Procreative Beneficence and Genetic Enhancement

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Abstract

Imagine a world where everyone is healthy, intelligent, long living and happy. Intuitively this seems wonderful albeit unrealistic. However, recent scientific breakthroughs in genetic engineering, namely CRISPR/Cas bring the question into public discourse, how the genetic enhancement of humans should be evaluated morally. In 2001, when preimplantation genetic diagnosis (PGD) and *in vitro* fertilisation (IVF), enabled parents to select between multiple embryos, Julian Savulescu introduced the principle of procreative beneficence (PPB), stating that parents have the obligations to choose the child that is expected to have the best life. In this paper I argue that accepting the PPB and the consequentialist principle (CP) that two acts with the same consequences are morally on par, commits one to accepting the parental obligation of genetically enhancing one's children.

Keywords: *Human enhancement, genetic enhancement, Julian Savulescu, designer babies, procreative beneficence, CRISPR/Cas, consequentialism*

1 Introduction

Imagine a world where everyone is healthy, intelligent, long living and happy. Intuitively this seems wonderful albeit unrealistic. However, recent scientific developments in genetic engineering, namely CRISPR/Cas bring the question into public discourse, how the genetic enhancement of humans should be evaluated morally. In 2001, when preimplantation genetic diagnosis (PGD) and *in vitro* fertilisation (IVF), enabled parents to select between multiple embryos, Julian Savulescu introduced the principle of procreative beneficence (PPB), stating that parents have the obligations to choose the child that is expected to have the best life [11]. In this paper I argue that accepting the PPB and the consequentialist principle (CP) that two acts with the same consequences are morally

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on par, commits one to accepting the parental obligation to genetically enhance their prospective children, i.e. embryos, a position Savulescu doesn't explicitly endorse but I argue is committed too. As the argument I provide may seem like a slippery slope, the largest part of this paper is tasked with responding to a multitude of possible objections. I will argue that even though there are differences between the application of PPB and genetic enhancement of embryos, they do not demarcate a relevant moral difference between the two in respect to their obligatoriness.

This paper is structured as follows. In *Section* 2 I define and explicate various concepts that are related to genetic enhancement, i.e. human enhancement, wellbeing and the principle of procreative beneficence. Technological specifics and explanations of how genetic enhancements work will for the most part be omitted in this paper dealing purely with a normative question, i.e. should parents genetically enhance their children if the technology was available. In *Section* 3 I formulate and explain the argument that those who want to be parents have the obligation to genetically enhance their embryos. In *Section* 4 I anticipate and evaluate a number of possible objections including, inequality, freedom and welfare in the society. In *Section* 5 I conclude that even though the consequences of the PPB application and genetic enhancements in embryos might require different kinds of policies, these differences do not provide sufficient reason to give the application of PPB and the parents using genetic enhancements on their embryos a different moral standing.

2 Important concepts

According to Savulescu, Sandberg and Kahane there are two main senses in which the term *enhancement* is used. "*Functional* enhancement, the enhancement of some capacity or power (e.g. vision, intelligence, health) and *human* enhancement, the enhancement of a human being's life" [10,: p. 3]. In most discussions surrounding the term enhancement, people refer to the functional definition. In all cases of the functional enhancements it is an open question whether the improvement of some capacity makes the life of the person receiving the enhancement actually better. It, therefore, is an open question what the moral stance on any particular form of enhancement is. However, proponents of enhancements usually use the latter definition. After all, Savulescu argues, it is not "disease [...] which is important, but its impact on a life in ways that matter which is important. People often trade length of life

for non-health related well-being" [11; p. 419]. The concept of *human* enhancement, employed by Savulescu and others, is comparatively less straightforward and requires further clarification as it is crucial for my argument. Savulescu, Sandberg and Kahane jointly propose the following definition for human enhancement; "[a]ny change in the biology or psychology of a person which increases the chances of leading a good life in the relevant set of circumstances" [10; p. 7]. According to this welfarist definition, a conception of normality is not needed to define enhancement as we do not define an enhancement as being better than normal, but simply being better full stop. Medical treatments are therefore just a form of enhancements [10; p. 8]. Opponents of enhancements, on the other hand are trying to argue that enhancing is something going beyond treatment and is therefore not morally demanded. The welfarist definition of enhancement is crucial to understand why parents have the obligation to genetically enhance their children. Those who disagree because of adherence to a different account of enhancement are talking about something different. If a genetic *alteration* in an embryo is not expected to lead to a better life of that human, than it is simply not an *enhancement*.

