologies fall over time these inequalities will automatically resolve themselves. The problems with the transhumanist approach will be

explored in detail in chapter 3, but it is important to clarify here that there is more to their claims than wishful thinking.

“What’s true of literacy is true of the other great historical enhancements—the agrarian revolution, the growth of institutions, computers, and the Internet: They start out as the property of a minority and then diffuse more widely. When it comes to biomedical enhancements, some people seem to forget this basic fact. They are so worried about the unfairness of some people lacking access to biomedical enhancements that they actually propose not developing them or at least not allowing anybody to have them until everybody can! Call this the Equality or Nothing View” (Buchanan, 2011b, p. 101).

Being in the privileged position of reading texts on the enhancement debate almost 20 years after their publication, we can see that many of the biotechnologies that worried bioconservatives, such as genetic testing, have indeed drastically dropped in price (Phillips et al., 2018). Furthermore, the idea that a technology should be banned unless equal access is guaranteed may very well be another case of bioconservatives falling for the fallacy of biomedical exceptionalism. Nobody approves of the differences in access to potable water, vaccines, the internet, fair political institutions, etc. but this does not mean that we would deprive those better off of any of these things. On the contrary, it means we should strive to provide access to as many people as possible. Therefore, the bioconservatives must either accept that we cannot outright ban enhancements for reasons of access, or ask for an equally draconian ban of every single advancement humanity has ever achieved.

2.2.10 Repugnance

Lastly, when all other arguments have been systematically dismantled, some bioconservatives have resorted to question the very need for rational argumentation. Leon Kass (1998) claims that the capture of bioethics by analytical philosophy has led bioethics to “by and large come to content itself with analyzing moral arguments” (Kass, 1998, p. 683). This puzzling remark is followed by the claim that this approach disregards an important aspect of the repugnance naturally felt (by bioconservatives) towards interventions such as “in vitro fertilization (IVF), [...] embryo manipulation, embryo donation, and surrogate pregnancy” (Kass, 1998, p. 681). This repugnance would be, according to Kass, “the emotional expression of deep wisdom, beyond reason's power fully to articulate it” (Kass, 1998, p. 687). Kass does not bother to address in this article the obvious critique that was raised by virtually all bioliberals; although repugnance may indeed be the manifestation of some deep-seated wisdom, it may also be the ugly expression of unconscious prejudice. Given formerly widespread beliefs surrounding the inferiority of women, non-whites, the permissibility of slavery and animal abuse, the persecuting of heretics and homosexuals, and many other clearly immoral practices, it seems fair to claim that the burden of proof squarely lays on the bioconservative camp. This is even more apparent when one considers that the examples offered by Kass a few

decades ago (i.e., IVF, embryo manipulation, embryo donation, and surrogate pregnancy) have all come to be widely accepted and the feeling of repugnance has vanished accordingly.

2.3 Bioliberal arguments against the treatment enhancement distinction

In the previous section we considered various bioconservative arguments for the adoption of the TED and their respective counterarguments. In the following section, we will look at bioliberal arguments that explicitly display the negative consequences of the TED.

2.3.1 The TED goes against other important considerations

In the absence of other considerations, we may simply choose to reject it due to two major constraints it imposes on us: the TED reduces our overall welfare and it constrains our liberty.

2.3.1.1 Welfare

First, since enhancements are improvements on our natural capacities, we have good reasons to believe that they will also increase our quality of life. This is the argument of Allen Buchanan in his article *Enhancement and the Ethics of Development*. In this article, Buchanan attempts to disprove the pervasive understanding of all enhancements as a zero-sum phenomenon —“zero-sum” meaning that the advantages derived by the enhanced will be equal to the disadvantages imposed on the unenhanced. Certainly, some

enhancements may be of this kind,⁶ but most enhancements do not fall under this category. Quite the contrary, many enhancements have *spillover effects* (also known as positive externalities), meaning that in addition to providing benefits to those being enhanced, they also provide some benefits to those other than the enhanced. This is probably the case of traits such as intelligence or health. Although those whose intelligence is enhanced will be advantaged in the job market, they will be able to use their augmented abilities for the benefit of others, for example by creating new and better products, coming up with better political theories, or developing more efficient pedagogical techniques. The same could be said of health, which would allow people to contribute to society for longer.

The issues raised above are no different than those raised by non-biomedical enhancements. By understanding biomedical enhancements as a continuation of a historical trend of trying to improve on naturally given human capacities, we can expect biomedical enhancements to greatly improve humanity's lot. Of course, some may be skeptical at the idea that increases to our abilities will be used in prosocial ways. After all, many smart minds were dedicated to the creation of weapons or the subjugation of their fellow citizens. Although historical trends support an optimism towards newly gained

⁶ Zero-sum enhancements and enhancements that impose costs on other people are discussed throughout Chapter 3, with particular emphasis on positional goods in section 3.6.3.

abilities (Buchanan, 2008, p. 8), we must take this concerns seriously and ensure that the availability of enhancements is accompanied by further development in our political, social, and educational institutions.

2.3.1.2 Liberty

Second, the TED as presented by bioconservatives can be (and has been) used to limit the access to biomedical interventions. It is important to note that most bioconservatives speak clearly of dangerous or immoral practices, but few offer an opinion on the need to outright ban practices, with the exception of cloning. However, it would be disingenuous to believe that bioconservatives, particularly those that took part in the President's Council on Bioethics (e.g., Leon Kass, Michael Sandel, Francis Fukuyama) did not believe that their position would translate into legal restrictions of various sorts. Furthermore, independently of the views held by individual bioconservatives authors on the legality of enhancements, there is no doubt that the TED lends itself to legal restrictions, which in the absence of sufficiently important concerns, should be rejected by appealing to the intrinsic value of freedom. Although not all people embrace this position explicitly, it seems uncontroversial to say that, *ceteris paribus*, humans prefer more to less freedom of choice, particularly when it comes to life changing choices. Having cast *reasonable* doubt on the most important bioconservative arguments, it seems

adequate to reject the TED on the ground that it illegitimately curtails particular freedoms (e.g., procreative freedom, bodily autonomy) for all citizens.

2.3.2 The TED does not treat similar cases similarly

Other than being inconvenient, the TED critically suffers from being inconsistent. A thought experiment originally proposed by David B. Allen and Norman C. Fost (1990) allows us to see how the TED, while intuitive at first, does not capture ethically meaningful differences. In their article, Allen and Fost introduce us to two fictitious exceptionally short boys, Johnny and Billy.

“Johnny is a short 11-year-old boy with documented [growth hormone] deficiency resulting from a brain tumor. His parents are of average height. His predicted adult height without [growth hormone] treatment is approximately 160 cm (5 feet 3 inches).

Billy is a short 11-year-old boy with normal [growth hormone] secretion according to current testing methods. However, his parents are extremely short, and he has a predicted adult height of 160 cm (5 feet 3 inches).” (Allen & Fost, 1990, p. 18)

As the TED would show, these two boys are different insofar that Johnny is short due to a disease (in this case a brain tumor), while Billy is short due to the ‘natural lottery’. Both children suffer from the same degree of shortness (insofar as one can ‘suffer’ from

shortness given current social preferences) and both would equally benefit from growth hormone therapy. Additionally, they are both short for reasons beyond their control. In fact, as Norman Daniels points out in *From Chance to Choice*, if Billy's shortness is caused by a genetic mutation that made him more likely to develop the brain tumor, "[w]e [can trace] both Johnny and Billy's shortness back to specific genes" (Daniels, 2000, p. 312). In other words, we have two children who suffer from the same affliction, through no fault of their own, and who would equally benefit from a particular treatment, yet according to the TED only Johnny could morally undergo growth hormone therapy. As for Billy, to pursue growth hormone therapy in order to achieve average height could, by extrapolation of the bioconservative position, be dehumanizing, a show of hubris, and undermine his autonomy. The radically distinct treatment of both cases is certainly puzzling and has led Buchanan et al. to conclude that "there is something 'morally arbitrary' about addressing the disadvantages produced by disease and impairment and not addressing those imposed by disadvantageous - but normal - allotments of capabilities or talents and skills" (Buchanan et al., 2000, p. 116). After all, the reason we treat someone's disease is not because it causes them to depart from biological normality, but because this departure inflicts some type of harm to them. The emphasis that the TED puts on *the cause* of a disadvantage distracts from more important considerations about

its consequences, leading to counter-intuitive cases where two morally similar misfortunes are treated differently.

2.3.3 The TED pushes towards the medicalization of sub-optimal traits

Another that has been raised at the TED is that it necessitates a very clear and stable definition of disease. Indeed, it would not be possible to distinguish medical from non-medical uses of biotechnology if the realm of what is a cure was in constant flux. Yet, our understanding of disease has changed over time and is greatly shaped by both social expectations and the medical technology available. Although we should not reject a moral distinction because it relies on fuzzy concepts, its difficulty of application may give us reason to opt for other alternatives. The reliance on the concept of disease also leads to the creation of problematic alternative ways of accessing enhancements, such as black markets and the medicalization of normal traits. Indeed, one can see an example of such dynamics in the case of stimulants (e.g., Ritalin) to enhance academic performance. Often discussed in the enhancement literature, the case of stimulants shows how limiting access to enhancement technologies can lead to their widespread illicit use in ways that have not been medically tested or approved, and with access to the enhancement limited to the most advantaged social strata (either by being able to pay the exorbitant black market prices, by having the means and know-how necessary to fake an ADHD diagnostic).

2.3.4 The TED is inconsistent with attitudes towards enhancements

As mentioned multiple times in other sections of this chapter, the TED often falls prey to the fallacy of biomedical exceptionalism. It is undeniable that most non-biomedical enhancements are not only tolerated, but enthusiastically adopted by most of us. In the absence of good reasons to believe that there is an inherent difference between biomedical and non-biomedical enhancements, we should reject the TED for reasons of consistency. Upon closer inspection, the mismatch between the TED and our intuitions goes even further than that. Not only are non-biomedical enhancements widely accepted, but many biomedical enhancements have also been widely adopted, often without so much as a second thought. While bioconservatives decry the use of stimulants to increase concentration, people all around the world drink coffee *with the specific intention of increasing cognitive ability*. One may respond that this is a transient intervention (although that would equally undermine the case against mood-enhancing drugs or other stimulants such as Ritalin), but we also have no problem accepting permanent enhancements, such as vaccines, which irreversibly augment our immune system. Again, one may try to disregard this example, because it seeks to improve health, if only preemptively, but other enhancements, such as over-correcting laser eye-surgery in order to

obtain “better-than-normal” eyesight have not stirred much moral outrage. It is possible to imagine more outlandish enhancements that may become available in the future and point towards our feeling of discomfort, but if there is a clear trend in the development and widespread adoption of new technologies and social trends is that what today seems unthinkable and odd, tomorrow becomes familiar and accepted.

2.3.5 The “we need change to stay the same” argument

One final argument given against the TED is that enhancements may be required in the future for the sake of the principles embraced by bioconservatives, particularly political stability and the opportunity to lead a meaningful normal life. As Allen Buchanan points out, the bioconservative position “simply assumes that we are now at a point at which further biomedical enhancements [...] will not be needed, either (1) to sustain the gains in well-being that many humans have achieved or (2) to make these gains available to those who now lack them. But this assumption is [...] highly dubious” (Buchanan, 2011a, p. 55). If, as Leon Kass seems to defend in *Beyond Therapy*, there is something inherently adequate about the current human lifespan, then life-extending enhancements should be not only accepted, but actively sought out by bioconservatives if external factors (such as the deterioration of the environment) decrease average lifespans. This line of thought does not disprove the possibility that the TED may be acceptable *in certain contexts*, but it

does show that whatever is assumed to be wrong with enhancements cannot be intrinsic to their mode of operation.

2.4 Practical advantages of the therapy enhancement distinction

It is hopefully clear by now that the TED suffers from too many conceptual flaws for it to be considered, as the bioconservatives would want, as the standard for separating morally acceptable from morally unacceptable uses of biotechnology. Some bioliberal authors such as Norman Daniels (2000) do however believe that the TED may have limited practical value, by identifying interventions that should be subsidized by the public or given priority over scarce medical resources.

2.4.1 The TED is a good proxy for risk-benefit analysis

As discussed throughout this chapter, we should reject the TED in favour of an approach that takes into consideration the risks and benefits associated with each type of intervention. If the risks exceed the benefits, we should not pursue said enhancement.

However, given that resources are scarce, we cannot be content with a conceptual framework that simply allows or encourages beneficial enhancements. Consideration should also be given to how much benefit can be expected from a particular intervention and, *prima facie*, priority should be given to those that offer the ‘most bang for our buck’.

Medical interventions tend to create larger benefits on their recipients than non-medical

interventions (e.g., eye surgery to cure severe astigmatism vs. eye-surgery on a normal eye to see further). Furthermore, they tend to be less risky, because the reestablishment of normal function does not create a novel state susceptible to cause unintended consequences. For this reason, the TED can prove to be a useful rule-of-thumb when trying to determine which interventions should be prioritised or publicly subsidized.

2.4.2 It is a good proxy for the requirements of justice

A common idea found in the writing of bioliberal authors is that we cannot be satisfied with maximizing the total benefits for society while disregarding the distribution of said benefits. One possible standard for judging a distribution as just is the difference principle, according to which differences in the distributions of benefits are only justified insofar as the permissibility of said differences increases the benefits of the worse off. In the case of biomedical enhancements, this simply means that we should prioritize all interventions that favour those that have been disadvantaged the most by the natural lottery. Once again, we see that the TED serves as a fairly accurate rule-of-thumb to judge which interventions should be given priority, since those that most need biomedical interventions are those who suffer from diseases.

2.4.3 The TED provides good “Moral Warning Flags”

Norman Daniels points out that “certain enhancements may be impermissible for reasons

that are unlikely to arise for treatments or for reasons that can be more easily dealt with in the case of treatments. Knowing that something is an enhancement should thus raise a moral warning flag” (Daniels, 2000, p. 320). This is not to say that we should immediately disregard enhancements as morally impermissible, nor that all treatments are unproblematic, but that special attention must be paid to interventions that seek to enhance human abilities. This is not unlike Nicholas Agar’s insistence on calling his position towards enhancement *Liberal Eugenics*. Given that past attempts to improve the human stock, such as those by the eugenics movement, led to the perpetration of horrible crimes, Agar believes that the only morally responsible way to proceed with a program that embraces similar objectives is to label it accordingly, so that we do not forget the risk of falling back into similar attitudes. Agar makes the useful distinction between *morally wrong* and *morally problematic* practices. He describes the differences so:

“All instances of an intervention properly identified as essentially morally wrong are morally wrong. However, a morally problematic intervention is problematic precisely because it comprises both morally bad and morally good interventions. When we recognize an intervention as morally problematic, we understand it as requiring special effort to determine whether it is morally good or morally bad.”

(Agar, 2019, p. 10)

When applying Agar’s concepts to Daniel’s position, we could say that the TED serves

an important role as an identifier of morally problematic practices. Once flagged by the TED as morally problematic, these practices can be more carefully evaluated, but the burden of proving that it is not a morally wrong practice would rest on those supporting the intervention.

