Articles

Genome Editing for Involuntary Moral Enhancement

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Abstract: During the previous years, voluntary moral bioenhancement (VMBE) has been contrasted to compulsory moral bioenhancement (CMBE). In this paper a third possible type of moral bioenhancement is discussed: genome editing for moral enhancement of the unborn that is neither voluntary nor compulsory, but involuntary. Involuntary moral bioenhancement (IMBE) might engineer people who will be more moral than they otherwise would have been. The possibilities of genome editing aimed at moral enhancement of our offspring is assessed. It is argued that genome editing might have the potential to engineer our offspring in three domains: to be more empathetic, to be less violently aggressive, and to have a higher potential for complex moral reflection. Genome editing is discussed in these three domains, and a proposal made that a combination of VMBE and IMBE might be the best option humans have to become better.

Keywords: genome editing; involuntary moral bioenhancement; voluntary moral bioenhancement; compulsory moral bioenhancement; empathy; violent aggression; moral reflection; freedom

Potential Targets of Involuntary Moral Bioenhancement by Genome Editing

Has genome editing the potential of morally bioenhancing humans? I will argue that there are at least three domains in which it *might* have such a potential: a strengthening of empathy; an attenuation of violent aggression; and an improvement of cognitive capacities, including moral reflection. Possible targets of such interventions include the unborn. I will discuss genome editing in the three domains, calling this type of moral enhancement "involuntary moral bioenhancement." The meaning of "involuntary moral enhancement" (IMBE) used in this paper refers to those moral enhancements that are neither mandated by the state nor intentional from the perspective of the subject of moral enhancement.

Empathy

It is not a novel hypothesis that genes have an impact on empathy. In 2009, in the first gene study of its kind, scientists from the University of Cambridge identified 27 genes associated with Asperger syndrome and/or autistic traits and/or empathy.[1] However, these findings appear to be only an indication of later discoveries. In 2018, Varun Warrier et al. provided strong evidence that the ability to detect and understand emotions in others is influenced by our genes. Reading, understanding, and responding to emotions in others is essential for social interactions, and these abilities are indeed influenced by genetics, as the mentioned study shows. It is reasonable to hypothesize that we will be able to develop genetic interventions with the potential to strengthen our empathy. Genome editing is an obvious candidate for such an intervention.

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Participants in the Warrier et al. study completed a "reading the mind in the eyes test," in which they were shown images of the area around the eyes of individuals.[2] The subjects were asked to identify the person's emotions, thus demonstrating their ability to assess, understand, and appreciate another person's mental state. Scientists have been seeking polymorphisms within the genome that can be traced to this ability—to read the emotions of others. Essential for the argument in this paper was the role of the discovery of the *LRRN1* (leucine rich neuronal 1) gene present on chromosome 3. This gene is primarily expressed in the striatum, an area of the brain associated with cognitive empathy. Brain scans provide tentative evidence for the hypothesis that this part of the brain may have a role in empathy. The fact that *LRRN1* is prominent in women suggests that there is a correlation between this gene and their empathy—a correlation proven to be absent in men. The "reading the mind in the eyes test" substantiated the finding of greater empathy in women than in men.[3]

Warrier's is the first study that correlates measures of empathy with variation in the human genome.[4] The reliability of previous research to assess this correlation has sometimes been questioned because of small sample sizes. However, the Warrier et al. findings analyzed data from more than 89,000 individuals worldwide, and the study's results are reliable in that respect.[5] It is therefore likely that genetic interventions in the unborn, including genome editing, might have the potential to develop individuals with a higher level of empathy than they otherwise would have had. Hence, IMBE by genome editing has the potential to strengthen empathy.

Violent Aggression

During the previous years, in several prominent murder cases in the United States and Europe, courts have permitted defendants to be tested for the presence of the so-called "warrior gene," and allowed positive results to be considered as a mitigating factor. The gene in question is the neurotransmitter-metabolizing enzyme monoamine oxidase A, abbreviated "MAOA." Abnormalities have been found in brain-imaging scans and in five genes that have been linked to violent behavior—including the gene encoding MAOA.

Avshalom Caspi et al. found low levels of MAOA expression to be associated with aggressiveness and criminal conduct of young male adults raised in abusive environments.[6] They studied a large sample of boys from birth to adulthood in order to assess why a number of children develop antisocial problems, while others do not. It was MAOA that was found to moderate the effect of maltreatment. Abused children with a genotype conferring high levels of MAOA expression turned out to be less likely to develop antisocial behavior. The findings of this study demonstrate that genotypes can moderate children's responses to abuse.