Furthermore, it is important to explicate the *principle of procreative beneficence* (PPB): "Couples (or single reproducers) should 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" [11; p. 415]. Savulescu proposed this principle in a time when preimplantation genetic diagnosis (PGD) and *in vitro* fertilisation (IVF) were highly debated, trying to convince even non-consequentialists. However new technologies might enable us not only to screen for genes but also change them. In his consequentialist framework he himself thinks that parents have the obligation to genetically enhance their children [10; p. 16]. The question arises whether the acceptance of the PPB and the consequentialist principle (CP), that two acts with the same consequences are morally on par, itself entails the parental obligation to genetically enhance their embryos. In the following I shall argue that this slippery slope cannot be avoided.

A crucial part for this argument is to define the *expectancy of the best possible life*. This is a vague part of his argument, but what counts as an enhancement hinges on how welfare is defined for which there are several theories: hedonism, desire/preference-satisfaction, objective list theories, see Griffin [2] and Parfit [7]. Savulescu has not assigned himself to any particular theory, thus claiming to avoid some of their weaknesses:

> "*I have not committed myself to any particular substantive conception of the good life. That is a complex question as old as philosophy itself. I believe the best life is a life of objectively worthwhile activity that provides pleasure and is desired.*" [12; p. 286].

Instead he focuses on *all-purpose goods* that would according to all of those welfare theories mentioned above count as enhancements e.g. "Memory, self-discipline, impulse control, foresight, patience, sense of humour, sunny temperament, empathy, imagination, sympathy, fairness, honesty, and so on, capacity to live peaceably and socially with others" [12; p. 284]. Surely some of this might harm us e.g. post-traumatic disorders in conjunction with better memory and imagination, but what matters is that they are expected to make a life go better. A final definition of welfare is not necessary for our account as long as we are able to evaluate these *all-purpose goods*. Even if it turns out that there is only one such all-purpose good satisfying the major theories of wellbeing, i.e. hedonism, desire/preference-satisfaction and objective list theories, the argument provided in the next section will require parents to genetically enhance it in their children. Nevertheless, as we follow the welfarist definition of what an enhancement is with medical treatments being a subset of enhancements, the set of all-purpose goods might be rather large, e.g. a functioning heart, brain, lung, etc.

3 Obligation to genetically enhance embryos

There are at least two ways to argue for the position that the PPB entails the obligation to genetically enhance embryos. One could argue that *selection* out of possible children entails the *selection* out of possible genetically enhanced embryos. After all one could *possibly* have a genetically enhanced child. In that case genetic enhancements would simply fall under the PPB and hence be obligatory. However, this is debatable and is not necessary to accept my claim. For my argument to proceed I will require an additional premise, which is the consequentialist principle (CP). Consequentialists are only concerned with outcomes, how these outcomes are achieved is morally irrelevant. Killing and letting die are thus ceteris paribus morally equivalent. In order for my argument to hold, I need to show that the outcomes of the PPB and genetic enhancements in embryos are morally on par. What is the crucial outcome of PPB? It is the expectancy of the best life, which we are expected to achieve with Savulescus *all-purpose goods*. To formulate my argument:

(1) Those who want to be parents have the obligation to select the child that is expected to have the best life, or at least as good a life as the others, based on the relevant available information (= the PPB).

(2) Application of the PPB leads to the creation of children that are expected to have the best life or a life at least as good as without the application of the PPB, based on the relevant available information

(3) If act A and act B have the same consequences, then they are morally on par. (= the CP)

(4) Genetic enhancements in embryos lead to the creation of children that are expected to have the best life or a life at least as good as without genetic enhancements, based on the relevant available information.

(5) Therefore, those who want to be parents have the obligation to genetically enhance their embryos.