2.5 Why we need to go beyond the distinction

Although the TED may have limited practical applications right now, it is very important that we develop alternative concepts to provide moral guidance for three reasons.

First it is not clear if the use of the TED as a proxy for calculating benefits calculation will hold true with the eventual development of new and cheaper enhancements. Let us contrast for example the treatment of mild hearing loss and a hypothetical future pill that raises IQ by 20 points for those with normal, but very low IQ. Let us further assume that the cost of this hypothetical pill continually drops over time, while the intervention to fix the mild hearing loss stays about the same. Given a case such as this one, using the TED as a heuristic for the efficient allocation of healthcare resources may no longer be legitimate. There is no certainty that enhancements will necessarily become much cheaper or bring about greater benefits than therapeutic interventions, but there is also no reason to believe that this will not be the case. In preparation for such scenarios, we must develop more robust concepts that truly capture the morally relevant

aspects of enhancements.

Second, by embracing the TED, even if only as a proxy for a different, morally meaningful aspect, we create an epistemic context ripe for the extension of the TED in illegitimate ways, such as the bioconservative ban of enhancements.

Third, even when using the TED as a legitimate proxy for requirements of justice or the efficient allocation of limited healthcare resources, we fail to provide patients, their families and (in the case of public healthcare systems) all citizens with the acceptable reasons needed for their legitimate agreement. If one were to deny someone genetic testing that they could use to develop an efficient dietary regime under the pretext that it is a non-medical use of this medical service, they may rightly ask “so what?”. A good set of parameters for judging moral and immoral biomedical interventions must not only differentiate one from the other, but do so in a way that is understandable and acceptable to those that are affected by it.

Finally, there is no reason to continue to use the TED as a proxy when better alternatives remain available. Having spent this chapter discussing the many ways in which the TED is problematic, we now move on to Chapter 3, where we will explore better moral frameworks for the analysis of non-medical interventions.

Chapter 3 – The Bioliberal Alternatives

As discussed in chapter 2, there are serious shortcomings associated with using the TED to differentiate morally acceptable biomedical interventions from unacceptable ones. We also saw that, although the TED may enjoy some limited application as a temporary rule of thumb to determine which interventions should be prioritized, it does so by roughly corresponding to some other principle, like expected benefits or distributive justice. Additionally, the TED was shown to be incoherent and not to match many of our moral intuitions. For these reasons, we must reject the TED as a moral standard. Yet, the rejection of the TED does not imply that no principle is needed (or possible) for the proper use and regulation of non-medical applications of biotechnology. Having made the case for abandoning the TED in the last chapter, we will now undertake the important task of critically presenting and evaluating potential alternative principles.

3.1 The problem with the precautionary principle

Before turning to the main bioliberal alternatives to the TED, let us briefly discuss a common-sense approach called *the precautionary principle*, and why it is inadequate. According to the precautionary principle, the implementation of a particular technology should be allowed only after its proponents show that it will not cause significant harm. In this way, the precautionary principle has the advantage of seeming to be a reasonable compromise between the bioconservative prudence and the bioliberal and transhumanist

desire to improve on our nature; it allows for the development and adoption of enhancements, but only after the necessary due diligence.

While reasonable in theory, this principle is impossibly demanding in practice. The bioliberal author Nicholas Agar points out that the precautionary principle is too strict, because one must provide “assurance that biotechnologies will not lead to a host of disasters as yet unimagined” (Agar, 2005, p. 161). Agar then points out that since the absence of such assurances leads to the rejection of the proposed enhancement, we are asked to judge a technology by its absolute worse-case scenario—a standard much more demanding than what is required for usual decision making. For example, when one decides to eat out, one may fall prey to a variety of misfortunes (e.g., food poisoning, commuting accident, terrorist attack, running into an ex-girlfriend). If we were to always act as if the worst possible outcome was unavoidable, we would have to reject all courses of action affecting the status-quo. It may be pointed out that the risk-benefit evaluations should be different for everyday actions and major technological developments. Nicholas Agar gives us reason to doubt that this could be the case by providing us with a list “of historic achievements that would have been thwarted by the Precautionary Principle[, which] includes the aeroplane, all drugs with side-effects, the contraceptive pill, fire, openheart surgery, the polio vaccine, the telephone, the wheel and x-rays” (Agar, 2005, p.

162).

Although providing good examples of how the precautionary principle could be too stringent, Agar's critique does not explain why we should accept the risks associated with the development of new technologies. According to another bioliberal author, John Harris, the problem with the precautionary principle is that "it is unclear why [it] should apply only to proposed changes rather than to the status quo. In the absence of reliable predictive knowledge as to how dangerous leaving things alone may prove, we have no rational basis for a precautionary approach which prioritizes the status quo"(Harris, 2007, p. 34). In other words, there is an underlying assumption by proponents of the precautionary principle that the current state of the world is satisfactory, and all changes are only worth it if they have no chance of disrupting this acceptable state. In the context of biomedical interventions, we could say that the assumption is that "disease is always a departure from the normal and hence that normality is a disease-free state. But [...] disease and unnecessary death are hideously normal"(Harris, 2007, p. 52). Since there is no good reason to assume that the current state of affairs is 'good enough', a fair evaluation of new technologies should not stop at the sight of risk, but should instead consider the expected risk —not the worst case scenario— and measure that against the expected benefits.

3.2 The four bioliberal alternatives

Having shown that the precautionary principle is not a sensible alternative to the TED, we will spend the rest of the chapter presenting and evaluating four bioliberal alternatives: (1) Classical Eugenics, (2) Procreative Beneficence, (3) Procreative Liberty, and (4) Genetic Justice. As we will see, the first three frameworks respectively attempt to regulate enhancements so as to maximize (1) the overall biological assets of society, (2) the individual welfare of those enhanced, and (3) the procreative liberty of parents. Only the fourth, Genetic Justice, seeks to balance all three concerns by aiming for a *just* distribution of human biological assets in order to provide all individuals with the best chance to become productive members of society (Figure 1). This balanced approach may appear intuitively desirable to most people, but it is more than simply appealing. Indeed, we will show that the pursuit of any single one of the three possible criteria to the exclusion of the other two leads to a variety of undesired or self-contradictory effects. More specifically, we will see that most options will either (a) cause the overall welfare and liberty of some to increase, but only at the cost of immense burdens being placed on a particular sector of the population, (b) give rise to an arms-race that leaves everyone worse off.

4 Bioliberal Frameworks

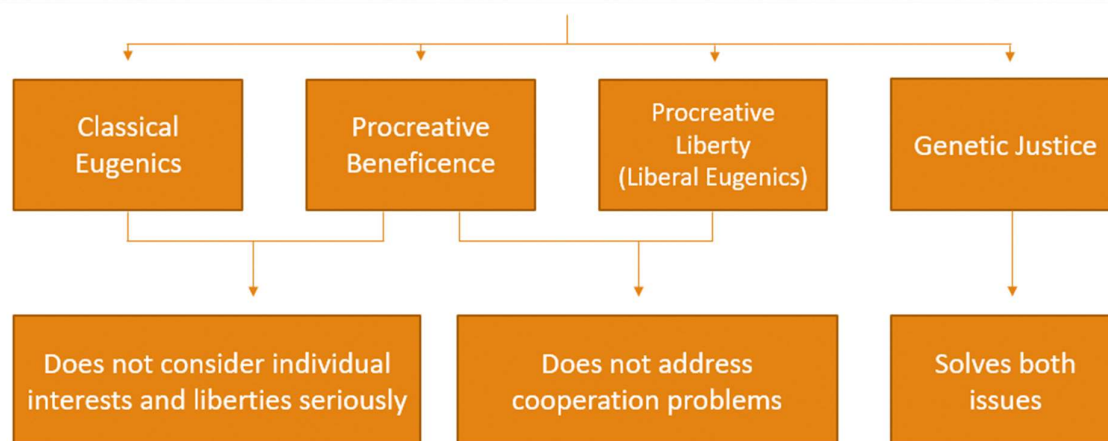


Figure 1: The four bioliberal alternatives to the TED

3.3 What is wrong with eugenics?

The first bioliberal alternative to the TED, classical eugenics, is no longer seriously discussed as a realistic alternative, but rather presented as the prime example of the moral perils of pursuing human enhancement. Due to the history of prejudice, racism and infringement of basic rights associated with eugenics, presenting it as an alternative to the TED is (understandably) a non-starter. The history of eugenics having been briefly sketched in Chapter 1, let us now look in more detail at the core principles of eugenics. Eugenics is a set of principles that seek to encourage the creation of the best possible offspring, in order to “improve the human race” (Galton, 2005, p. 1). *Prima facie*, this

desire to have a healthier, stronger and smarter population is not morally problematic. Quite the contrary, it is what most people wish for themselves and their loved ones, particularly their children. Yet, most of us would not hesitate to condemn eugenic practices. To understand why this is the case, we will consider various potential problems with eugenics and evaluate them along the lines of the analysis provided by Buchanan et al. (1999).

First, critics will point out that the idea of “better” offspring is problematic since it implies a particular vision of human goodness and what traits are considered superior. Should we for example assume that the human race would be improved if everyone was tall and had blue eyes? Although this critique rightly puts the finger on the main problem of eugenics as it unfolded historically, the founders of the eugenic movement had already considered this refutation and convincingly responded that certain traits are what we can call “all-purpose talents”, that is qualities that are useful for most if not all conceivable conceptions of a good human life. Examples of such traits include health, intelligence and self-control. Even if these traits can be somewhat fuzzy (e.g. by intelligence do we mean the ability to do mathematics or to create music? Or maybe emotional intelligence?), it seems possible to agree that the reduction of cases where these traits are clearly lacking would promote better human lives. So, although a narrow conception of “good genes”

historically led to biased and counter-productive eugenic practices, it is important to point out that this conceptual narrowness is *not* inherent to eugenic thought and can be conceptually overcome.

Second, we may believe that the problem with eugenics lies in its infringement of human rights, particularly procreative rights, bodily autonomy (e.g. the forced sterilization of those considered unfit) and the right to life. The coerciveness associated with the eugenics movement is surely one of its most haunting aspects, but once again we may reconsider whether this is an essential feature of eugenics, or an accidental one. Although a coercive apparatus would expedite the selection of “good genes”, there is no logical incoherence in holding eugenic principles, while keeping them subservient to a higher principle, such as human rights. In fact, this seems to be the standard position in contemporary liberal societies. We believe in eating well without forcing our neighbor to follow our diet, we support high culture without coercing others into going to the theater, etc. Historically, many eugenic associations, “especially in Latin America but also in Iran, Egypt, and the Netherlands” (Levine, 2017, p. 7), supported positive eugenics, or the idea that those judged to have good genes should receive financial and social support in order to support bigger families. In today’s context of advanced biotechnology, one could imagine non-coercive eugenics based on private or even public programs that provide

social or financial incentives to individuals that choose to enhance their children.

What is more, even if eugenics was inherently coercive, it would not automatically lead to its moral disqualification. After all, many widely accepted practices are based on coercion by the state, such as the execution of criminal justice, the preservation of public health and even the provision of education. Although it may be impossible to make a sufficiently strong case for the violations of liberty associated with eugenic policies, this is not a feature of any public policy that should automatically disqualify it.

If coercion and prejudice are not inherent to eugenics, what would be so problematic about pursuing a modern eugenic program involving only positive interventions (e.g. financial incentives, education, subsidized medical services) exclusively for all-purpose genes? We agree with Buchanan et al. (2000, p. 52) that the problem with such a program is that it would not meet the requirements of justice. Even if “society” were to benefit from discouraging the reproduction of those with lower intelligence or self-control, all of the costs of the intervention would be borne by individuals in this particular group, for example by seeing themselves stigmatized and seeing their effective procreative liberty reduced. The injury is only magnified if this group also happens to already be disadvantaged by current socio-economic structures (e.g. people with low IQ that would suffer from being discouraged from reproducing may also

happen to be employed in less remunerative or prestigious jobs).

It is important to note once again the horrendous abuses that were perpetrated in the name of eugenics. These are a reminder of the potential that eugenic ideas have in fomenting prejudice and illegitimate uses of force. It is however clear that when evaluating the conceptual issues of a hypothetical modern eugenics, we cannot fall back on criticisms of old eugenics. Instead, we should identify the core conceptual issue with this practice, i.e. how it imposes great costs on an already marginalized portion of the population (e.g. by discouraging the actualization of a core human desire such as reproduction, by stigmatizing and denigrating those judged inferior) for the benefit of the rest. For these reasons, a just framework for the regulation of enhancements must take into consideration the distribution of burdens and benefits among the members of society. As we will see, this consideration is what motivated the development of the next moral framework, Procreative Beneficence.

3.4 Maximizing individual welfare: Transhumanism and Procreative Beneficence

The second bioliberal alternative to the TED, Procreative Beneficence, could be described as an attempt to improve on eugenic principles so that they give proper consideration to the interests of individuals. One way of doing so is by shifting our conception of improvement from those interventions that increase social welfare to those that increase

individual welfare. As explained in the previous chapters, this is the position defended by transhumanists, who propose to transcend eugenics by encouraging the full development of every person (human or otherwise) through enhancement (biomedical, cybernetic or other (Bostrom & others, 2003, p. 4). Transhumanist thought also incorporated a zero-tolerance approach to coercion, allowing each individual to decide what represents an enhancement to them. As we will see below, this principle solves certain issues associated with eugenics, but also creates a host of social problems in the process, particularly when applied to the realm of reproduction.

The clearest formulation of transhumanist principles as applied to reproduction was provided by transhumanist Julian Savulescu as a response to the development of genetic screening techniques for embryos. According to Savulescu, “couples should select embryos or fetuses which are most likely to have the best life, based on available genetic information” (Savulescu, 2001, p. 413), where the best life is understood as the one that provided the child with the most happiness. Savulescu contrasts this principle with Procreative Liberty,⁷ which is the idea that couples should be free to use genetic

⁷ In the article referred to as Procreative Autonomy

information whichever way they want. For Savulescu, it is clear that not to use this information for the benefit of the child is tantamount to neglecting one's child; the welfare of the child should always take precedence over a parent's desire to 'let nature run its course'.

Due to the emotional and psychological burdens associated with abortion and the encroachment on bodily autonomy involved, Savulescu does not want to extend this duty to naturally conceived children, where genetic information would only become available about a dozen weeks into the pregnancy (Cuckle & Maymon, 2016). However, he is adamant on his position that all children conceived through IVF should undergo preimplantation genetic diagnosis (PGD) before being implanted in the uterus of the mother. Not only is PGD safe for the child, but it does not impose significant costs (financial and other) on the prospective parents, since the testing is non-invasive and is orders of magnitude less expensive than IVF (Phillips et al., 2018).