In light of these findings, it is not surprising that in 2009 an Italian court reduced the sentence given to a convicted murderer by one year because it explained his violent behavior by genetic factors. That was the first time that behavioral genetics affected a sentence passed by a European court. In 2010, a murderer in the United States, Bradley Waldroup, avoided the death sentence because of the same genetic reasons. As his attorney explained, "His genetic makeup, combined with his history of child abuse, together created a vulnerability that he would be a violent adult."[7]

However, a note of caution would be in order. Predictions of individual behavior on the basis of statistical data applying to groups is potentially flawed. The flaws of neuroprediction reside largely in the "group-to-individual problem" (also abbreviated

as the "G2I problem"). This problem is rooted in a key difference between the aims of science and the aims of law. Although science focuses on universal phenomena, averaging data across groups of individuals, law is oriented toward specific individuals. Neuroprediction assumes that scientific data ought to be individualized. However, if a study finds that a certain allele in gene *Y* is statistically associated with violence, this finding is not a reliable predictor of the likelihood of violent behavior of *a specific* individual.

Still, the possibly wrong application of scientific data in the legal system does not compromise the finding that genes constitute part of the explanation of violent aggression. Consequently, genome editing of the unborn has the potential to attenuate violent aggression. It is therefore a possible venue for IMBE.

Moral Reflection

The quality of moral reflection depends on intelligence. However, moral reflection is not sufficient as it does not guarantee moral behavior. Empathy and absence of violent aggression are some of the dispositions that are relevant for moral behavior. But they alone are not enough, as appropriate moral reflection is needed. Moral bioenhancement (MBE) can therefore also consist of an enhancement of moral reflection, which comes down to an enhancement of our intelligence. In that sense, moral enhancement *includes* cognitive enhancement. The question that is relevant for the issue of IMBE is whether we can enhance the intelligence of the unborn.

It can be argued that the genome only provides a blueprint for the formation of the brain, while the finer details of cognitive development are subject to multifarious environmental influences. Moreover, it was believed that general intelligence is not based on single-gene genetics, but that it involves multiple genes in inheritance patterns that are still largely unknown. These genes were deemed to be beyond direct genetic control. It has also been argued that the correlation between specific parts of the genome and intelligence gives us the option to search for genome sequences in embryos and select those embryos with the desired traits, rather than to edit specific genome sequences.[8]

However, recent research conducted at the University of Edinburgh that analyzed genetic data from 20,000 people taking part in a study called "Generation Scotland" has shown that genetic mutations that harm our health may also decrease our intelligence. It appears, namely, that intelligent people have fewer genetic mutations that adversely affect their intelligence and health, rather than more mutations that make them smarter. This implies that being born with a smaller number of bad mutations could be more important to being intelligent than having many mutations that positively affect intelligence. This led scientists to argue in favor of genome editing for cognitive enhancement: editing mutations, they contend, might make people healthier and smarter at the same time.[9] As smarter people have a better capacity for moral reflection than less intelligent people, cognitive enhancement of the unborn by genome editing has the potential to morally enhance humans. That goal could be achieved by IMBE.

Contextualizing IMBE

In what way does IMBE differ from compulsory and voluntary MBE? Compulsory MBE is a program that is advocated by Ingmar Persson and Julian Savulescu.

They diagnose a disconnect between modern technologies and human morality. Human moral psychology has been adapted to life in small, cohesive societies with primeval technology, while it is unprepared for the moral challenges of a technologically advanced global society. Life in traditional society has developed a bias towards the future, as well as a bias towards smaller groups of people. As a result, people are disposed to care primarily about immediate events that are relevant to themselves and to their neighbors. They are morally unprepared to respond appropriately to the hazards that the more distant future may bring, as well as to the hardships suffered by larger groups. Consequently, they are faced with the danger of "ultimate harm" (UH), defined by Persson and Savulescu as an event or series of events that make worthwhile life forever impossible on this planet.[10]

The development of advanced scientific technology calls for a radical change in human moral dispositions. If we are to achieve restraint, promote cooperation, and develop respect for equality and other values necessary for the survival of humanity, moral enhancement is needed to ameliorate the disconnect between the limits of our moral nature and a technologically sophisticated global society. But that is precisely where the caveat ("the bootstrapping problem") is: human beings, i.e., those who need to be morally enhanced, are the ones who have to make a morally wise use of the techniques of moral enhancement.[11]