From premise (1) follows, that (2) is obligatory for those who want to be parents. As (2) and (4) have the same consequences, it follows from the CP (3) that (4) is also obligatory for those who want to be parents (5). As stated in the beginning, we are accepting the PPB, therefore premise (1) & (2) and the CP (3). If someone, e.g. Savulescu would want to refute the conclusion (5) without dropping one's commitment to (1), (2) & (3), only two ways remain. First, denying the truth of premise (4). Second, denying that the conclusion follows from the premises as the consequences of premise (2) and (4) differ in a morally relevant way. Let me now turn to these considerations in section 4.

4 Objections and Defense

Keeping in mind that every position that refutes the conclusion, but is inconsistent with premise (1), (2) or (3), is not a valid objection to the argument I bring forward. One cannot deny the conclusion of an argument that takes the form, "if you accept these premises, you have to accept this conclusion" by denying the truth of one of the premises. The argument provided in this paper aims for just this sort of conclusion: Philosophers accepting the CP and the PPB do not have a valid escape from being charged with the slippery slope of advocating genetic enhancements. To narrow the scope of this paper I am not taking a stance

on the matter of whether the CP or the PPB is right. Such an endeavor would require more than a single volume book. I only argue that philosophers and researchers like Julian Savulescu, Anders Sandberg and Guy Kahane should either bite the bullet of advocating human enhancements or indeed stop being consequentialists advocating the PPB. The objections that follow are then nothing more but misguided attempts of stopping the 'slippery slope'.

Let me begin with the seemingly, obvious objection that premise 4 is false. An objection often put forward is that genetic enhancements have risks that are too high or unknown and would make the life of the person targeted go worse. I argue that this hinges on different conceptions of what counts as an *enhancement*. First, it is clear that genetic alterations do not necessarily increase the expected welfare of an agent. However I am not concerned with genetic *alterations* per se, but with genetic *enhancements*. No serious advocate of enhancements in humans would deny the difficulties in achieving successful genetic alterations. In fact, the terminology of philosophers and researchers advocating the PPB, i.e. Savulescu, Sandberg & Kahane doesn't allow for this objection. As noted in section 2 they employ the welfarist definition of enhancement: A genetic enhancement by definition increases the expected welfare of children. The question whether genetic enhancements thus really increase welfare is irrelevant, because premise (4) is in fact a tautology. Though this may seem like a cheap way of justifying genetic enhancements in humans, this is what proponents of human enhancements are advocating: Using genetic alterations when they are expected to improve the life of a human embryo, including perhaps open-mindedness for the future of the technology.

It can of course still be asked whether genetic alterations are technologically possible in such a way that they lead to the creation of a child with higher expected well-being. This is an empirical question and even if they currently are not, this doesn't free us from the task of answering this question. After all many questions in ethics are formulated like this: one might argue that current technological limitations might give society an obligation to invest heavily into research as the potential benefits are enormous. However this is of no concern for my argument, because even those who disagree with genetic enhancements ever being technologically possible have to accept alleged empirical evidence. In 2015 Chinese researches released an article, showing that the gene editing of human embryos is in fact technologically possible. They used a technique called CRISPR/Cas9 which makes it impossible to tell which

genes are edited [4; p. 363-372].

Realizing that premise (4) being a tautology, cannot be false, and conditionally accepting premise (1) – (3), any further objection against the conclusion following from the premises might seem pointless. However one way to refuse the conclusion remains, that is denying that the consequences of PPB application and genetic enhancements of embryos are the same. Granted, it is obviously true that two acts may never have the 'same' consequences, if we consider every possible consequence. However these differences have to justify a different moral standpoint, meaning that the PPB is obligatory, while genetic enhancements of embryos are not. For two acts can be different in their goodness while, nevertheless, still both being obligatory. A familiar example in line with PPB would be the obligation to send your children to school and the obligation to feed them.

Objections of this sort can be categorized in two ways. First, the expected welfare of the child might differ between selecting and enhancing an embryo in a morally relevant way. Second, they might only be morally equal in one respect, i.e. expected welfare of the child, while leaving out other relevant consequences that differ between the two and justify a different moral standing. Some objections might overlap as consequences such as freedom or equality and their implications on the welfare of the targeted embryo and overall/average welfare. The remainder of this paper has the purpose to explore and debunk a multitude of such objections.