Because Procreative Beneficence is predicated on the objective of promoting the best possible genes, it is easy to make the mistake that it is nothing but eugenics with a different name. Although similar in many of their core principles and real-world recommendations, there are important differences between these two frameworks and the kind of regulation they entail. As mentioned previously, the objective of eugenics is to

improve the genetic stock of *society*. This means that all evaluations are made with the benefits to society at large in mind. In contrast, Procreative Beneficence focuses solely on the advantages derived by the child who receives the enhancement. In the words of Savulescu, “Eugenics is selective breeding to produce a better *population*. A *public interest* justification for interfering in reproduction is different from Procreative Beneficence which aims at producing the best child, of the possible children, a couple could have” (Savulescu, 2001, p. 424). This more individualistic approach has the benefit of not requiring prospective parents to refrain from having children, or to select enhancements that help the community to the detriment of their own child. Here we can turn to hypothetical enhancements, such as modifications that made one more docile and compliant, or much stronger and nationalistic. Such enhancements may be advantageous for a society, for example by creating less confrontational citizens or better soldiers, and thus welcomed by eugenicists. However, they would be rejected by supporters of Procreative Beneficence, because these modifications do not improve the life of the enhanced person. We can see how Procreative Beneficence is not simply a variation on classical eugenics, but an attempt to respond to one of its biggest flaws, namely its indifference towards the enhanced individual.

Although clearly an improvement over eugenics on this front, Procreative

Beneficence, in trying to overcome the limitations of eugenic thought, gives rise to a host of new problems. First, although more mindful than eugenics to the burdens imposed on individuals, Procreative Beneficence demands a lot from prospective parents. If we truly seek to maximize the welfare of children given currently available technology, Procreative Beneficence could be understood to require all prospective parents to undergo IVF, which is physically, emotionally and financially taxing. One could of course follow Savulescu and claim that “Beneficence is a valid principle, albeit one which must be balanced against others”(Savulescu, 2001, p. 425), but unfortunately, he does not provide clear reasons why we wouldn’t ‘bite the bullet’ and take Procreative Beneficence to its logical conclusion, other than this vague addendum: “For the purposes of public policy, there should be a presumption in favour of liberty in liberal democracies” (Savulescu, 2001, p. 425). Indeed, he admits that “there are no simple answers to conflicts between Procreative Autonomy and Procreative Beneficence.”(Savulescu, 2001, p. 425), but even if we admit that a compromise must be made, Procreative Beneficence as a conceptual framework lacks the tools to find and justify the balance between providing children with the best possible traits and respecting the desires and needs of parents. The Bioconservative Josephine Johnston rightly points out that this excessive focus on the flourishing of the child fails to give proper consideration to the flourishing of parents

(Parens & Johnston, 2019, p. 113). Indeed, since we do not have such high standards of self-sacrifice for comparable parental responsibilities (e.g. education, nutrition) it is not clear why we should accept such a demanding standard for the selection of a child's genes.

A second issue with Procreative Beneficence is that due to its emphasis in maximizing the benefits derived by the individuals enhanced, it is unable to solve what are called *collective action problems*. A collective action problem is a situation where each actor can only maximize their benefits by inflicting a cost on someone else, leading all actors to inflict costs on each other greater than the benefits derived. For example, taking the car to work may be more convenient than taking the bus, but in doing so one makes everyone's commute worse by adding to traffic. After enough people choose for the "convenience" of the car, the traffic generated makes everyone's commute worse than if they had all chosen to behave altruistically and take the bus. Since the key principle of Procreative Beneficence is that traits should be chosen so as to give one's child the best possible life, beneficial traits that impose costs on others are not prohibited, as they would be with eugenics, but actively encouraged. This is, for example, the case of traits linked to positional goods, where the worth of the trait is comparative. Here we can think of traits such as height, for which the enhanced will derive the advantages of being taller at the expense of those that would have been the tallest in the absence of that enhancement.

Although a taller person may benefit from higher stature, they do so at the expense of others; one person's gain is another one's loss. The advantage is simply displaced from one person to another. If enhancements on height were allowed, the resulting societies would have to pay the costs associated with the arms race that the constant and widespread pursuit of such zero-sum enhancements brings about (e.g. greater demand for genetic screening, changing the size of cars and buildings, greater energy consumption, etc.), without creating any social benefits. It is important to remark that transhumanists are aware that such social dynamics could arise and that they should be addressed. The problem is that they offer *ad hoc* solutions instead of a complete and coherent framework that would address them, making it hard to foresee the need for intervention or provide the necessary justification.

3.5 Respecting People's choices: Procreative Liberty

Having seen that both attempting to maximize the social benefits derived from enhancements (eugenics) or the private ones (Procreative Beneficence) leads to a variety of problems, one may opt to improve on these two frameworks by pursuing a radically different strategy: to limit encroachments on individual choice. Liberal societies recognize a parent's right to raise their offspring as they see fit, giving them great latitude in how they choose to feed, raise and educate their children. Even children's medical decisions are left to parents, since we judge that they will most often than not act for the

benefit of the child. Only cases of clear abuse are grounds for encroaching on the rights of parents to raise their children. Procreative Liberty consists in the idea of extending these rights to the period before the birth of the child, entrusting parents with the ability to choose a child's genetic assets for them.

As mentioned in Chapter 1, the concept of Procreative Liberty was first systematically explored by John A. Robertson (1996) in his book *Children of Choice*. According to Robertson, "the concept of procreative liberty [had] rarely been analyzed beyond birth control and abortion" (Robertson, 1996, p. 17) and no justification was given to its importance. Robertson describes Procreative Liberty as "the freedom either to have children or to avoid having them" (Robertson, 1996, p. 22). Furthermore, "procreative liberty [should] be given presumptive priority in all conflicts, with the burden on opponents of any particular technique to show that harmful effects from its use justify limiting procreative choice" (Robertson, 1996, p. 16). The basis for such a strong conception of Procreative Liberty being that "control over whether one reproduces or not is central to personal identity, to dignity, and to the meaning of one's life. [...] It also centrally affects one's psychological and social identity and one's social and moral responsibilities" (Robertson, 1996, p. 24).

Robertson's conception of Procreative Liberty is not limited to the ability to have any

child, but also extends to having access to the techniques required to exercise that right. Robertson also considers that techniques that expand our ability to select what kind of children we have should be protected by Procreative Liberty. Indeed, he explains that “[f]or many couples the decision whether to procreate depends on the ability to have healthy children. Without some guarantee or protection against the risk of handicapped children, they might not reproduce at all. Thus viewed, quality control devices become part of the liberty interest in procreating or in avoiding procreation, and arguably should receive the same degree of protection”(Robertson, 1996, p. 33). Although interventions needed to ensure the health of the child are protected under Robertson’s conception of Procreative Liberty, under Robertson’s framework, “prenatal interventions for nontherapeutic enhancement, cloning, or diminishment of offspring will not be protected by procreative liberty”(Robertson, 1996, p. 172), because he does not believe that such interventions can be defended in the name of what makes procreative liberty so important—namely, the chance to shape one’s life through the act of reproduction. This is a surprising conclusion, given his fierce defense of reproductive techniques for creating the “right” children. Indeed, if certain couples will only choose to reproduce under the guarantee that their child will be healthy, it is also possible to imagine for example couples that would only choose to reproduce if their child had the athletic capabilities needed to

excel at their parents' favorite sport. The exclusion of enhancements from under the umbrella of Procreative Liberty may be seen as arising from a bias against technology or human intervention in reproduction, but it is important to clarify that Robertson does not mean to say that enhancements are unjustifiable. Rather his claim is that a justification of enhancements must appeal to a different principle than Procreative Liberty.

Inspired by Robertson's work, the bioliberal Nicholas Agar modified the concept of Procreative Liberty to include enhancement technologies. This expanded conception of Procreative Liberty is called *Liberal Eugenics* by Agar, and it is defined as a "liberal approach to human improvement, [where] the state would not presume to make any eugenic choices. Rather it would foster the development of a wide range of technologies of enhancement ensuring that prospective parents were fully informed about what kinds of people these technologies would make"(Agar, 2005, p. 5). This is another example of how modern bioliberal frameworks define themselves in opposition to the eugenic movement and its principles. While Procreative Beneficence attempts to solve the shortcomings of eugenics by changing its social emphasis into an individual one, Procreative Liberty does so by finding the fault with the eugenics movement in its authoritative and perfectionist aspects. The hope of liberal eugenicists is that by ensuring that liberty is at the center of our conceptual framework, we will avoid the abuses

associated with eugenics. At the same time, Agar positions himself as the middle ground between the bioconservatives, who would completely take away the parent's option to enhance their children, and the transhumanists, who would push for all parents to embrace enhancements. Liberal Eugenics would be neutral towards enhancements, requiring the state to limit itself to provide the information needed by parents to make a choice according to their values.

At the core of Liberal Eugenics lies the conviction that parents will overwhelmingly choose what they believe to be best for their children. Given the large scope given to parents in choices influencing their children, one concern is that parents may choose sub-optimal or even disadvantageous traits. However, Agar goes to great lengths to show that even parents who choose to have children for selfish reasons (e.g. fill an existential void, transcend their own mortality, religious convictions) can (and usually do) still provide their children with a life worth living, and in most cases will also strive to provide them with the material and emotional bases for human flourishing. Notwithstanding this generous faith in parents, Agar believes that it is possible to conciliate Procreative Liberty with certain basic prohibitions on how parents may choose traits for their prospective children. Commenting on the widely discussed case of Sharon Duchesneau and Candy McCullough, a deaf couple that deliberately chose to conceive a

deaf child, Agar states that “deafness compromises a wide range of life plans. This reduction in real freedom should make it impermissible to genetically engineer one’s child to be deaf” (Agar, 2005, p. 105). Agar supports his position by appealing to the *right to an open future* of children.⁸ In virtue of this concept, if the enhancements chosen for a child were so restrictive as to deny them a reasonable spectrum of possible lives, they would be seen as illegitimate and forbidden under Procreative Liberty.

Puzzlingly, Agar does not want to extend the application of this principle to other traits, such as intelligence. According to Agar, because “[t]hose of average intelligence can enjoy uncomplicated pleasures denied to some with superior intelligence”, “[e]xchanging a genetic arrangement that predisposes to an IQ of 160 for an arrangement that predisposes to an IQ of 100 may reduce prospects associated with some life plans – but it offers improvements in prospects associated with other plans of sufficient magnitude to compensate for the loss. It does not reduce real freedom” (Agar, 2005, p. 109). It is striking that this rationale is not extended to the case of the deaf child, who will benefit from participating in a social group with a culture and way of life that would remain inaccessible if they were not deaf. Further undercutting his commitment to restrictions on Procreative Liberty, Agar also comments that “[i]t is possible that

⁸ This concept will be presented in detail in section 3.7.3

Duchesneau and McCullough [...] are just consciously doing what everyone else has always done subconsciously”(Agar, 2005, p. 114), which is to influence the traits of our children through biomedical intervention instead of partner selection. He also agrees with the parents’ argument “that their deafness makes them better parents of a deaf child”(Agar, 2005, p. 14).

Even if Nicholas Agar does not provide clear limits to Procreative Liberty, it is clear that he believes that some cases would be an *abuse* of this liberty. While this is undoubtedly another case of the *ad hoc* curtailment of a proposed principle to compensate for its shortcomings, it may not be as big of a problem for Procreative Liberty as it was to Procreative Beneficence for two reasons. First, limitations to basic freedoms are common and usually understood as part of the process of defining them. For instance, the right to free speech is understood not to include the right to shout “fire!” in a theatre, because the *raison d’être* of this right is to allow for dissenting opinions to be discussed in public, not to create chaos in public spaces. In the same way, limitations on our right to subject children to clearly disadvantageous medical interventions may not be considered part of our right to choose what kind of children to have, since the principle behind this liberty is to allow parents to provide children with the best possible life. Second, as Agar convincingly shows, concerns about parents purposely choosing to

“diminish” their children through biomedical interventions are overblown, since most parents want what is best for their children. In practice, restrictions to Procreative Liberty that ensure a child’s right to an open future would hinder Procreative Freedom as little as restrictions on the distribution of bomb-making manuals prevent us to enjoy our freedom of expression.

A more interesting and ultimately problematic critique of Procreative Liberty is that it suffers from the same inability as Procreative Beneficence to solve collective action problems, such as how to prevent people from pursuing enhancements whose social benefits are zero-sum or worse (e.g., height). Indeed, if all parents are free to choose which enhancements to provide to their children, we can expect the widespread adoption of enhancements that benefit children while imposing costs on others, leading to significant social costs, ultimately rendering the enhancements self-defeating. Additionally, procreative liberty does not provide any indication as to the just distribution of access to enhancements. An interesting critique along this line can be found in Allen Buchanan’s article *Enhancement and the Ethics of Development*. In this article, Buchanan (2008) challenges various “framing assumptions” that define the Liberal Eugenics defended by Nicholas Agar. According to Buchanan, we should try to understand biomedical enhancements as a continuation of the historical drive to enhance human

abilities. For this reason, “theories of technological innovation and diffusion advanced by development economists will provide valuable insights into the emergence of those enhancements that increase productivity” (Buchanan, 2008, p. 14). By embracing this approach, it is also possible to bring to light certain fundamental issues with Liberal Eugenics. The first assumption that a developmental understanding of enhancements challenges is that it is possible and desirable to exclude the state from enhancement endeavors. As mentioned above, a cornerstone of Liberal Eugenics is the exclusion of the state from the interdiction or promotion of enhancements. However, Buchanan points out that “[t]he state may well take an interest in these enhancements and may even claim the right and indeed the obligation to foster them”(Buchanan, 2008, p. 11), in the same way that the state foments other non-biomedical enhancements, such as education or the development of new technologies. Not only would it be naïve to believe that we can simply restrain governments from intervening in a phenomenon that can so widely shape the welfare of their citizens, but it would also deprive us of an excellent instrument for introducing enhancement safely, justly, and quickly. The second assumption that Buchanan challenges is the idea that problems in the distribution of access to these technologies is a minor issue, or that it will be solved as the price of these technologies goes down. Buchanan summarizes the Liberal Eugenics approach to distributive justice

and the bioconservative one like this:

“thinking of enhancements under the rubric of development makes clear how inadequate it is to say that unless everyone has a particular enhancement, no one should, or to blithely assume that eventually everybody will catch up, due to some providential trickle-down process.”(Buchanan, 2008, p. 14)

Indeed, the lack of a process ensuring just access to these new technologies under Liberal Eugenics is a major shortcoming of this system. In the following section we will present a fourth bioliberal alternative that addresses these issues of access and collective action problems. As we will see, Genetic Justice improves on the previously proposed frameworks by relying on the concept of justice to reach a balance between overall social benefits, individual benefits to the enhanced and the liberty of parents.

3.6 Balancing all relevant concerns: Genetic Justice

In the previous sections of this chapter, we have seen that eugenics, Procreative Beneficence and Procreative Liberty are all deficient principles for the moral and regulatory evaluation of enhancements. These deficiencies occur in eugenics and Procreative Beneficence by putting too much emphasis on social or individual benefits respectively, while Procreative Liberty runs into major issues because it gives too prominent a place to individual and parental autonomy. As we have seen, most authors

that defend these positions will concede that an unadulterated version of their primary ideal would lead to negative outcomes —although they all offer plausible explanations as to why the harms would not be as great as they are made to be— and admit that the ideal system would combine these three concerns: social benefits, individual benefits, and control of our bodies and life choices. However, as explained in Chapter 2 when discussing Michael Sandel’s bioconservative argument for gratefulness, such eclectic positions suffer from lacking a standard that would allow us to identify when an equilibrium between all concerns has been reached.