That is how Persson and Savulescu arrive at the conception of making MBE compulsory. Persson and Savulescu advocated compulsory MBE openly: if hazards with the potential of causing UH are to be controlled successfully, "effective forms of moral enhancement are our duty and ought to be mandatory.[12] In their later writings, Persson and Savulescu no longer insist on MBE as obligatory, although from much of their arguments compulsory MBE is implied.[13] For instance, the implication of the "bootstrapping problem" is either to abort MBE, or to continue to advocate compulsory MBE, or to give arguments in favor of voluntary MBE that circumvent the "bootstrapping problem," or to propose an alternative type of moral enhancement. As Persson and Savulescu have neither aborted the idea of MBE, nor have they given any reasons favoring voluntary MBE, nor have they proposed an alternative type of moral enhancement, we can deduce from this that they still are in favor of making MBE mandatory.

Adding force to a program of compulsory MBE, Savulescu and Persson introduce the conception of the "God machine."[14] This device is imagined as a brain implant that "deletes" thoughts that are "grossly immoral." It is a mechanism designed to *impose* morally laudable behavior. Hence, it is entirely in line with a program of CMBE. It is left to individuals to decide for themselves whether they want to be connected to this device. In that regard, it might appear to be respectful of our free will. But such an impression is misleading. Unlike medication for MBE that we may decide to take or stop taking (precluding addiction), once connected, the "God machine" hijacks our free will (or what we believe is our free will).[15] This device is charged with policing our thoughts in order to keep us away from acting immorally. Unlike God from the Judeo-Christian and Islamic traditions who keeps our free will intact, the "God machine" more closely resembles a "police machine" rather than a traditional deity.

There is also no doubt that the "God machine" would be disinclined to accept our decision to disconnect ourselves from it, because it would consider such a decision to be conducive to what it deems to be immoral behavior. Hence, the outcomes of our voluntary decision to take MBE medication and our voluntary decision to connect to the "God machine" are very different. In the first case,

our free will remains intact (unless, again, we become addicted to the MBE drug we have been administered), while in the second case our free will is being lost.

According to Persson and Savulescu, morality has four essential features:

1) It is determined by its consequences.
2) The primary consequence to which it aspires is survival of the greatest number of humans, the human species, and worthwhile life on this planet in general.
3) Since we have to become better (to become morally enhanced) in order to lower the likelihood of UH, morality is an instrumental value.
4) As the prevention of UH is essential for the survival of humanity, and as Persson and Savulescu are willing to subject all people to CMBE in order to achieve UH,[16] human freedom is diminished and the role of moral reflection rendered practically superfluous.[17,18]

Tom Douglas defines moral enhancement as follows: "A person morally enhances herself if she alters herself in a way that may reasonably be expected to result in her having morally better future motives, taken in sum, than she would otherwise have had."[19] He argues that direct modulation of emotions is something that ought to be pursued in order to morally enhance humans. Examples of moral enhancement Douglas has in mind include a reduction of dislike of certain racial groups as well a lessening of impulsive violent aggression.[20] As an enhancement of morally relevant motivations can have a positive impact on behavior (e.g., less biased behavior towards other races or ethnic groups, less violently aggressive behavior), Douglas' position goes in the direction of an understanding of how to improve not only moral comprehension but, very rightly so, also the morality of behavior.[21]

The approach to MBE that Douglas proposes has been criticized by John Harris, who claims that means of MBE are rather ineffective. Moreover, direct modulation of emotions would come at an unacceptable cost to our freedom. In fact, we might end up modulating emotions in ways that actually lead to moral decline.[22] John Harris is not only against mandatory moral enhancement, but he suggests that even voluntary MBE based on direct modulation of emotions could be detrimental to our freedom.[23]

In response to Harris's position that MBE comes at an unacceptable cost to our freedom, it could be argued that as long as we decide ourselves whether or not to undergo MBE, our freedom remains fully intact. In that sense, Harris's criticism of MBE affects only CMBE, not VMBE. Moreover, if humans are being prevented from using the possibility of undergoing MBE, their freedom will be curtailed. The fact that they would be able to decide for themselves whether to use means of MBE that will make them unfree, even permanently unfree, does not imply that they must be prevented from having the choice of giving up their freedom. They have similar choices already. For example, they can decide to bring into power a totalitarian, even tyrannical regime. The history of humanity shows that humans have on certain occasions decided to do that. Furthermore, humans have the possibility to inflict various other sorts of harm upon themselves, up to taking away their own lives. Suicide is an option people have and, if successful, has a permanent effect. Still, that does not imply that they are less free if they can commit suicide and, in losing their lives, lose their freedom forever. On the contrary, this option gives them more freedom. Similarly, VMBE does not infringe upon their freedom, even if they have the option of using it in a way that makes them unfree,

even permanently. To have the option of MBE can make an individual only more free than if she were without it, irrespective of how she will use this freedom.