4.1 Degree and Precision

Concerning differences in wellbeing, Parens objects that genetic alterations might be morally different from other welfare increasing procedures of offspring because they have the potential to be much larger in degree and precision [6; p. S7]. However concerning premise (4) this objection is unsuccessful, because the consequence we want is explicably the life that is expected to be *best*. If genetic enhancements do so much better than mere selection than Parens' objection would rather support a moral priority of genetic enhancements against mere selection. However some might object that genetic enhancements are less reliable in their effects, therefore unprecise. That however is an empirical question and doesn't change the fact that these genetic alterations are expected to make the targets life better. Though this is the most obvious objection and should therefore be tackled first, it is also the least harmful to the

argument provided in this paper.

4.2 Risk

Another objection often put forward against genetic enhancements is the risk objection, i.e. that the PPB has far less risks to its application compared to genetic alterations. Of course genetic alterations currently bear risks much greater than mere embryo selection by IVF and PGD, which do not change the genetic constitution of the embryo. However when genetic alterations are expected to be overall more harmful than beneficial, they do not count as genetic enhancements and are therefore ruled out. If we cannot determine probabilities, than we cannot judge the expectancy of the best life anyway. This critic of human enhancements is rather meaningless against the welfarist definition of enhancements. When it comes to risk, the opponents of genetic enhancements are attacking a straw-man position that proponents of genetic enhancements do not adhere to. Risk, degree and precision are empirical concerns not only for the opponent of genetic enhancements, but also for enhancement advocates who DO take them serious.

But even if the risk of harm is currently unknown or outweighs the potential benefits, this doesn't indicate that genetic enhancements should be avoided. One could rather argue again that we should do research until the expected benefits outweigh the medical risks of harm not stop research altogether. Also the potential benefit to be gained by genetic enhancements is much larger in degree than mere selection. Demanding a risk of zero to the targeted agents is over-demanding, otherwise medical treatments would never be at the point they are today. Still, this is a factor that affects the expected well-being negatively and therefore has to be considered in judging whether a genetic alteration counts as an enhancement.

One might further object that, contrary to somatic gene therapy, which only affects the targeted individual, germ-line interventions will affect the offspring of the targeted embryo and the offspring of his offspring and so forth... However we are enhancing all-purpose goods like intelligence and health. It seems implausible to claim that all-purpose goods are always expected to increase welfare, but might not do so for future generations. Even so, if in the future new scientific advances change our subjective probability assessments, genetic alterations that did not count as enhancements, could do so in the future and vice-versa. However, it would then be the obligation of our hypothetical parent's

off-spring to ensure, that their own off-spring has the best life possible and perhaps undo some of the changes to their gen-code. The PPB does not indicate an obligation towards grandchildren, but only to our own children. Different times and cultures may very well render different genes beneficial, think of intelligence and the muscular labor in former centuries.

Maybe it will be the case that those enhanced will be less well off than unenhanced humans would have been, because they see themselves as objects rather than subjects. A "natural" patient with paraplegia may be better off than a "super-enhanced" guy with superiority in health, intelligence, strength etc. but cannot deal with the fact that he is created artificially, perhaps becomes an alcoholic or worse. If we had reason to give this outcome a certain probability, it would have to be calculated in whether we can judge a genetic alteration to be an enhancement or not. Therefore, higher risks are no reason to justify a different moral standing from PPB.

4.3 Harm

However even though the expected welfare of genetic enhancement in embryos and the application of PPB are the same, the issue of potential harm to the embryo could still justify a moral difference between the two. The PPB seems to capture the intuition of parents being obligated towards their children's welfare. Harming would indeed be quite contrary to this. Savulescu argues that genetic enhancements can harm an embryo in a way mere selection cannot. He asks us to imagine an embryo A, who was selected for existence but later develops cancer. As long as its life is worth living, it cannot be said that we have harmed him, for he would not have existed otherwise. However this still seems to be morally wrong. If we genetically alter an embryo B and he develops cancer (assuming his life is worse than it would have been without genetic alteration) then we would have harmed him [11; p. 422]. Unlike the objection to premise (4) we cannot disregard the harm objection by hinting at the welfarist definition of enhancement. Genetic enhancements are expected to lead to the best possible life. However harm is concerned with the actual life, not the expected welfare. In this respect PPB and genetic enhancements differ because the harm objection is successful against genetic enhancement while it is not against PPB.