An approach that synthesizes all three concerns into a single coherent concept is Genetic Justice. First presented by Buchanan et al. (2000) in their seminal book *From Chance to Choice*, Genetic Justice could be described as the application of Rawlsian principles of justice to genetic assets. As explained in their book, up until the last century, the genetic make-up one received upon birth was given by nature. However, the development of new technologies that allow for the modification of our genetic make-ups changes the moral landscape by making it possible for us to intervene in the natural ‘genetic lottery’, displacing disparities in biological assets from the realm of fortune to that of justice (Buchanan et al., 2000, p. 83). In the words of Buchanan et al., “As the possibilities for significant and large-scale genetic interventions on human beings come

closer to being actualized, we may be forced to radically expand our conception of the domain of justice by including natural as well as social assets among the goods whose distribution just institutions are supposed to regulate” (Buchanan et al., 2000, p. 63). Put simply, while naturally occurring differences are to be accepted as part of nature, our newly gained ability to shape the genetic assets of individuals creates a new space in which the requirements of justice must be applied. After all, discrepancies can only enter the realm of justice if we have the ability to rectify them.

3.6.1 Are genetic inequalities subject to the considerations of justice?

Both the fact that people are born with different capabilities and the fact that there have been major advancements over the last half-century in our understanding and mastery over genes are undeniable. However, some may deny that these two facts automatically expand our moral obligations towards the unborn. Although there is a clear consensus that a just society must offer equal opportunities to all its members, equalizing biological assets could be thought to go beyond the requirements of justice. In order for interventions in the name of Genetic Justice to be legitimate, we must first show that remediable biological differences are incompatible with a reasonable conception of equality of opportunity. Buchanan et al. identify three possible definitions of equality of opportunity. As we will see, the first two candidates do not offer the necessary buttress for Genetic

Justice, but the last one, *the brute luck view* does.

First, *formal* equality of opportunity consists in “the elimination of legal barriers to similar prospects for persons of similar talents and abilities” (Buchanan et al., 2000, p. 65). Under this conception of equality, there is no moral requirement to equalize biological differences, just legal ones. A second, more demanding conception of equality of opportunity is also possible. This extended conception of equality of opportunity requires that we also take into consideration informal barriers, such as racial, sexual or religious discrimination, and compensate for those that suffer from them so as to level the playing field. Intervention in biological differences between people would also be unjustifiable under this conception, because biological limitations would not be an arbitrary social hindrance, but one based in the nature of the physical world. The third and last conception of equality of opportunity, known as the *brute luck view*, “requires not only the elimination of legal and informal barriers of discrimination, but also efforts to eliminate the effects of bad luck in the social lottery on the opportunities of those with similar talents and abilities” (Buchanan et al., 2000, p. 65). Until now, this last interpretation has been used to justify interventions that remedy disadvantages caused by being born in a particular social or economic condition, for example by the provision of free education to those unable to afford it. Since one is no more responsible for one’s

genes than for one's social environment at birth, it is possible to include "biological" to the other two conditions (i.e., social and economic) considered by the brute luck view.

A full defense of the brute luck view of equal opportunity over the two other conceptions would go beyond the scope of this work, but we may follow Buchanan et al. in saying that "the third interpretation of equal opportunity has considerable appeal, once the expansion from the first to the second interpretation is granted"(Buchanan et al., 2000, p. 66). Indeed, once we accept the idea that one's social and economic outcomes should only be a factor of one's choices, the requirements of justice will expand so as to include all factors beyond one's control. More importantly, the analysis of Buchanan et al. shows that if we accept the brute luck view of equality of opportunity, then the biological assets of an individual should be treated in the same way as their social or economic conditions at birth, meaning that interventions to rectify unjust disparities would be legitimate.

3.6.2 Why is *genetic* intervention necessary?

A proponent of the brute luck view may agree that biological differences should be compensated to the same extent as social and economic ones, but this does not necessarily entail that biomedical interventions are necessary. Instead, we could simply demand that biological differences are offset through other means. For example, instead of trying to cure children with disabilities (e.g. blindness), they should be given the supplementary aid needed to achieve the same educational goals as those who are not

afflicted by said disability. Setting aside the fact that this would be a clear example of *biomedical exceptionalism*,⁹ this approach suffers from three main drawbacks. First, compensation involves a complex process of finding equivalences between very different (and often incommensurable) goods. Second, non-biomedical interventions tend to be more expensive, invasive and further prolonged through time (Buchanan et al., 2000, p. 78) (e.g., providing a deaf child with an interpreter for the duration of their schooling vs. providing the child with a cochlear implant). Third, biomedical interventions tend to provide the recipient with what could be called ‘the basis for self-respect’. By intervening on the biological capabilities of the less fortunate, we provide them with the tools needed to participate in society as equals, instead of perpetuating a feeling that they need accommodation and support.

Notwithstanding the clear advantages that biomedical interventions may have over traditional interventions, one may still believe that to expand the demands of distributive justice to include biological assets would lead to “[t]he breakdown of the distinction between the subjects of distribution and the objects of distribution” (Buchanan et al., 2000, p. 86). Buchanan et al. do not see this as an argument against such an

⁹ As discussed in Chapter 2, this is the fallacious idea that biomedical interventions should be subjected to different moral standards than similar non-biomedical interventions

expansion, but as proof that our conceptions of justice need to change to better reflect the evolving reality of biomedical enhancements.

3.6.3 Intrinsic vs positional goods

The discussion of the previous sections allows us to appreciate how genetic justice, in contrast with the other approaches considered, contains the conceptual tools needed to balance individual and social interests. Indeed, Genetic Justice legitimizes interventions that will increase the overall social biological assets, but only by requiring that we prioritize those of the worse off. Let us now illustrate more concretely how Genetic Justice can use its conceptual repertoire to solve the cooperation problems mentioned in the sections on Procreative Beneficence and Procreative Liberty (i.e., the case of enhancements that only offer positional value, such as making one's child taller).

In order to understand the solution offered by Genetic Justice, we want to focus on the concept of normal participation in society. By favoring normal participation in society, enhancements are allowed (and incentivized) so as to maximize the potential for normal participation of those that currently enjoy it the least. In this way, we augment the overall social biological assets by prioritizing the individuals that need them the most. Having this in mind, we may first believe that genetic justice would ban zero-sum enhancements like those relating to height, since they would benefit the most privileged classes to the detriment of the rest. However, this is not necessarily the case. Because

Genetic Justice must take into consideration the overall benefits and disadvantages that a particular enhancement may bring about, it would be possible to offset the gains derived by individuals that choose to increase the height of their children, for example by imposing financial penalties on these enhancements and use the obtained funds to provide better access to enhancements to those that can't afford them, so that the benefits derived by those worse off exceed the costs imposed by those pursuing zero-sum enhancements. A concrete example of this dynamic in the context of biotechnologies will be provided in the next chapter when we explore the regulation of PGD.

Additionally, the advantages and disadvantages considered by genetic justice should not be limited to functional enhancements but should also include symbolic considerations. For example, we could imagine that those with privileged access to these technologies choose to provide their children with a distinctive feature, such as a particular eye color, effectively signaling class status. We should not disregard this non-medical intervention as neutral in respects to Genetic Justice, but understand it as potentially creating social advantages that must be compensated financially. Lastly, if an enhancement generates advantages so great as to make all compensation to those worse off impossible (e.g., very expensive enhancements that radically increase strength, intelligence and longevity, effectively creating two castes of people), genetic justice can

justify their ban, on the basis that their introduction importantly shifts the standards of normal participation in society to the detriment of those worse off.

3.6.4 Genetic Justice and the TED

The framework presented in *From Chance to Choice* finds its origin in Norman Daniel's earlier theory of healthcare, which concluded that "a just health care system should strive to remove barriers to opportunity that are due to disease"(Buchanan et al., 2000, p. 16).

Following the publication of Daniel's *Just Health Care* in 1985, developments in medical science and their non-medical applications needed to be addressed. Due to the importance of removing barriers to opportunity, no difference needs to be made between cure and enhancement, because they are both interventions that can be used to ensure equal opportunity among citizens. This is a clear rejection of the TED at a conceptual level, but this does not imply that the therapy-enhancement distinction becomes ultimately irrelevant. Quite the contrary, "in general the genetic disadvantages that are adverse departures from normal functioning tend to have more serious negative impacts on opportunity. Given that resources are scarce, a reasonable allocation [...] would presumably focus on the prevention and cure of disease first" (Buchanan et al., 2000, p. 101). Let us note that this is an accidental feature of diseases and enhancements as they exist today, but it is not impossible that in the future enhancements become as necessary for effective participation in society as cures are now. For example, if we were to triple

the average IQ of infants through gene therapy, both the unenhanced and those with mild intellectual disabilities will be seen as equally unable to productively participate in society and equally in need of assistance, compensation or biotechnological intervention. In fact, Buchanan et al. further comment that eventually “we would come to reclassify as a disease any correctable genetic condition that has a significant adverse impact on equality, because we would come to regard it as an adverse departure from normal functioning” (Buchanan et al., 2000, p. 101).

While the idea that our conception of “adverse departures from normal functioning” should change over time to match the novel and improved capacities made possible by biomedical interventions, the idea of justifying such interventions by reclassifying sub-optimal traits under the umbrella of ‘disease’ seems deeply problematic. As Allen Buchanan clarified in later books about enhancement (Buchanan, 2011a, 2011b), the medicalization of normal human limitations does not come without its drawbacks. At a practical level, “shoehorning enhancements into the disease treatment regulatory framework is likely to increase the cost to the consumer and deter some potential researchers and producers” (Buchanan, 2011a, p. 20). More importantly Buchanan believes in the importance of becoming “a society where efforts to improve our capacities don’t require us to view every gap between the way we are now and the way we desire to

be as evidence of disease” (Buchanan, 2011b, p. 181), in part due to the perverse social and personal dynamics it creates. We should not see enhancement as a burden necessary towards normalcy, but as an opportunity for a more fulfilling life. It may ultimately be more productive and consistent with the principles of genetic justice to eventually abandon the concept of disease in favour of talk about obstacles to a reasonable expectation to have a good life, regardless of the origin of said obstacles.

3.6.5 Inequality of access

The prospect of biomedical enhancements enlarging the breach between the have and have-nots is a recurrent preoccupation of the enhancement debate. Contrary to Procreative Liberty or Procreative Beneficence, which are both compatible with great inequalities of access to biotechnologies, Genetic Justice takes concerns of access very seriously. This is due to the fact that a core principle of Genetic Justice is that in order to rectify natural injustices, we ought to start by maximizing the biological assets of those that were the least advantaged by the natural lottery. In that way, not only is access to technologies by the biological have-nots given proper consideration, it is a priority.

As we have previously seen, bioconservatives put much emphasis on the possibility that novel biotechnologies will exacerbate socio-economic disparities, offering it as one more reason to ban them. As explained in Chapter 2, this “Equality or Nothing” view seems unfounded given the historical trends of technological diffusion,

from literacy and agriculture to cellular phones and access to an internet connection, and should be rejected in the absence of evidence that enhancement technology is inherently different. What is more, bans of biotechnology over concerns of growing inequality are wrongheaded and counterproductive. Allen Buchanan comments that “Ironically, prohibiting enhancements out of fear that they will only be available to the rich exacerbates problems of distributive injustice. In a society that recognizes the legitimacy of enhancement, new regulatory institutions can be developed to facilitate the wider and more rapid diffusion of highly beneficial and safe enhancements, in part by eliminating overmedicalization” (Buchanan, 2011b, p. 182). Put simply, because these technologies are needed to rectify naturally occurring biological injustices, banning them would be illegitimate, since it would perpetuate the unjust distribution of biological capabilities. Additionally, we cannot expect full compliance of these prohibitions to be observed, and barriers to illicit enhancements will be greater for those with limited economic and political resources, effectively barring everyone from accessing enhancement technologies but the rich and well connected.¹⁰

Procreative Liberty and Procreative Beneficence can limit themselves to pointing out the faults with the bioconservative position, but the emphasis that Genetic Justice puts

¹⁰ See [Bayefsky \(2016\)](#) for an excellent exposition of the problem of reproductive tourism

on normal participation in society requires us to pay special attention to the needs of those that are most likely to be left behind if no intervention is made to ensure equality of access. We have already mentioned how understanding enhancements as development is the conceptual key to create a system that provides just access to enhancement technologies. The following sections on institutional design will deal with more practical considerations on equality of access.

3.7 The institutional design approach

Contrary to other alternatives explored, a consequence of choosing genetic justice as our guiding principle for the evaluation of biomedical interventions is a need to consider the concrete social, economic and political contexts in which these interventions take place, and their variation through time. While Procreative Liberty could simply entail the development of a clear legal framework requiring little revision over time and Eugenics and Procreative Beneficence require the identification of ‘good enhancements’, which can be expected to remain relatively stable over time, genetic justice requires dynamic solutions. The reason why this is the case is that each intervention made in the name of genetic justice affects the actual distribution of genetic goods, impacting the priority that should be given to future interventions. However, individual cost-benefit analysis for every case of biomedical intervention would most likely be impossible in theory, due to the incommensurability of many of the variables that it takes into

consideration, and most definitely impossible in practice due to the overwhelming number of factors to be considered. Instead, it is more sensible to determine what set of rules will best embody the principles of genetic justice and create the institutions that would enforce such rules. This attribute of genetic justice makes it particularly amenable to what is known as *the institutional design approach* (IDA). The remainder of this chapter will present some of the principles of IDA as discussed by Allen Buchanan in his book *Beyond Humanity?* as well as some additional principles derived from other sources, which will improve our framework by better allowing us to actualize the principles of genetic justice.

While the principles of genetic justice will remain the same over time, the various kinds and modes of intervention, their uses and their risk-benefit profiles are bound to change radically over time, forcing the institutions that will implement genetic justice to respond to these changes. In other words, we cannot content ourselves with finding a set of rules that establish genetic justice once, but instead have to create institutions that are constantly on the lookout for changes in the available technologies, keep track of which abilities are considered essential for social participation at a particular time and adapt to changes in the socio-political context, particularly trends that would threaten genetic justice (e.g. the gradual creation of a GenRich class whose genetic advantages compound

over each generation). Genetic justice as implemented by IDA cannot judge all interventions, be it enhancements or cures, as a group, but needs to evaluate each type of intervention individually and for a particular socio-economic context at a particular time.