What unites my arguments directed to Persson and Savulescu on one hand and to Harris on the other, albeit in different ways, is the issue of freedom. By advocating CMBE, Persson and Savulescu diminish our freedom to decide for ourselves how moral we will be and what cost to our freedom we are willing to pay in order to safeguard our security. Harris, on the other hand, diminishes our freedom by leaving us without the option to embark on the path of MBE. In contrast, VMBE respects both aspects of freedom that Persson, Savulescu, and Harris, respectively, neglect.[24]

I have argued elsewhere that VMBE maintains our freedom (of the will) intact and that it is to be preferred to CMBE and the view that proposes "survival-at-any-cost bias."[25] In that sense, VMBE clearly departs from features 2 and 4 in the position advocated by Persson and Savulescu. By making MBE compulsory in order to lower the likelihood of UH, humans would be deprived of their freedom of the will.[26] Depriving humans of this freedom would mean to take away something that is essential for their existence as moral beings. As morality is an essential disposition of humans, depriving us of it, or even diminishing it, would imply depriving us of a central feature of our humanness. In actual fact, although CMBE is intended to avoid UH, it already inflicts a degree of UH by depriving us of an essential human quality. It does so because it aspires to safeguard the survival of humanity at *any* cost.

Moreover, if MBE were made mandatory, moral reflection would lose its role. We would still be able to think about moral issues, but any "grossly immoral" thought would be deleted by the "God machine." Our thoughts would be censored, thus diminishing our freedom of will, and a free will that is diminished by an external censor leaves us with no freedom of will at all.[27] Moreover, if we are free to reflect on moral issues but not to act in line with how we will our actions (or could have willed them, had not the "God machine" intervened), our moral reflection becomes superfluous.[28]

The conception of VMBE can be criticized, however, by arguing that those who are disinclined to behave more morally will also be disinclined to take medication to that effect. Against this argument I have raised the possibility of people opting for MBE because they understand that moral behavior is conducive to happiness (i.e., that morality and happiness operate in a circularly supportive fashion),[29] and because they understand that their weak will to become more moral can be addressed by MBE.[30] However, in this paper I am introducing an alternative to the VMBE position: involuntary moral bioenhancement—IMBE.

IMBE consists of interventions that affect the unborn and are therefore neither compulsory nor voluntary. Parents can decide whether they would like to genetically engineer their offspring by enhancing their morality. One such possibility is genome editing of the unborn. This can consist of genome editing of the embryo that does not intervene in the germ line, but it can also consist of germ-line genome editing. Germ-line genome editing opens up a variety of moral issues that go beyond the confines of this paper and will not be discussed here. It suffices to note that genome editing for moral enhancement of the unborn can affect the embryo but also the germ line.

The prospects of genome editing for moral enhancement affecting our empathy (by enhancing it), our violent aggression (by attenuating it), and our moral reflection (by improving it) are possibilities bioethicists should investigate. If such possibilities

turn out to be realistic, VMBE is not the only alternative to compulsory MBE. Genome editing for moral enhancement does not subject an individual to compulsion, as there is no individual yet who can take decisions. Parents would be free to make the decision. It is also no voluntary act of an individual, for the same reason: because there is not yet an individual who can take decisions. Those are also precisely the reasons for calling such an intervention *involuntary* MBE.

The pitfalls of CMBE are that it infringes upon our freedom and that it radically weakens moral reflection; its advantage is that it may lower the likelihood of UH. IMBE does not diminish the freedom of any individual, nor does it make moral reflection practically superfluous: as future genome edited individuals will fully retain their freedom, their moral reflection will be kept intact. If genome editing for moral enhancement engineers morally enhanced individuals, the likelihood of UH might also become lower. Hence, IMBE combines the advantages of VMBE (freedom and moral reflection would remain uncompromised) with the advantage of CMBE (our offspring would be less likely to cause UH). The domains in which it currently appears to have the potential of success are genome editing designed to increase empathy; to attenuate violent aggression; and to improve cognitive functioning, including moral reflection.