However Savulescus argument also implies, that parents that selected an embryo with the expectancy of the highest welfare and turns out to

have a higher wellbeing than the others, cannot claim that they benefitted him. On the contrary parents that arranged their embryo to be genetically enhanced and the embryo turns out to benefit from it, can take credit for this. Imagine a couple both bearing a defective gene that would certainly cause blindness in their child. IVF and PGD would not be able to help them (and the child), however a genetic enhancement would. According to the CP, failing to select for sight and blinding a child would be morally equal, i.e. impermissible as they share the same consequence. If such enhancement technology were available children could justifiably condemn their parents, for having *harmed* them in the sense that they did not give them this benefit. This might seem odd at first, but using an ordinary example, we condemn parents who do not send their children to school in order to ensure their education. In this case we also use the term *harm*. The claim then that there is a moral distinction between harming and failing to benefit requires a special kind of argument that may not be compatible with the CP. I take on the view that there is no relevant moral difference. As such the harm objection that aims to establish a relevant moral difference between genetic enhancements and applying the PPB raises a benefit objection against the PPB that parents do not actually benefit their children.

However, I have an additional argument against the harm objection and that is the irrelevance of harm and benefit altogether. As indicated in section 3 the morally relevant part of the PPB is the expectancy of the best life, I argue that it is not *selection* of the best expected life that is morally relevant but the *creation* of the best expected life. Using again the example of a blind child or the child not being sent to school, it is obvious how the term benefit and harm seem to be used interchangeably. If refusing to provide benefits is the same as harming, than these categories are not morally exclusive. Therefore if we take premise (3) serious, we cannot argue for a moral difference between *selecting* and *altering*. The only thing that matters is the *creation* of the indicated consequence *welfare*. Those who disagree would have to solve the non-identity problem of Parfit, which suggested that harming future individuals is not possible, because in acting in that way the people existing in the future are completely different from those who would have otherwise existed, thus would not have existed otherwise. This is under the assumption that small events can change history dramatically. The same can be said about long-term investments that would only benefit generations far in the future. However, even when we do not harm future generations, we still value actions as wrong that lead to worse lives than otherwise could

have existed [8; p. 100-115]. The analogy to the PPB and genetic enhancements is obvious, as no one is harmed that would have otherwise existed. Therefore I conclude that what matters for parents is not a life being beneficial or harmful for their child but the creation of a "best life" in a welfarist sense – providing further support for the thesis that there is no relevant difference in their moral consequences. Let us now turn to possible moral differences between selecting, i.e. the application of PPB, and enhancing an embryo in areas other than the welfare of the embryo. In the following I will explore freedom, equality and the welfare of society.

4.4 Freedom

Let us first consider consequences like freedom, autonomy or missing consent. The majority of philosophers refuse the view that it is impermissible to have children on grounds of their lacking consent for being born. The notion of requiring consent from an embryo appears to most philosophers unnecessary or perhaps more so incoherent. However in the case of genetic enhancements on embryos this matter might be different, for they could have existed without genetic enhancements. Still, there are many therapies/treatments in medicine, that are often deemed to be obligatory, even though there is no consent e.g. vaccination. Also everyone should be familiar with parents sending their children to school, even though their children might not have given them their consent. As a child I certainly wondered who gave my parents my permission to so. But even granting that we can meaningfully speak of consent here and it being morally relevant, the consequentialist framework requires us to weigh the negative consequences against benefits of such genetic alterations in order to justify a violation of consent. In fact freedom to choose can be viewed as instrumental or even constitutive to welfare, but this objection would be ruled out by the welfarist definition of enhancement. If a genetic alteration undermines such it cannot count as an enhancement. The question then becomes whether a genetic alteration does so in general. Thinking of deleting a gene that causes deafness or blindness suggests otherwise. In medicine there is often a clash between respecting the autonomy of the patient and his welfare. But as Bostrom and Roache highlight, considerations like missing consent cannot be applied for embryos that by definition cannot give consent. Instead they argue, we should make decisions in a way that would be in their interest, so thinking in terms of their welfare [1; p. 22). Habermas claims that this