3.7.1 The principles of IDA

At the core of the IDA is the implementation of genetic justice, through the creation of institutions that will maximize everyone's chances of effectively participating in society, starting with those most affected by biological inequalities. In practical terms, this means that when judging a new intervention, we must first ask ourselves who will profit from the implementation of this intervention.¹¹ If we can expect it to benefit those that are the most biologically disadvantaged (e.g. a bionic eye that restores sight to the blind, an intelligence pill that is more effective with people with low IQ), then we must facilitate accessibility, either by investing in its development and refinement or by providing resources to those that would benefit the most from this technology and may not have the means (financial, logistic, educational) to access it. If on the other hand the benefits of a new intervention will be more pronounced to those that are already biologically gifted (e.g. the development of a gene that guarantees perfect pitch, allowing children given elite piano courses a better chance to become professional piano players), we may consider

¹¹ We assume that questions of safety have already been addressed independently of an analysis of genetic justice.

applying a tax on said intervention to limit the medical resources it will divert from other interventions and to raise funds for subsidizing enhancements for those worse off biologically. If the imposition of major financial disincentives is not enough to limit the negative effects an intervention has on genetic justice, we can consider banning it completely.

3.7.2 Truly informed consent

Institutions cannot rely solely on financial penalties and subsidies to ensure genetic justice. An additional principle of good institutional design for biotechnological interventions consists in making sure that those choosing to undergo biomedical enhancement or choosing it for their children, are provided with enough information to understand the risks and potential benefits associated with said enhancement. Under the IDA, institutions will be created to ensure that the genetic counseling provided to prospective parents allows them to choose according to their values (i.e., shared decision making) and does not frame recommendations in a way that makes prospective parents feel that some options are more reasonable than others (i.e., non-directiveness).¹² These two factors play an important role in maximizing parental autonomy.

3.7.3 Open future for children

The next principle that must be guaranteed by the IDA involves the autonomy of

¹² For more information on shared decision making and non-directiveness, see (Elwyn et al., 2000)

genetically modified children. As explained in Chapter 2, the bioconservative claim that enhancements are incompatible with autonomy is rather weak. Nevertheless, there is a legitimate concern that allowing parents to impose enhancements on their children may limit their autonomy by restraining the scope of life plans available to them. In order to prevent such limitations of autonomy, we will incorporate to our framework a concept that was introduced earlier in this chapter: *the right to an open future*.

Originally developed by the philosopher Joel Feinberg in the context of a debate about the type of education we may legitimately choose for our children, the concept of a child's right to an open future is described by Buchanan et al. as follows:

“parents have a responsibility to help their children during their growth to adulthood to develop capacities for practical judgment and autonomous choice, and to develop as well at least a reasonable range of the skills and capacities necessary to provide them the choice of a reasonable array of different life plans available to members of their society”(Buchanan et al., 2000, p. 170)

Under this definition, biomedical interventions that diminish the number of options open to children beneath a reasonable amount, or interventions that are likely to foment beliefs that would cause similar restrictions, could be limited for the sake of respecting the child's autonomy. Due to the vagueness of the term 'reasonable' in “a *reasonable* range of the

skills and capacities necessary” and “a *reasonable* array of different life plans”, I believe that Nicholas Agar’s reformulation of this principle will better inform the IDA: “It must be possible for a person to completely reject the ideals motivating her enhancement. Furthermore, if she does reject these ideals she must have a reasonable chance of successfully pursuing her chosen plan”(Agar, 2005, p. 106).

Limitations to a child’s autonomy by enhancements can happen in two ways: the limitations created by the enhancement itself and the limitations created by parental and social expectations. It is important to conceptually disentangle the unlikely constraining role of enhancements, from the much more pernicious role of parental expectations. For example, being conceived using the sperm of a Nobel Prize winner¹³ will likely affect autonomy very little, since that genetic make-up is compatible with a variety of possible life plans; believing that the child is destined to succeed in intellectual endeavors would be to fall prey to genetic determinism. However, the knowledge that one carries the genes (or in this case half of the genes) of a Nobel Prize winner and the expectations one’s parents would project on their child may unreasonably limit a child’s ability to choose their own life plan. Through this distinction, it is clear that currently available biomedical

¹³ Although the example may seem absurd, the Repository for Germinal Choice, founded in 1980, had as its objective to collect the sperm of Nobel prize winners. William Shockley was the only Nobel laureate to publicly contribute to the sperm bank (Magazine & Eschner).

enhancements do not inherently restrict autonomy but may often do so by fomenting insidious attitudes from parents and enhanced children. This means that a respect for the right of an open future will be better maintained by institutions that seek to remedy what Michael Sandel identified as “ugly attitudes” or by limiting the access to certain enhancements to parents that cannot be expected to take the autonomy of their child seriously.

3.7.4 Real-time technology assessment

Lastly, one excellent idea originally developed by John Harris as a way to mitigate the risk associated with enhancements is *real-time technology assessment*. The idea is quite simple, but very powerful. The risk to society associated to an enhancement tends to be proportional to the number of people that choose to be enhanced in this way. One way of managing the risk that a technology imposes on us is to limit its availability to small groups, and only expand it to larger groups as the repercussions are better understood. For John Harris, “Real-time technology assessment seems to offer a viable path that would allow for the monitoring and real-time regulation of emerging technologies and that could be superior to the stale and unproductive choice between stultifying moratoriums, which do not allow for social learning, and those who would recklessly plough ‘full steam ahead and damn the torpedoes,’ thereby exposing society to unanticipated negative consequences downstream” (Harris, 2007, p. xii). In the context

of the IDA, we must always keep in mind that the restriction of a technology to a small group for the sake of diminishing risk must be done in a way that is compatible with a just distribution of burdens and benefits. As long as this consideration on just distribution is respected, it would be possible to restrict new technologies to fully informed consenting adults and only make them fully available as their repercussions are better understood. Once again, an example of this principle as applied to reproductive technologies will be discussed in detail in the following chapters.

Having presented the basic principles of a full moral framework for the regulation of non-medical uses of biomedical technology in this chapter, we now turn to the evaluation of a particular technique, Preimplantation genetic diagnosis (PGD), through the lens of Genetic Justice and the IDA.

Chapter 4 – Regulating Preimplantation Genetic Diagnosis Through Genetic Justice

The previous chapters served as a critical presentation of the possible moral frameworks for the evaluation of medical and non-medical uses of biotechnology. The case was made that Genetic Justice applied through the IDA is the framework that best balances all the desiderata of a framework that allows for the just introduction of new technology into society. We now turn to the task of investigating how this moral framework applies to one particular technology: preimplantation genetic diagnosis (PGD). PGD is a relatively novel technology of interest to the enhancement project due to its potential to mold future generations of humans by selecting their genes. The interest in applying Genetic Justice to PGD does not only originate from its potential as an enhancement technology, but also from the fact that PGD is currently regulated in most of the world, including Canada, along bioconservative principles; its medical uses are both allowed and financially supported, while its non-medical uses are strictly banned. By illustrating how Genetic Justice can be applied to PGD, we offer a philosophically interesting and coherent alternative to the bioconservative status quo.

In order to properly evaluate PGD along the principles of Genetic Justice, we must first understand the technique, its potential uses and limitations. This chapter begins with

a brief exploration of the science behind PGD, with an emphasis on distinguishing currently available uses from possible future ones. Having explained the technique, we will then move on to exploring some philosophical concerns that are unique to this technique and are not directly addressed by Genetic Justice, most prominently the debate surrounding the moral status of embryos and concerns surrounding the symbolic power of PGD. Once we have dispelled the most prominent critiques of PGD, we will have set the groundwork for briefly outlining the core principles of the just regulation of PGD, which we will be the subject of the concluding chapter.

4.1 What is PGD?

PGD is a prenatal screening technique used to determine the genetic make-up of embryos created through IVF. Prospective parents can use this information to select one (or more) embryos for gestation, according to their genetic material.¹⁴ Because PGD requires the embryo to be outside of the uterus until it grows to a small cluster of cells—at which point some cells can be removed for genetic analysis—this technique does not allow prospective parents to do a genetic diagnosis of naturally conceived embryos, but only applies to embryos generated through IVF.

Due to it being a screening technique, PGD also does not allow for the creation of

¹⁴ For an accessible technical description of the IVG+PDF process, see (Bayefsky & Jennings, 2015, p. 12)

novel genes or the selection of genes absent in the parents' genomes. While there is a temptation to picture PGD as a tool for creating "designer babies", it can be better understood as a technique that allows us to simultaneously start a handful of pregnancies *in vitro*, take a look at the genetic make-up of each of them, and decide which one to carry to term. All the embryos chosen through PGD could be described as "natural", in the sense that they could have been the result of natural conception. In that sense, although PGD is a radical departure from other prenatal screening techniques in that it can screen through multiple embryos, it shares the same limitations as other prenatal *screening* techniques (Cuckle & Maymon, 2016; Wilson et al., 2014).

The most important difference between PGD and other prenatal screenings is that other techniques must be used in conjunction with abortion, since they only provide information about the genetic make-up of the fetus many weeks into the pregnancy. This only allows parents to select against a fetus already growing inside the mother through by aborting it, forcing them to try conceiving again until their child has the desired genetic make-up. In contrast, PGD allows for the selection among dozens of potential children outside the mother's body. This wider selection translates into parents being virtually guaranteed that their child will not have or carry a genetic disorder. For example, if both prospective parents have a family history of cystic fibrosis may decide to get genetically

tested. If they both turned to be carriers of the disease (i.e. possess a single copy of the mutated version of the CTFR gene), their chances of conceiving a sick child are 25%, and those of having a child that only carries the disease 50%. While the natural conception of a child with no cystic fibrosis (or the chance to transmit it to the next generation) could necessitate many abortions, the chances of creating at least one healthy embryo through a single cycle of IVF¹⁵ are virtually 100%, and the chances of having a child that doesn't carry the disease around 80%.¹⁶

The superiority of PGD is even more striking when considering the real-life burdens of other screening techniques. First, unlike other prenatal screening techniques, PGD does not require to undergo the physically and emotionally taxing process of abortion (Cuckle & Maymon, 2016). Second, while parents who choose to abort a fetus have to worry about their ability to conceive in the future, and whether the next fetus will be healthy, PGD creates all potential children at once, removing this source of anxiety. Third, the abortion of a fetus could be considered more morally problematic than the creation and destruction of embryos (a subject that will be discussed in the following sections), making PGD a more morally palatable technique.

¹⁵ It is assumed that 20 eggs were retrieved, 16 were matured, 14 successfully fertilized, and 8 kept growing beyond the first 3 days. (*Getting Real about IVF Success Rates*, 2021)

¹⁶ $1-(0.25)^8$ and $1-(0.75)^8$ respectively

On the other hand, PGD is not without its disadvantages. PGD currently requires the creation of embryos through IVF, which is also a very physically and emotionally taxing process, as well as a relatively expensive one.¹⁷ Until less invasive and less costly techniques for the retrieval of unfertilized eggs become available, PGD will most likely continue to be used almost exclusively by couples who are unable to conceive naturally or are at high risk of conceiving a child with a deleterious genetic condition.

As mentioned above, PGD is not an *embryo-creating* technique, but an *embryo-selecting technique*. The technique does not allow us to select which genes a particular embryo will have, but simply to examine the genes of multiple existing embryos, allowing parents to select one (or more) for implantation in the mother's uterus. This limits selection not only to the genes of the parents, but also to the combinations that were created through the fusion of arbitrary sperms and eggs. Furthermore, although the selection against any gene is technically possible, it is important to clarify that this does not necessarily translate into the selection of any possible trait. First, most (non-medical) traits that humans may care about (e.g. intelligence, muscular strength, kindness, creativity, longevity) are polygenic, meaning that the trait is affected by more than one gene (*Polygenic Trait, Brody*). While choosing against particular gene variants (called

¹⁷ Around \$10,000 per round (BLANCATO et al., 2017)

alleles) is perfectly feasible, choosing against *sets* of alleles is much harder, because the chances of not getting at least one specific allele grow exponentially the more alleles one considers. This problem is only compounded when trying to select *for* a particular gene. The following allegory may help the reader understand why this is the case: Let us imagine that we participate in a lottery. If other screening techniques are the equivalent to playing again if we don't get the winning ticket, then PGD would be the equivalent to drawing a dozen different numbers. However, while selecting one particular gene would be comparable to only playing with the numbers from 1 to 10, each additional gene considered would be like doubling the number of possible numbers, leading to their exponential growth. PGD's ability to choose from a handful of possible embryos quickly becomes meaningless, helping our chances to get the desired gene combination as much as buying a handful of tickets helps one win the lotto jackpot. Attempting to select for *multiple* polygenic traits simultaneously would continue to exponentially diminish the chances of finding a satisfactory embryo —similarly to expecting to win the lotto and then putting all our winnings into a single roulette number with the expectation of winning that too— making PGD a tool unfit for the creation of “designer babies”.

Other than the astronomically low chances of finding an embryo with the desired genome, a second limitation of PGD when it comes to selecting for specific traits is that

the genes affecting complex traits are for the most part unknown and can be expected to remain that way for the near future, particularly genes surrounding higher cognitive functions (Bayefsky & Jennings, 2015, p. 45). Although the molecular pathways leading certain genes to influence complex traits remain obscure, scientists have recently found ways to circumvent this gap in knowledge by leveraging large quantities of statistical information. Indeed, it is currently possible to select embryos through PGD by using *embryo selection based on polygenic scores* (ESPS). Instead of focusing on specific genes, ESPS consists of the evaluation of the whole genome of the embryos produced through IVF. Each genome is then compared with the genomes of existing human beings and granted a score, which “summarizes the combined effects of many genetic variants on a trait and imperfectly predicts an individual’s trait”(Turley et al., 2021, p. 78), such as height or the propensity for breast cancer. Although garnering a lot of interest by the scientific community and the popular media,¹⁸ this new probabilistic method does little to change the limits of PGD as a tool for creating ‘designer babies’ for several reasons. First, the results obtained are not large enough to warrant concern (Turley et al., 2021, p. 81)

¹⁸ Interest piqued in the summer of 2020, following the birth of Aurea Smigrodzki, the first child born using this technique. In her case, “[f]our embryos were screened, and the embryo selected for implantation was the one given the best genetic odds of avoiding heart disease, diabetes, cancer, and schizophrenia in adulthood” (Soni & Savulescu, 2021).

and are too dependent on environmental factors matching those of the reference genomes (Turley et al., 2021, p. 79). More importantly, because it is impossible to predict how genes will interact with their environment (including other genes) the variance in results is considerable. “For example, for those with biologic parents who are of European ancestries, the 95% prediction interval of actual gain in score ranges from +4.2 years of education to −3.2 years”(Turley et al., 2021, p. 80).

Once we understand the limitations of PGD, both practical (cost and invasiveness of IVF) and inherent to the technique (embryos can only have genes present in parents, limited to the selection of a few traits, selection for complex traits is practically impossible), we will realize how far off this technique is from the *Brave New World* scenarios depicted by bioconservatives. Indeed, PGD is currently almost exclusively used to avoid having children with chromosomal aberrations and genetic conditions caused by single genes, (Ball, 2021) and could be used to select embryos according to sex and non-polygenic traits, such as eye color (Osland et al., 2019). This fact will hopefully help assuage many of the bioconservative fears that currently stop us from regulating this technique according to the principles of genetic justice. In the following section we will switch our focus to a different type of critique of PGD, that is the moral issues of PGD *qua* reproductive technique.