VMBE and IMBE in Combination

A complete program of MBE could consist of a combination of VMBE and IMBE of the unborn. VMBE would be directed toward individuals who have the capacity to comprehend morality. They could decide to morally bioenhance themselves. The positive correlation between morality and happiness might motivate them to do so,[31] and the state could offer positive incentives to that effect.[32]

IMBE would target the unborn, possibly by genome editing for moral enhancement in the domains of empathy, violent aggression and moral reflection. It can target not only the unborn individual, but also the germ line. Moreover, IMBE would reduce the impact of the "bootstrapping problem." MBE of the unborn would bring into being morally enhanced humans; consequently, the issue of the morally unenhanced deciding to subject themselves *voluntarily* to MBE would apparently cease to figure prominently.[33]

A combined VMBE-IMBE program would offer humans the possibility of embarking upon MBE, while at the same time leaving their freedom intact to decide otherwise. It is to be expected that humans will become increasingly inclined to opt for MBE targeting both themselves and their offspring. In the first case, the more people learn about the positive correlation between morality and happiness, the more people are likely to choose MBE. I propose that an essential ingredient of moral education should consist of teaching the citizenry about this correlation, as well as about the usefulness of MBE for contributing to their happiness.

In the second case, parents who opt for IMBE of their offspring might have morally enhanced children. These children can reasonably be expected to be happier than they otherwise would have been. Moreover, they can reasonably be expected to be more moral (e.g., more empathetic) in relation to their parents than they otherwise would have been. This might incentivize parents to opt for IMBE. They also have a moral right to do so out of respect for the conception of procreative beneficence and because they have a legitimate interest in providing their children with the best options in life, including the option of a (morally) good life.

Notes

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3. Ibid.
4. Ibid.
5. Ibid.
6. Caspi A, McClay J, Moffitt T, Mill J, Martin J, Craig I, et al. Role of genotype in the cycle of violence in maltreated children. *Science* 2002;297:851–4.
7. Bradley BB. Can your genes make you a murderer? *Morning Edition*. National Public Radio; 2010; available at https://www.npr.org/templates/story/story.php?storyId=128043329 (last accessed 9 Nov 2017).
8. See Bhavsar NC. Futurism. *Gene Editing Could Make You Smarter*; available at https://futurism.com/is-genetically-improved-intelligence-possible/ (last accessed 14 Nov 2017).
9. See Hill WD, Arslan RC, Xia C, Luciano M, Amador C, Navarro P, et al. BioRxiv. *Genomic Analysis of Family Data Reveals Additional Genetic Effects on Intelligence and Personality*; available at https://www.biorxiv.org/content/early/2017/06/05/106203.full.pdf+html (last accessed 14 Nov 2017) and Page LM. New Scientist. *DNA Variants That Are Bad for Health May Also Make You Stupid*; available at https://www.newscientist.com/article/2137926-dna-variants-that-are-bad-for-health-may-also-make-you-stupid/?cn=bWVudGlvbg%3D%3D (last accessed 14 Nov 2017).
10. Persson I, Savulescu J. The perils of cognitive enhancement and the urgent imperative to enhance the moral character of humanity. *Journal of Applied Philosophy* 2008;25:162–77, at 74.
11. Persson I, Savulescu J. The turn for ultimate harm: A reply to Fenton. *Journal of Medical Ethics* 2011; 27(7):441–4.
12. See note 10, Persson I, Savulescu J, at 174.
13. Savulescu J, Persson I. Moral enhancement, freedom and the God machine. *The Monist* 2012; 95(3):399–421.
14. Ibid.
15. For arguments advocating the notion that decisions might take place before we become aware of them, see Libet B, Gleason C, Wright E, Pearl D. Time of conscious intention to act in relation to onset of cerebral activity (readiness-potential). The unconscious initiation of a freely voluntary act. *Brain* 1983;106:623–42. This finding is sometimes used as an argument against the existence of a free will.
16. Persson I, Savulescu J. The perils of cognitive enhancement and the urgent imperative to enhance the moral character of humanity. *Journal of Applied Philosophy* 2008;25:162–77, at 74.
17. "Practical" is used here as an antonym of "theoretical." The meaning of "practically superfluous" comes close to "functionally superfluous." It denotes something that is inoperative.
18. Rakić V. Compulsory administration of oxytocin does not result in genuine moral enhancement. *Medicine Health Care and Philosophy* 2017;20(3):291–97. Rakić V. Moral bioenhancement and free will: Continuing the debate. *Cambridge Quarterly of Healthcare Ethics* 2017;26(3):384–93.
19. Douglas T. Moral enhancement. *Journal of Applied Philosophy* 2008;25(3):228–45, at 229.
20. Ibid., at 231.
21. The gap between how we believe we ought to act (moral cognition) and how we actually act (moral behavior) I called the "comprehension-motivation gap" (see Rakić V. The issues of freedom and happiness in moral bioenhancement: Continuing the debate with a reply to Harris Wiseman. *Journal of Bioethical Inquiry* 2017;14(4):469–74.
22. For Douglas' reply to John Harris, see Douglas T. Moral enhancement via direct emotion modulation: A reply to John Harris. *Bioethics* 2013;27(3):160–8.
23. Harris J. Moral enhancement and freedom. *Bioethics* 2010;25(2):102–11.
24. VMBE also affects our freedom, but in ways that still permit us to take credit for moral choices. Some choices available to people in advance of VMBE might be unavailable after they embark upon VMBE, but these people still deserve credit. Their position is in a certain sense analogous to that of alcoholics who decide to destroy all alcohol in their home. After they remove alcoholic beverages and can no longer choose to drink they do not deserve credit for no longer drinking; however, they do deserve credit for deciding to make it impossible to drink. I am thankful to Nick Agar for making this analogy.