goes against the freedom of the embryo [3; p. 62]. He calls this denying the opportunity of being "the undivided author of his own life" [3; p. 63]. Again Bostrom and Roache argue that enhancements would not decrease autonomy, but rather have the potential to increase it [1; p. 21]. Just as education makes us more autonomous, genetically increased intelligence would serve the same purpose. If the mere existence of genetic enhancements undermines our feeling of being autonomous beings, than this is not an argument against genetic enhancements, but rather exposes our concept of autonomy as nothing more than an illusion. If children feel like they have to fulfill the plans of their parents, than this might limit them in their freedom to be the "undivided author" of their own lives, but this is an objection to a particular treatment of children. Genetic enhancements have the aim to increase rather than limit ones possible choices in life. If genetic enhancements make us free to do things we would otherwise not have been able to, then this seems to be even further support for genetic enhancements.

4.5 Equality

Suppose that besides the PPB, equality is also a morally relevant consequence. There is a rather famous critic against genetic enhancements from Mehlman and Botkin, i.e. them being too expensive and therefore even when all parents follow their obligation, the children of rich parents will be far more enhanced or those of poor parents won't get any enhancements at all (1998). Why could this objection be applicable to genetic enhancement but fail against the PPB? Applied as an objection against PPB, Savulescu explains that one would have to argue that because selecting the child with the expectancy for the best life will lead to more inequality, parents would have to create a child with worse life prospects [12; p. 288], which seems to be counterintuitive. If everyone applies the PPB there might rather be more equality rather than less by eliminating the natural lottery and additionally making everyone better off. Under this argument we could accept both equality and the PPB as compatible. However with genetic enhancements this might not be possible. First let me defend my argument against the intrinsic value of equality. Equality unlike freedom or welfare as a concept always hinges on the relations between individuals. Contrary to this, an enhancement that makes someone less equal, say by bringing a genetically altered embryo into existence with the disposition for intelligence far above average (other things being equal), would increase

inequality in genetic makeup. Concerning the worry of unequal access through wealth, Savulescu argues that this is not an objection to the PPB hence genetic enhancements, but to all purchases of benefits like better education or healthcare. If equality matters then these benefits should be available to all [12; p. 288]. The same obviously applies to genetic enhancements. This is neither an objection against the PPB nor the parental obligation to genetically enhance their embryos, but to how equal the access to technologies in society is. Both consequentialist views can very well coexist, e.g. if the state ensures equal access while parents are only concerned with their child. Furthermore there are reasons to believe that genetic enhancements enhancement will not affect inequality at all, or even decrease it as Bostrom and Roache [1; p.16] suggest by making people "more equal", like it is the case with Modafinil [9], the same could hold for genetic enhancements. How inequality could affect welfare, will be adressed in the following section.

4.6 Welfare

Another consequence of applying PPB is the effect on overall/average welfare. The objection against the PPB is that it is too much focused on the individual as opposed to the lives of everyone [12; p. 287]. Of course the same objection can be applied to genetic enhancements. In fact even if we state genetic enhancements might be good for the one who gets them (by definition), they could decrease the overall/average welfare and vice versa. Now referring back to freedom and equality we can account for their instrumental or constitutive value to welfare in this part. The implication of both equality and freedom on the individual welfare is by definition accounted in what counts as an enhancement. However both could have morally relevant implications on the overall/average welfare.

For instance, such a moral principle might lead to discrimination of the unenhanced. However, Savulescu response is that discrimination does not show that the PPB is wrong, but rather how people treat each other, which is a different topic. Genetic enhancements in empathy, sympathy and other "moral" capacities could very well decrease discrimination to a level that is even lower than the discrimination we face in an 'unenhanced world' [12; p. 288]. Also, the optimistic outlook that increased intelligence, including emotional intelligence, should make 'the enhanced' less likely to discriminate should not be disregarded. Even if, in virtue of introducing genetic alterations as a new technology, this leads to a new form of discrimination (against the unenhanced), we might sig-

nificantly decrease other forms of discrimination once 'moral' enhancements are introduced. Though, akin to parents denying their children vaccines, I suspect that it is much more likely that if there is any new form of discrimination, then it will be directed against parents denying their children the possibility of a better life, i.e. moral condemnation. In analogy, I argue that just as we should not let scientific research into vaccines be influenced by anti-vaccines parents, fearing moral condemnation, the introduction of genetic alterations for humans should not be stopped by set of parents unwilling to use the new technology. Both act against the interest of their child and perhaps just as in the case of vaccines deserve moral condemnation. In fact, vaccines are just a form of enhancement.