4.2 The morality of embryo and fetus destruction

One important critique raised against reproductive techniques that require the destruction of embryos or fetuses (such as IVF+PGD¹⁹ or pre-natal screening+abortion), is that they may violate the right to life of the prospective child. Debates on the moral status of the fetus and the permissibility of abortion are extremely rich and complex, and an exhaustive presentation of the various arguments and responses would be beyond the scope of this work. Instead, we will critically present 3 authors that approach the question from different angles, which will help showcase the multifaceted nature of this ethical problem. First, we will look at Rosamund Scott and her gradualist approach, which presents embryos and fetuses as slowly gaining moral status throughout their development. Second, we will look at Don Marquis's argument that by killing embryos we are depriving them of a valuable future, and as such they deserve the same protections given to newborns and infants. Third and finally, we will look at the arguments presented by Judith Jarvis Thompson showing that the right to abortion is not only limited by the moral status of the fetus, but also by the right of the mother to her body. There is no intention in the sections that follow to settle this debate or contribute any original position, but rather to show that

¹⁹ In the case of PGD, the destruction of embryos is not inherent to the technique (since the screened embryos are not destroyed in the process) but caused by the discarding of non-implanted embryos..

there is a variety of possible, yet incompatible, reasonable views. Once shown that no consensus is possible, we will present and defend David DeGrazia's *political solution*, which attempts to accommodate this variety of reasonable views on the basis of political pluralism. Through this approach, we will show that it is both possible and legitimate to create institutions that regulate the creation and destruction of embryos in a way that is compatible with all conceptions of their moral status.

4.2.1 Rosamund Scott and the gradualist approach

It is no easy task to identify a specific moment where the ontological switch between “human tissue” and “human being” takes place. There is widespread consensus on considering gametes (i.e. sperm and eggs) as human tissue and viable fetuses as human beings, but the status of all the intermediary developmental stages continues to be the subject of strong disagreement, in part due to the biological intricacies of fetal development, but also due to wide disagreement on which attribute should be considered as granting rights. For many defenders of the right to abortion, the moral status of the fetus is no different than that of any other human tissue (e.g., a patch of skin cells) because of its inability to feel pain²⁰ and the complete lack of personhood.²¹ On the opposite side

²⁰ until after 24 weeks of gestation (Scott, 2007, p. 22)

²¹ We do not need to formulate an exact definition of personhood for understanding the arguments that will be presented below, but we can loosely understand personhood as the possession of a sense of self, an ability to project oneself into the future and the ability for practical rationality.

are those that put emphasis on the fetus potential to become human and grant it the same moral status as already born human beings. A third group of authors, called gradualists, judge both accounts to be insufficient and believe that “the more one reflects on the moral status of the embryo or fetus, the less satisfactory the potentiality account at one end or the personhood account at the other, or the identification of some intermediate marker, such as the fetus’s attainment of viability, can ever be” (Scott, 2007, p. 21).

An alternative to finding a specific point in the development at which the fetus can be said to have gained a right to life, is to claim that those rights are gained gradually with the attainment of each developmental stage. This gradualist approach was first described by Derek Parfit as follows: “The fertilized ovum is not at first, but slowly becomes, a human being, and a person. In the same way, the destruction of this organism is not at first but slowly becomes seriously wrong” (Parfit, 1987, p. 447). Rosamund Scott, the main advocate for the gradualist approach in the context of the modern enhancement debate, believes that “the gradualist approach can be said to be able to acknowledge both the ideas of potentiality and personhood, which are at the two extremes of the other moral accounts. On the one hand this is in the sense that a gradualist account (in my view at least) does not say that the embryo is ‘nothing’, so that there is some recognition of its huge potential. At the same time, however, that potential does not answer the question of

its moral status” (Scott, 2007, p. 22). Although the gradualist approach states that the right to life is gained piecemeal, it does not assume that the rights are *steadily* obtained throughout development, but rather claims that each relevant stage of development slightly increases the consideration that must be given to the fetus. “For instance, it seems right that we should be able to acknowledge the fetus’s development of sentience, and with it the capacity to feel pleasure and pain, as increasing the strength of its claims and as relevant to our treatment of it”(Scott, 2007, p. 22). The same can be said of achieving viability outside of the uterus, the development of certain organs, or cell-differentiation.

The main advantage of adopting a gradualist approach to the moral status of the fetus is that it avoids the hard (and maybe impossible) task of both having to make a convincing case for one’s proposed ontological turning point *and* disproving every other possible candidate. Unfortunately, contrary to other approaches, the gradualist approach offers very little guidance on the morality of PGD or abortion, other than “if a decision to terminate is to be made, it is better if this is earlier rather than later. In this way, developments in screening techniques that result in earlier detection are to be welcomed” (Scott, 2007, p. 23). This solution is not satisfactory because the fact that destroying an embryo at a later stage would be morally worse is no argument for the permissibility of its destruction.

4.2.2. Don Marquis and the 'future like ours' argument

The idea that to destroy an embryo would be immoral because we rob it of a valuable future was most famously presented in the form of the 'future like ours' argument by the philosopher Don Marquis. According to Marquis, the problem of the ethics of abortion can be solved by first exploring the wrongness of killing (Marquis, 1989, p. 189). In his article "Why Abortion is Immoral", Marquis defends the idea that "what makes killing any adult human being *prima facie* seriously wrong is the loss of his or her future" (Marquis, 1989, p. 190). Since abortion robs an embryo or fetus of its future and all the experiences it would have had, it follows that abortion is "presumptively very seriously wrong, where the presumption is very strong — as strong as the presumption that killing another adult human being is wrong" (Marquis, 1989, p. 194).

Having presented the core of his argument, Marquis criticizes the position that killing a grown adult is wrong because they are persons. According to this argument, adult human beings, being persons, are capable of identifying with their future selves and forming expectations about their future. By killing them, we would deprive them of a future *they expected* to be able to value (Marquis, 1989, p. 185, 196). From this, it would follow that only persons can be said to be harmed from being robbed of their future, while all other living beings would not suffer from a painless death, making abortion morally unproblematic. The problem with this view according to Marquis is that "principles such

as ‘It is prima facie seriously wrong to kill only persons’ or ‘It is prima facie wrong to kill only rational agents’ do not explain why it is wrong to kill infants or young children or the severely retarded or even perhaps the severely mentally ill” (Marquis, 1989, p. 185). Since there seems to be a consensus that it is wrong to take the life of young children and disabled people despite their incapacity to plan their future, it is understood that whatever principle we appeal to give them moral consideration can also be used to protect fetuses and embryos. In this way, Marquis establishes a rationale for giving the fetus a moral status as strong as that of an adult human being, making “abortion, like ordinary killing, [...] justified only by the most compelling reasons” (Marquis, 1989, p. 194).

Marquis also addresses the potential critique that giving moral consideration to organisms in virtue of the future they may one day experience raises questions about how far this principle may be taken. One may wish to grant for example the same consideration to an unfertilized egg, or a sperm. After all, given the right conditions, they will also eventually have valuable experiences, and to deprive them of the chance to develop would rob them of what they “would come to value” (Marquis, 1989, p. 190). This issue is addressed by Marquis, who asserts that due to the multiplicity of possible sperm and eggs combinations, “the immorality of contraception is not entailed by the loss of a future-like-ours argument simply because there is no nonarbitrarily identifiable subject of the loss in

the case of contraception” (Marquis, 1989, p. 202).

4.2.2.1 Potential issues with Don Marquis's defence of abortion

Don Marquis provides us with compelling reasons to treat abortion starting at the stage of the zygote (i.e., the single cell embryo produced by the fusion of sperm and egg) akin to murder, due to the similar way in which an organism is denied its future. We will now briefly explore two issues with Marquis's approach: the assumption that a disregard of someone's moral status requires a physical body and the complications associated with choosing the zygote as the first biological entity whose future can be robbed.

4.2.2.1.1 The need for a biological entity

First, it is not clear that an existing biological body needs to be identified for one to be able to talk of a person's loss of their future. Indeed, when considering the case of a couple who uses contraception, it seems possible to imagine an alternative scenario where the same couple decides not to use contraception, leading to the creation of a child. We could use the 'future like ours' argument to claim that by using contraception the couple deprived this potential being of a life worth living. After all, said hypothetical child is not deprived of its future any less than an aborted fetus. Marquis may claim this is nonsense, because there never was a child whose future was robbed. However, when asked to point at the subject whose future was denied, given that it is not the awareness of their future, its appreciation or the desire to have such future that matters, there seems to be no need

to identify a biological tissue as the recipient of moral consideration. Instead, we can simply point to ‘the child that would have been created had the couple not used contraception’. Thus, it is not self-evident that, as Marquis’s argument assumes (Marquis, 1989, p. 201), a biological entity is needed for us to identify a person whose future was denied.

4.2.2.1.2 Issues with granting a moral status to zygotes

The second issue with Marquis’s position is that identifying the zygote or even an embryo in its earliest stages as the first entity we can identify as having “a future like ours” leads to major complications due to two biological realities: the rate of implantation of embryos and twinning. A corollary of the ‘future like ours’ argument is that since depriving an embryo of its future is morally equivalent to taking a child’s life, then the loss of an embryo should be seen as a tragedy comparable to the loss of a child. Considering that “between two-thirds and three-quarters of all embryos do not implant” (Harris, 2007, p. 171) to the uterine wall, leading to the arrest of their growth and eventual expulsion of the uterus, one would expect a reaction to this loss of life commensurate with the tragic scale at which it occurs. Yet, our intuitions do not seem to match the implications of the ‘future like ours’ argument. John Harris believes that the ‘future like ours’ in its original form would make natural conception immoral. After all, “[t]hose who attempt to have

children in the light of these facts and indeed those who have unprotected intercourse, or who use contraceptive methods which risk embryo loss, [may cause] the creation and destruction of embryos” (Harris, 2007, p. 173). One way to modify the ‘future like ours’ argument to match our intuitions regarding the loss of embryos would be to identify the *implanted* embryo as the first instance of an entity whose future is morally comparable to ours.

A second complication to be considered arises from the fact that “[f]or the first few cell divisions, according to the present school of thought, the embryo functions less like a single integrated, energy-using unit of the sort we call an organism than like a collection of single-cell organisms contingently stuck together” (DeGrazia, 2014, p. 22). This allows cells in the embryo to get detached from their neighbors and grow into a second embryo that shares the same genetic material (i.e. an identical twin). What is more, at these early stages of development, embryos can be fused together to form a single embryo (who will become a single person) (DeGrazia, 2014, p. 22). Since it is possible to artificially cause twinning to create multiple persons with a future like ours (and fuse them back), it is not clear if Marquis is right to identify the single-celled zygote as the first “nonarbitrarily identifiable subject of the loss” (Marquis, 1989, p. 202). After all, said zygote may become not one, but multiple persons. Even worse for Marquis’s

argument, if taken at face value, the ‘future like ours’ argument would require us to cause multiple artificial twinnings for every single embryo, generating as many twins as possible. In the absence of such an intervention, biological tissue which could have become a human being would be deprived a life like ours.

The various considerations explored challenge the boundaries of the ‘future like ours’ argument. First, we saw that it is not clear why we should limit the reasoning to biological entities and not claim instead that abstaining from conceiving as many children as possible is immoral. Even if a way is found to accommodate this concern, we need to reconsider what the earliest entity that may be granted this robust moral consideration is, so as to better reflect biological realities. This could be achieved by identifying implanted embryos at a stage where twinning is no longer possible as the first entity whose future can be robbed. Interestingly, while Marquis’s original argument implies that PGD is an immoral practice, this modified version would be compatible with PGD, because the creation and destruction of embryos takes place before twinning becomes impossible (Verpoest et al., 2009, p. 2945).

4.2.3 Judith Jarvis Thomson and the duty to share one’s body

Although the morality of abortion is usually discussed in terms of the moral status of the fetus, the most famous defence of the right to abortion, that of Judith Jarvis Thomson (1971), eschews this debate completely. Thomson explains that “[o]pponents of abortion

commonly spend most of their time establishing that the fetus is a person, and hardly any time explaining the step from there to the impermissibility of abortion” (Thomson, 1971, p. 48). Even were one to prove that the fetus has the same moral status as a fully grown human, “the fact that for continued life the fetus needs the continued use of the woman’s uterus does not establish that it has a right to be given the continued use of that uterus” (Thomson, 1971, p. 55). Thomson tries to prove this point through a thought experiment. In this hypothetical situation, you are kidnapped and hooked up to a sick person who, afflicted by a rare disease, needs his circulatory system to be connected to yours in order to survive. Effectively you become bedridden until the sick person can be cured of said illness (in approximately 9 months). There is no doubt that it would be a great display of kindness and generosity for you to accept such a request, but it is not so certain whether you have a moral obligation to bear such a heavy burden.²² By analogy with this thought experiment, the fact that a fetus’s continued existence depends on its connection to the mother’s uterus may not generate a moral duty in the mother to continue to host it until viability. Notice that in this scenario there is no attempt to question the right to life of the fetus, who is assumed to have the same moral status as a full-grown human, but its right

²² If the reader is not convinced, they may want to test how their moral intuitions change as the time constraint increases. Would one still have this obligation if the duration was 18 months? What about 5 years? What about for the rest of one’s life?

to use the mother's body against her will.

One may criticize this analogy by pointing out that the relationship between the sick man and the kidnapped person is different from that of the fetus and the mother. While the kidnapped person did not cause the sick man to suffer from the rare disease, the mother (and father) caused the state of dependency of the fetus by creating it, and as such has a responsibility towards it. Thomson provides a second analogy to show that such a responsibility does not follow, as long as the mother never intended to conceive in the first place:

“if the room is stuffy, and I therefore open a window to air it, and a burglar climbs in, it would be absurd to say, ‘Ah, now he can stay, she's given him a right to the use of her house-for she is partially responsible for his presence there, having voluntarily done what enabled him to get in, in full knowledge that there are such things as burglars, and that burglars burgle.’ It would be still more absurd to say this if I had had bars installed outside my windows, precisely to prevent burglars from getting in, and a burglar got in only because of a defect in the bars”
(Thomson, 1971, pp. 58–59).

Put bluntly, the fetus could be conceived as morally indistinguishable from a parasite that infects the mother, and her right to get rid of it is independent of the consequences it may have on the fetus.

4.2.4 David DeGrazia's political solution

To summarize the previous sections, we have seen that the morality of abortion hinges on a variety of difficult questions: (1) whether one believes the moral status of the fetus is determined by it being a person or becoming one in the future, (2) whether moral status allows only for discrete statuses or for a range of degrees, and (3) whether the fetus has a claim to the mother's body until viability or not. It is clear that these philosophical questions cannot be easily resolved, and there is no reason to believe that they will be resolved any time soon. In fact, the answers to these questions may very well lie beyond human understanding or there may be no definite answers to any of these questions. David DeGrazia embraces this last position, claiming that "ethics may be partly indeterminate: that there may be some ethical issues on which there is, at the end of the day, a plurality of more or less equally defensible yet incompatible views" (DeGrazia, 2014, p. 43).