25. Rakić V. Voluntary moral enhancement and the survival-at-any-cost bias. *Journal of Medical Ethics* 2014;40(4):246–50.
26. Rakić V. Compulsory administration of oxytocin does not result in genuine moral enhancement. *Medicine Health Care and Philosophy* 2017;20(3):291–97; Rakić V. Moral bioenhancement and free will: Continuing the debate. *Cambridge Quarterly of Healthcare Ethics* 2017;26(3):384–93; Rakić V, Wiseman H. Different games of moral bioenhancement. *Bioethics* 2018;31(2):103–10.
27. Rakić V. Moral Bioenhancement and Free Will: Continuing the Debate. *Cambridge Quarterly of Healthcare Ethics* 2017;26(3):384–93
28. Rakić V. Compulsory administration of oxytocin does not result in genuine moral enhancement. *Medicine Health Care and Philosophy* 2017;20(3):291–7; Rakić V, Wiseman H. Different games of moral bioenhancement. *Bioethics* 2018;31(2):103–10.
29. Rakić V, Wiseman H. Different games of moral bioenhancement. *Bioethics* 2018;31(2):103–10; Rakić V. The issues of freedom and happiness in moral bioenhancement: Continuing the debate with a reply to Harris Wiseman. *Journal of Bioethical Inquiry* 2017;14(4):469–74.
30. The role of moral behavior (and MBE) in the enhancement of happiness can, to a certain extent, be in line with features 1 and 3 of the conception of morality that is being promoted by Persson and Savulescu. Happiness can be understood as a consequence of morally appropriate behavior (and MBE), while such behavior (and MBE) has an instrumental value for the enhancement of happiness. However, in the position of Persson and Savulescu is UH prevention that is designed to be a consequence of MBE, while MBE is an instrument leading to UH prevention.
31. Sheldon MK, Lyubomirsky S. Achieving sustainable new happiness: Prospects, practices, and prescriptions. In: Linley A, Joseph S, eds. *Positive Psychology in Practice*. Hoboken, NJ: John Wiley & Sons; 2014:127–45; Dunn EW, Aknin LB, Norton MI. Spending money on others promotes happiness. *Science* 2008;319:1687–8; Isen AM, Levin PF. Effect of feeling good on helping: Cookies and kindness. *Journal of Personality and Social Psychology* 1972;21(3):384–8.
32. Rakić V. The issues of freedom and happiness in moral bioenhancement: Continuing the debate with a reply to Harris Wiseman. *Journal of Bioethical Inquiry* 2017;14(4):469–74.
33. It is possible to argue that the "bootstrapping problem" wouldn't be entirely eliminated, as parents who would reject VMBE for themselves might be inclined to reject IMBE for their children, offering analogous reasons. My reply to this argument is that parents might be more willing to subject their future children to IMBE than to accept MBE for themselves—for two reasons. First, by employing IMBE they wouldn't deprive their children of anything, including a free will or even the right to informed consent, because these children wouldn't exist yet. Second, parents might have a very personal interest to have morally enhanced children: these children would presumably be more inclined to care for their parents in their old days than morally unenhanced children.