The 'discrimination-objection' further requires the possibility of distinguishing between the enhanced and unenhanced. With the new technology CRISPR/Cas9 it is, however, impossible to find out which genes were altered or edited [4]. The unenhanced might not even know that they have not received enhancements. Even if there won't be blatantly obvious discrimination of the unenhanced, we may argue that there will be discrimination in competition like work, because the unenhanced might on average simply be less efficient. The discrimination then would be based however, on differences in skill rather than a naïve enhanced/unenhanced distinction. But first such a treatment does already take place and is generally not regarded as discrimination. If some parents are able to afford a better or further education for their children, e.g. tutoring, we neither prohibit such practices nor are we able to provide good counter-arguments for parents who insist that they are obligated to provide their children with the means to get ahead. Most political philosophers take it as the task of the state to make education accessible to those who would otherwise not be able to afford it, including perhaps tutoring. Rather than denying the parental obligation of enhancing one's children, the 'discrimination-objection' provides a very good argument for an egalitarian policy making genetic enhancements available to all.

Savulescu accepts that some enhancements might make the individual better off, but harm the rest, e.g. by making someone manipulative or cunning [12; p. 287]. For example parents might choose to alter the DNA of their child in a way that makes them more cunning. Resulting in "him" being better off, while the overall/average welfare decreases. However, that argument can simply be taken in the opposite direction. We might want to alter the DNA of embryos that will expectedly lead

them to have worse lives, but will benefit the overall/average welfare. This of course would also be an issue for the PPB. One cannot hold this view and simultaneously be in favor of the PPB. Though the argument might successfully undermine the PPB, a defense of said principle exceeds the scope of this paper. For a defense of the PPB I suggest the work of Savulescu [10, 11, 12]. Even so, this might be an issue for the state that should enforce restrictions, while parents are primarily concerned with the welfare of their own child. The effects of one particular enhancement on the overall/average welfare of society must in the eyes of parents seem negligible. These arguments are usually stated in a much broader sense, i.e. the availability of the technology itself. In fact, even with restrictions on the technology the underlying parental obligation doesn't cease to exist. If the state is justified or obligated to stop such genetic enhancements as a whole, be it by appealing to equality, freedom or overall/average welfare, it is an open question whether that actually frees parents from their obligation to genetically enhance their embryos. There are several reasons to think that a prohibition of genetic enhancements by the state doesn't free parents from their obligation. First, it would be over demanding to ask from parents to act against the best interest of their child on grounds of marginal effects on the overall/average welfare in the society. Second, it would be an incompatible view with the PPB, as parents specifically have to aim for the best possible life. Third, even when means to genetically enhance are not available, this doesn't mean that in case the genetic enhancements were available, there would be no obligation to apply them.

5 Conclusion

To conclude, objections against genetic enhancements not weighing their costs against their benefits must fail against the backdrop of the CP. Of course maybe the PPB, thus premise (1) or the CP, thus premise (3) is false, but the aim of this paper is to establish that the parental obligation to genetically enhance their children logically follows once the PPB and the CP are accepted. The 'slippery slope' is genuine. Objections trying to establish that the individual costs outweigh the benefits of the targeted agent, seemed to be more successful. However, a genetic alteration that is not expected to lead to the creation of a being with higher welfare cannot be called an enhancement in the welfarist sense. Merely showing than that an enhancement in the sense of increasing some capacity is contrary to the welfare of the child does not undermine the argument

provided in this paper as it precisely rests on the welfaristdefinition of enhancement. However, these cases might provide us with a valid argument against exceedingly strong optimism in discovering *all-purpose goods*. Having explored the potential differences in the PPB and the parental obligation to genetically enhance their children in section 4, I conclude that even though they do not share exactly the same consequences, the differences between them do not justify a different moral standing, i.e. their obligatoriness. With the additional premise of lacking relevant moral differences between the consequences of the two procedures, we have successfully defended the conclusion (5). That is to say, those who accept the PPB and the CP must bite the bullet and accept that parents have the obligation to genetically enhance their embryos. As a consequentialist Julian Savulescu should have no problem of doing so.

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