If it is true that these questions cannot be answered (at least for now), what are the implications for the regulation of PGD? According to DeGrazia, since "[l]aws and policies that significantly curtail liberty generally should not rest on moral positions about which consensus among reasonable people is so sorely lacking" (DeGrazia, 2014, p. 48), we must create a legal framework that respects this plurality and remains neutral on the moral status of the fetus and its entitlement towards the mother's body. This "political solution" would require PGD regulations to be drawn so as to apply to each person in a

way that is compatible with their (reasonable) deeply held beliefs. In practice, this will lead to a “moderately liberal”(DeGrazia, 2014, p. 34) arrangement, where PGD cannot be banned (since it would assume a strong moral status for the embryo), but where PGD cannot be imposed either.²³

DeGrazia’s political solution also has important implications on the ability to publicly fund PGD. On one hand, as with many other publicly funded morally objectionable practices, we can legitimately demand a dissenting minority to contribute funds as long as this is done through “duly elected representatives”(DeGrazia, 2014, p. 51). This is the case for example of military spending or public funding of secular education. Although discretion is given to citizens to not join the army or to not send their children to public schools, they must still contribute financially to these democratically sanctioned institutions through their taxes. Access to reproductive technologies would be no different, and funding public access through taxes would be acceptable. On the other hand, because PGD may be seen as immoral by many citizens, DeGrazia believes that “it is acceptable to prohibit the provision of [public] funds for abortion services [...] so long

²³ This last point may serve as a further reason to reject Eugenic principles and Procreative Beneficence in its most perfectionist version. That is, even if one could make a case for mandatory PGD on the grounds that it maximizes public interest or the interest of the child, parents could reject the procedure on deontological grounds (i.e., the discarded embryos are being treated solely as means).

as that is the choice of duly elected representatives” (DeGrazia, 2014, p. 51). This means that there is no guarantee for publicly funded access to PGD under DeGrazia’s political solution to the moral status of the fetus.

4.2.4.1 Appealing to genetic justice to guarantee public funding for PGD

A democratic ban on public funding of PGD would be unavoidable in the absence of other considerations, but we may turn to Genetic Justice to argue for the impermissibility of such a ban. Let us start by looking at an analogous case: let us imagine that “duly elected representatives” chose to ban all funding of secular education for girls due to the deeply held belief of a majority of the population that it would be sinful for them to support such an endeavor. Parents unable to afford a secular education could protest that to remove these funds effectively deprives their children of a proper education. The parents could also claim that this law is discriminatory, by applying only to the education of girls. These are two principles (i.e., the right to an education and gender equality) that could be used by a judicial branch to override a ban on public funds imposed by a duly elected majority of representatives. It may be possible for Genetic Justice to play a similar role in defending the public funding of PGD. A prospective parent (especially a carrier of a recessive genetic disorder such as cystic fibrosis) that is unable to afford the IVF treatment necessary for PGD and cannot receive the necessary funding because it was democratically withdrawn, could appeal to a right to access reproductive technologies,

since in failing to provide him with such financial support, his child risks receiving significantly lower biological assets than those needed for full participation in society. Whether the right to a minimal set of biological assets should be treated in the same way as fundamental rights such as access to education or gender equality, for example, by inclusion in a Charter of Rights and Freedoms, is a question that goes beyond the scope of this work.

Throughout this section, we explored objections to PGD based on the right to life of the fetus. Having found that no clear consensus has been achieved on this subject, we adopted a political solution that can accommodate a plurality of reasonable beliefs. This solution both prohibits the enforcement of PGD on those that object to it and also prohibits its ban, even by democratically elected representatives. This political solution also provides legitimacy to a democratically imposed obligation to contribute to the public funding of PGD. Although this may also imply that it is possible to democratically refuse to provide public funds for these procedures, appeals to Genetic Justice may allow for the enshrinement of a right to these procedures.

4.3 Harms to disabled people

A different group of critiques of reproductive technologies deals, not with the possibility of harm to the unborn, but with the possibility of harm to those already born. More specifically, the *loss of support* argument and the *expressivist objections* concern

themselves with the possibility that the widespread adoption of pre-natal and preimplantation screening will cause harm to those currently affected by the conditions usually screened out through these methods (e.g., people with Down's syndrome, spina bifida).

4.3.1 The Loss of Support Argument

The loss of support argument, the first of these two arguments against reproductive technologies, could be described as practical in nature. It consists in claiming that the widespread adoption of pre-natal and preimplantation screening will cause for a withdrawal of economic, political and social support towards those who have disabilities and conditions that can be screened through these means. It would follow that in order to avoid such losses, screening techniques should be banned. It is undeniable that the adoption of screening techniques will inevitably lead to the decrease of people born with genetic conditions that can be screened against. In fact, such declines are already seen around the world, with an average decrease in live-births with Down's syndrome of over 50% in Europe (de Graaf et al., 2021). At an economic level, we can imagine that this will lead to an overall decrease in the costs associated with the care, education and accommodation of disabled people, but an increase in the per capita costs, because the fixed costs (e.g. developing medicine for rare diseases, special education schools, accessibility ramps) will be divided among fewer people. If financial support is allocated

on a per capita basis, we will see a decrease in the quality of services provided to disabled people. Needless to say, Genetic Justice requires that the quality of, and accessibility to, services available to those with less biological assets are as good as necessary to compensate for said biological disparities, thus most of the funds liberated by the decrease in the number of disabled people ought to be reinvested so as to improve the services provided to them.

The just allocation of funds liberated by the decrease of people with less biological assets would not be a major concern if it were not for the compounding effects of an expected loss of political support. As the number of people with disabilities decreases, we may expect the political capital of organizations representing their interests to diminish. It could be suggested that some citizens may be less likely to give proper consideration to the difficulties experienced by disabled people if they do not have a chance to interact with them on a regular basis or have someone with disabilities close to them. This may lead to a drop in the support received by advocacy groups as well as a disappearance of these concerns from the political agenda presented by mainstream political candidates. This fear, however, is not only speculative, but contrary to what is currently observed in many parts of the world, where a sensibility to the hardships endured by minorities has been growing, even as the number of disabled people continue to decrease (Rees et al.,

1991), (Morin et al., 2013). Nevertheless, due to the central role that the welfare of those with less biological assets has in the Genetic Justice framework, we must take seriously the risk that a tipping point may be reached where the number of people afflicted by a particular condition becomes so small that their welfare stops being a social concern. Following the IDA, we cannot content ourselves with simply stating that it would be wrong for such a loss of support to take place, but must provide a plausible institutional intervention to remedy it. Whether such interventions will be necessary or what kind of intervention would be the most effective remains an empirical question which will have to be answered by sufficiently informed social scientists. However, we may hypothesize on some possible candidates for the benefit of the reader: Running awareness campaigns (e.g., invite people with disabilities to educational institutions to talk about their lives) and promoting the appearance of people with disabilities in advertisement and popular media (e.g. establishing minimum quotas, providing funding).

Finally, at the social level, the knowledge that those born with Down's Syndrome could have been screened through currently available techniques may drain empathy towards the problems faced by disabled people. Similar expert analysis of changes in attitude, the issues they raise and possible solutions should be made available in order to fulfil the requirements of Genetic Justice.

Thus, we have seen that although the loss of support argument raises valid concerns surrounding harms that may be imposed on disabled people by the increased use of screening techniques, the conclusion that the ban of said techniques is the only possible solution does not follow. Instead, we can turn to Genetic Justice and the IDA to provide solutions that seriously take into consideration these concerns, while trying to provide a just balance between the needs and desires of disabled people and society at large.

4.3.2 The Expressivist Objection

While the loss of support argument concerns itself with what could be described as tangible harms done to already existing disabled people, the expressivist objection deals with the symbolic power that the widespread adoption of screening techniques may have on the sense of self-worth of disabled people. In a nutshell, the argument claims that to normalize the systematic search for and destruction of embryos and fetuses exhibiting certain conditions (or a predisposition towards them) conveys a message that existing people with such conditions are undesired and lead lesser if not wholly unworthy lives. For this reason, it would be legitimate to ban such techniques in order to protect the most vulnerable sectors of our society. Various ways of dealing with the expressivist objection have been proposed. The simplest way of resolving this issue is to outright deny that screening against people with certain conditions implies a belief that those currently living with those conditions lead lives not worth living. This is for example the view of

Buchanan et al. (2000), where they explain that “[w]e devalue disabilities because we value the opportunities and welfare of the people who have them. And it is because we value people, all people, that we care about limitations on their welfare and opportunities” (Buchanan et al., 2000, p. 280). Another bioliberal author, John Harris, is of a similar opinion, claiming that “[n]o one, I believe, would say that the lives of most people with disability are not worth living. All that is claimed is that it would be better not to have a disability: if it would not, then it would not be a disability” (Harris, 2007, p. 98). After all, “[t]o have a rational preference not to be disabled is not the same as having a rational preference for the nondisabled as persons” (Harris, 2007, p. 99). An unapologetic pragmatist, Harris sees the expressivist objection as a red herring, detracting from what he sees as the noble desire to provide every person with as good a chance to lead a flourishing life as possible. To prove why the expressivist objection fails, Harris turns to possible future biomedical enhancements. One could imagine a world where it becomes possible to offer our children all sorts of extraordinary abilities: superintelligence, new and improved senses (e.g. ‘seeing’ magnetic waves, dog-like olfaction, feeling other’s emotions), super strength, wings, etc. Regardless of whether such enhancements ever become available outside of works of science fiction, the fact that some of us would like to possess them, and to provide our children with such enhancements, casts doubt on the

claim that to want biological assets that increase our capabilities implies a disdain for those that lack them. As Harris says, “[i]f I would prefer to confer these advantages on any future children that I may have, I am not implying that people like me, constituted as they are, have lives that are not worth living or that are of poor quality” (Harris, 2007, p. 108).

Both bioliberal responses assume that, although worth living, the lives of those who have a disability would be less desirable ones. Other bioliberal authors have offered similar responses but paid more consideration to concerns of belittling the lives of those afflicted by disability. In his book *Choosing Children*, Jonathan Glover offers a similar answer to Buchanan et al. and Harris’s but puts more emphasis on the importance of showing that we ‘hate the disability without hating the disabled’. He begins by providing a comparison with other diseases and conditions that we wouldn’t consider as defining who someone is as a person. For example, “[w]e want to defeat cancer, not because we lack respect for people with cancer and want to rid the world of them, but because of what cancer does to people” (Glover, 2007, p. 35). However, because “[t]he harm the expressivist argument points to comes through communication” (Glover, 2007, p. 35), we must make an extra effort to show that we are not embarking on a crusade against the disability out of spite towards those who exhibit it. In the words of Glover, “disability is

only one way in which flourishing is impaired. Poverty, bad housing, or child abuse can do so at least as much. If we single out disability among the obstacles to flourishing, the ugly attitudes may seem to be lurking there. We have to take the other obstacles just as seriously” (Glover, 2007, p. 35).

The bioliberal responses to the expressivist objection, even Glover’s more tactful approach, seem to imply that conditions such as Down’s Syndrome, Spina Bifida or Cystic Fibrosis are to be understood as biologically inferior to a “normal” constitution, but one may also challenge this assumption. According to what is called the *medical model of normal health*, a disability can be understood as an objective fact of the world, based solely on people’s biology. In contrast, one may embrace the *social model of normal health*, according to which a disabled person would not be biologically *disabled*, but differently abled, and only the existence of specific social institutions turns the characteristics of this person’s biology into disabilities by imposing a set of social expectations. A good example of this dynamic can be seen in the case of dyslexia. While dyslexia can be a major hurdle for those participating in modern society, most of human history took place before the invention of writing. In such illiterate societies, a condition that affected one’s ability to read and write would not have been seen as a disability. In fact, it would not have been seen at all. In the same way, someone affected by

achondroplasia (i.e., dwarfism) would not ‘suffer’ from crippling short stature, but from a world built for tall people. People bound to wheelchairs do not need to ‘suffer’ from mobility issues in a world with ramps instead of stairs and children who fail at school due to attention deficits disorders may very well succeed given an educational environment tailored to their needs. The institutional application of Genetic Justice must take these ideas at heart and use them to ensure that the costs imposed by differences in biological assets are kept to a minimum. This can be achieved by creating an environment that allows a variety of people to succeed, for example by ensuring that public spaces and workplaces remain accessible to all people, regardless of whether they use a wheelchair or not, and by providing funds to compensate those that must have their homes retrofitted to match their necessities instead of those of the majority of the population. However, this is not to say that genetic justice must embrace the social model of normal health. Indeed, it is true that many disabilities only become so through unaccommodating social arrangements, but to claim that this is the reality of all disabilities would be equally erroneous and callous. Indeed, many of the disabilities we have mentioned so far inherently diminish the person’s ability to interact with the world, and cause great amounts of physical pain and a reduced lifespan. Instead, it seems more reasonable to support an *interactive model of normal health*, which asserts that certain biological conditions can be understood as

inherently disabling, while also granting the important role that society can play in diminishing (or exacerbating) the degree to which such a condition can impede normal social participation. This approach is particularly amenable to genetic justice by showing that there is a legitimate need for intervention in the reduction of the births of people with disabilities, while also investing in creating the conditions that will diminish the burdens imposed to those that are disabled.

4.4 The Non-Identity Problem

If the loss of support argument could be described as a practical concern, and the expressivist objection as a symbolic one, the non-identity problem could be seen as a quintessentially philosophical problem. Originally developed by Derek Parfit, the “non-identity problem” is the name given to the counterintuitive idea that it is not immoral to cause a child to be born with avoidable disabilities if the process that prevents said disability could be said to create a different child. Let us take the fictional case of Ruth, a carrier of a congenital disease that afflicts “only males. If Ruth pays for [undergoing] in vitro fertilization, she would be certain to have a daughter whom this disease would not kill. She decides to save this expense, and takes a risk. Unluckily, she has a son, whose inherited disease will kill him at about the age of 40” (Parfit, 1987, p. 518), while also suffering from mild pain and reduced mobility for those 40 years. The most common

reaction to this example is to feel affront towards the recklessness of Ruth, who could have provided her child with a better chance for a good and long life. However, the intuition at the center of the non-identity problem lies in the fuzziness surrounding the concept of “her child”. It is probably the case that had Ruth conceived a girl, her child would have had a better chance to have a good life, but it is important to note that this would have been a different child than the sick boy she ended up having. Since the boy can be assumed to have a life worth living, (after all, most people with reduced mobility and a short lifespan still have lives worth living) the only way to have *a* child with a better chance to have a good life would have been to deprive *him* of his life. Thus, we conclude that we cannot blame the mother for having a sick boy any more than if she, given the choice to only save one, had chosen to rescue a disabled boy over a healthy girl.

Some practically minded authors choose to reject the non-identity problem as a mere philosophical riddle. John Harris decries that “while the personal identity issues are fun philosophically, they don’t seem, to me at least, to have any ethical impact at all. Indeed, such puzzles seem to be a gross form of philosophical indulgence at the expense of moral decency” (Harris, 2007, p. 180). Instead, he believes that we should evaluate the decisions of parents on the basis of the child that is generated. We can do this by asking the question ‘would it be acceptable for a parent to purposely inflict this condition on the

healthiest possible child?'. In the case of Ruth, we could compare the hypothetical healthy girl with the sick boy and ask ourselves, if the boy had been born as healthy as the girl, would it be morally acceptable for Ruth to infect him with a virus that causes the symptoms described above. Since this would be a clear case of abuse, we could judge Ruth's choice not to undergo IVF+PGD while knowing she carried such a disease as equally morally unacceptable.

As much as one may agree with Harris, simply claiming that a philosophical puzzle is ethically unpalatable does not make it go away. This has led authors such as Dan Brock to come up with ways to resolve the non-identity problem. According to Brock, the issue with the non-identity problem is that it assumes that harm can only be done to specific people. Brock defends a non person-affecting conception of harm (D.W., 1995, p. 272). By building on the intuitive claim that "[i]t is morally good to act in a way that results in less suffering and less limited opportunity in the world"(D.W., 1995, p. 273), Brock concludes that "[i]ndividuals are morally required not to let any possible child or other dependent person for whose welfare they are responsible experience serious suffering or limited opportunity if they can act so that, without imposing substantial burdens or costs on themselves or others, any alternative possible child or other dependent person for whose welfare they would be responsible will not experience serious suffering

or limited opportunity”(D.W., 1995, p. 273). This means that it is possible for anyone to condemn someone like Ruth, for having caused harm, even if she hasn’t caused harm *to someone*.

Dan Brock’s non person-affecting approach is a reasonable response to the non-identity problem, but it would also be possible to provide a more fundamental challenge to the non-identity problem by questioning its conception of identity. It is surprising that none of the bioliberal authors challenge the non-identity problem on the strong association that it implies between genome and personhood, given how well acquainted these authors are with the fallacy of genetic determinism. It is true that a zygote with a statistically typical genome and one that will reduce the mobility of the child must lead to the creation of two different persons. However, we would also create a different person if we took the healthy newborn and surgically divided his higher and lower spine. After all, the inability to use his legs is sure to greatly impact his experience of the world and his life trajectory. The fact that the resulting disabled child would be a different one than if he had not been operated on as a baby is no excuse to do so. Clearly, most of the persuasive power of the non-identity problem resides in the privileged association it makes between genome and personality. Although it is undeniable that different genomes will lead to different persons, so will different environments (e.g., intra-uterine,

nutritional, educational, experiential), and yet nobody would claim that any environment we provide to a child, regardless of how harmful it proves to be, is acceptable on the grounds that had we given them a different one they would be a different person.

Throughout this chapter we have explored the moral considerations surrounding PGD and how they inform the way it would be regulated under Genetic Justice and the IDA. The next chapter will present the main conclusions of this work, and following a brief description of its current regulation, Section 5.2 will provide a sketch of how all of these principles could come together to regulate the various types of application of PGD.

Conclusion

Through this work we hope to have shed some light on the ongoing philosophical debates on the use of technology to enhance human capabilities, and the potential contribution of these discussions to the regulation of reproductive techniques, particularly PGD. Chapter 1 provided us with a historical overview of these debates by introducing the three camps that compose it (i.e., transhumanists, bioconservatives, and bioliberals) and the different periods of this debate. In Chapter 2 we focused on what we identified as the second period of the contemporary enhancement debate, which focused on discussions of the bioconservative Therapy-Enhancement Distinction (TED) and its bioliberal and transhumanist critiques. Having cast doubt on the ability of the TED to justly regulate enhancement technologies, we spent chapter 3 looking at four bioliberal alternatives to the TED. The first three, classical eugenics, Procreative Beneficence, and Procreative Liberty presented a variety of issues due to their inability to properly balance social welfare, individual welfare, and procreative freedom. Genetic Justice was defended as the best alternative, due to it relying on the concept of distributive justice to balance all three concerns. We finally explored how the dynamic nature of applied Genetic Justice favours an institutional approach, which pays close attention to ongoing changes in attitudes and outcomes relating to biological assets. Finally, we consider practical applications of this

moral framework in Chapter 4, where we looked at the ethical issues surrounding reproductive techniques, with a focus on Preimplantation Genetic Diagnosis (PGD).

Having tackled the bioconservative opposition to non-medical uses of PGD in chapter 2 and to PGD *qua* reproductive technology in the previous chapter, we have shown how an alternative approach to the regulation of PGD under the principles of Genetic Justice would be legitimate. We conclude this work by bringing together and classifying the recommendations mentioned throughout the previous chapters. The objective of this section is not to provide a concrete proposal for the regulation of PGD, since that would require taking into consideration the realities of the social, economic and political context in which it would be implemented. Instead, the objective of this last section will be to show how the principles we have developed over the previous chapters can come together into a coherent and sensible whole, which may provide inspiration to policy makers and regulators.

5.1 Current status of PGD regulation

Before trying to understand how Genetic Justice could improve the way in which PGD is regulated, let us take a look at the current state of PGD regulation. PGD is currently regulated throughout most of the western world under bioconservative principles;²⁴ while

²⁴ One notable exception are the United States, where there currently is no regulation for the use of PGD (Bayefsky, 2018).

genetic screening of conditions such as Down's Syndrome and Tay-Sachs Disease is allowed, the selection of any trait for non-medical reasons is not (Bayefsky, 2018). Some may point out that this is not entirely true, because some countries (e.g., The UK, Portugal, Belgium, the Netherlands (*Switzerland among the 'Hardliners,'*), Canada (Urquia et al., 2016))²⁵ allow the use of PGD for Human Leukocyte Antigen (HLA)-typing and the selection against silent carriers of recessive genetic conditions. Indeed, these two interventions cannot be said to be strictly medical, because the selection of these traits confers no medical advantage to the embryo selected. However, as pointed out by Guido de Wert (de Wert, 2005), these traits are better understood as falling in 'the intermediate category'. That is, they are traits that do not directly affect the health of the embryo but will impact the health of a third party. In the case of using PGD for HLA typing, couples do so in order "to select HLA-matched embryos which could be used as donors of stem cells from umbilical cord blood" (de Wert, 2005, p. 3261) for a sibling suffering from a disease such as Fanconi anemia. Similarly, using PGD to select against carriers of genetic disorders they don't suffer themselves²⁶ could be seen as a case of enhancement through

²⁵ Some other countries, such as France and Germany allow using PGD for HPLA typing, but do not allow sex-selection for medical reasons (*Switzerland among the 'Hardliners,'*)

²⁶ Genetic disorders linked to the X chromosome (e.g., Hemophilia) will not cause the carrier to present symptoms as long as she carries a single copy of the gene. However, she may eventually give birth to a boy, who may express the disorder, or a girl, who may express it or be a carrier depending on the chromosome

PGD. However, since the selection is done to avoid future offspring from having this disease, it is better to understand this as a case of a medical use of PGD, albeit under an extended conception of cure that includes a third party. Once these grey areas are understood as arising from a desire to address medical concerns, it becomes evident that the current regulation of PGD is strictly bioconservative.

5.2 Regulating Embryo Selection

Given the bioconservative approach to the current regulation of PGD in Canada and many other countries, we believe it is possible to improve on the current system by following the principles of Genetic Justice. Such changes would aim to increase the freedom and welfare of prospective parents, their children and society at large. This section will not consist of an exhaustive presentation and defence of each possible modification and its implementation in the Canadian context, which should be the subject of a future work. Instead, we conclude this work by presenting how Genetic Justice can justify improvements on current regulation of PGD for the 3 different types of interventions (Figure 2); (1) PGD for selecting against disease, (2) PGD for selecting for functional traits and (3) PGD for selecting for non-functional traits.

obtained from the father.

Recommendations for a more just regulation of PGD

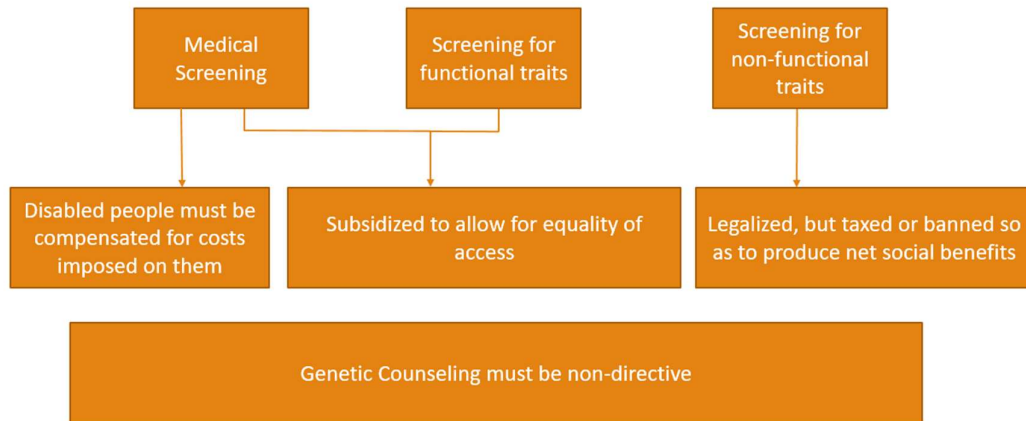


Figure 2: The three types of uses of PGD and how to regulate them according to Genetic Justice

5.2.1 Recommendations concerning the screening against diseases through PGD

PGD currently allows for the screening of “around 500 diseases, including cystic fibrosis and Tay-Sachs disease” (Ball, 2021). Under the principles of Genetic Justice, all prospective parents must be given the possibility of using this technique in order to guarantee their children a basic level of biological assets. This provides the ethical buttress for an ambitious subsidising program that would allow all prospective parents to get genetically screened and, if they so desire, act on that information by using PGD to select against particular genetic conditions. Genetic Justice also provides, following the necessary cost-benefit analysis, the justification for subsidizing the development of cheaper and less invasive reproductive techniques to be used in conjunction with PGD.

5.2.1.1 Compensating those disadvantaged by a higher accessibility to PGD

Because Genetic Justice seeks to maximize the ability of all citizens to participate in society, starting with those that are the most disadvantaged, it is a priority to counteract the negative effects²⁷ that an increase in the use of PGD may have on people with conditions usually screened against. As mentioned in Chapter 3 when discussing the principles of the IDA, the specific ways in which these issues will (or not) arise and the necessary interventions will have to be determined by careful investigation of the changes that PGD may cause in the economic, political and social reality of people living with disabilities.

5.2.2 Recommendations concerning non-medical uses of PGD

5.2.2.1 Selection for functional traits

As mentioned in Chapter 4, PGD is poorly suited for the selection of traits that enhance human capabilities (e.g., intelligence, longevity, strength), due to most of them being polygenic in nature. However, possible refinement of ESPS and the development of novel genetic modification techniques²⁸ leave the door open to the possibility that non-

²⁷ Such as potential losses of financial and political support (see section 4.3.1), or spreading the belief that their lives are not valued or worth living (see section 4.3.2).

²⁸ Those acquainted with developments in applied ethics and reproductive techniques may be surprised by the lack of discussion on the CRISPR system. We have avoided any discussion of genetic modification techniques, because this type of intervention is not ready for safe use in humans yet. As such, it is not their use, but their safe development that would need to be the focus of their ethical analysis, which is a subject that goes beyond the scope of this work. See section 5.3 for more details

negligible enhancements will become available in the future. If PGD in combination with other techniques ever allows for major increase in intelligence and longevity, Genetic Justice will require that we both maximize the just access to these techniques and foster their overall adoption. Following the principles of the IDA, institutions should be developed to monitor real time rates of PGD use, the benefits PGD provides and the level of disparity of access (as well as the causes and potential remedies for these disparities). Those institutions should also compare the costs and benefits of these techniques with other public investments that aim to promote justice. Genetic Justice justifies does not justify subsidizing PGD if improving educational, health or social services has greater chances of promoting justice and increasing overall welfare (e.g., by improving academic achievement, lowering crime rates, increasing longevity and happiness).

5.2.2.2 Selection for non-functional traits

While (meaningful) selection of functional traits through PGD is not possible at this time, the selection of non-functional traits such as sex and eye colour²⁹ is. Indeed, selection of eye colour is not only possible, but a service already offered by many clinics in the United States (Marcus, 2018). Following the principles of Genetic Justice, the selection of non-

²⁹ Because PGD is a *screening* technique, the choice in colors is limited to the genes of the parents. For example, in order to have a baby with blue eyes, both parents must have at least one copy of this gene.

functional traits should be regulated in two ways. First, the selection of non-functional traits should be allowed, but contrary to the selection of medical and functional traits, no financial assistance should be provided, because these interventions do not help make the distribution of biological assets needed for social participation more just. Because the selection of non-functional traits through PGD diverts medical resources from interventions that *do* promote Genetic Justice, these interventions should be taxed to limit their use and generate funds for subsidizing interventions that *do* promote Genetic Justice. Second, following the principles of the IDA, selection of non-functional traits and its repercussions should be evaluated in real time, and such procedures should be banned if it is judged that the social costs they impose exceed the benefits derived through taxing it.

Another currently available application of PGD that deals with a non-functional trait and is illegal in Canada is the selection of sex. We recommend for the legalization and regulation of this practice along the same lines as other non-functional traits. There is however the added concern that allowing for sex-selection would lead to skewed sex ratios in favour of sons, as is the case in India and China (President's Council on Bioethics (U.S.) & Kass, 2003, p. 59). Although there is reason to believe that this will not happen in Canada, since such preferences are not seen in the use of other pre-natal screening

techniques (Yasseen & Lacaze-Masmonteil, 2016), the principles of the IDA support modifications to the regulation of sex-selection based on real time tracking of sex imbalances in society and an evaluation of any social costs associated with it.

5.2.3 Setting up guidelines for genetic counseling

As mentioned in Chapter 3, regulatory agencies should work together with professional associations and practitioners in order to create and support legislation and guidelines that regulate the advice that can be given by professionals to prospective parents. In the case of all 3 uses of PGD, practitioners have to make sure that the advice given is accurate, relevant and complete, making sure that it does not direct parents to a particular choice, but rather allows them to choose according to their own values. At the same time, it must be ensured that prospective parents will respect the child's *right to an open future*. Whether this will be done by allowing medical experts to refuse patients if they judge that the parents will not respect the child's autonomy, by having an independent organism be in charge of reviewing requests for PGD, or through other means is a question that we leave up to the relevant experts.

5.3 Additional ethical considerations surrounding reproductive technologies

This work focused on proving that the use of safe and reliable biotechnologies for non-medical uses is legitimate and even necessary for reasons of justice. As discussed briefly

in Chapter 1, the enhancement debate is ripe for entering a new stage, where philosophical discussions give more consideration to the current state of —and future developments in— biotechnology. Little however has been said about the morally perilous endeavor that is the development of novel reproductive techniques. A future work must include an exploration of the ethics of developing new techniques through the lens of Genetic Justice.

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