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REVIEW ARTICLE; BOOK REVIEW

Arguments for and against Germline Intervention: A Critical Review of Ronald Green's *Babies by Design*

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Abstract: *It seems certain that one day we will allow the genetic technology which will enhance our offspring. A highly effective new tool, called CRISPR, which allows for carving out genes, is already being used to edit the genomes of animals. In July 2017, the FDA legalized that germline drugs for therapeutic purposes could be sold in the market. It is a high time, now, that we need engage in discussions about the ethics of germline intervention. To contribute to the discussion by showing our thought and to educate the public, we write this paper.*

Keywords: *Germline intervention, genetic technology, the President's Council on Bioethics, John Rawls, bio-conservatism, bio-liberalism.*

INTRODUCTION

This paper has a three-fold aim. First, the paper is a critical review of Ronald M. Green's *Babies by Design* (Yale University Press, 2007). Ronald Green is Eunice and Julian Cohen Professor Emeritus for the Study of Ethics and Human Values at Dartmouth College and the former Director of Office of Genome Ethics at the National Human Genome Research Institute. The second aim of this essay is to show our own view on the issue. We argue that the moderate bio-liberal proposals that Green makes in his book is the only, ironically, "conservative position" we can practically have here and now, though we evaluate that the premises Green has provided throughout the book does not support his recommended proposition. We find the most serious weakness of Green's thesis to be the fallacy of non-sequitur. Last, we wish that this paper could be a comprehensive guide to those who are new to the field, ethics of germline intervention – that is, ethical issues concerning the germline treatment or enhancement which may permanently alter the genetic makeup of future generation. In this paper, we use the reports made by the President's Council on Bioethics, the George Bush Administration's bioethics council, as representative of bio-conservatives' position, while letting Ronald Green, whom we think is the best defender of bio-liberalism, respond to the council. We believe that medical researchers, graduate students, and clinicians would particularly benefit from this paper.

Readers may wonder why we, the authors of this paper, pay attention to the decade-old work of Green's, when genetic technology is changing so fast and so many brand-new books and journal articles on the topic are pouring into the field. It is true that the pace of change in genetic engineering is overwhelming and bioethicists continue to write about the shift. But the key ethical themes and arguments have not been changed at all for the past decades; in fact, it is very difficult to change because ethical arguments have timeless features. The best arguments that oppose the germline intervention were made by the President's Council on Bioethics, *Human Cloning and Human Dignity* (2002) and *Beyond Therapy* (2003). The formidable arguments against the council appeared rather immediately. A collection of essays written predominantly by the liberal-minded scholars, *A Companion to Genethics*, edited by Justine Burley and John Harris, was published in 2004 (Wiley Publishing). A few years later, John Harris'

Enhancing Evolution (Princeton University Press, 2007) and Johnathan Glover's *Choosing Children* (Oxford University Press, 2008) were published alongside Green's *Babies by Design* (2007). The current academic debates on genetic intervention, particularly germline intervention for therapy and enhancement, revolve around what has been said or dealt with in these works.

To compare Green's work with Harris' *Enhancing Evolution*, though the latter contains an elaborate exposition against the anti-enhancement position, Harris' radical claim that we, human race, have it in our power to enhance evolution and that parents have "moral duty" to give enhancement to their children throws many people off. As critics point out, Harris' notion of moral duty is strange and should be replaced with "moral permissibility."¹ And his own understanding of and strong belief in evolutionary ethics is so naïve and optimistic that he was blindsided to see the enormity of social evil existing in the world. Given that every year millions of babies and children are dying from completely preventable diseases because of lack of clean water and basic medicine, why would Harris say that a few rich parents have "moral duty" to enhance their children?

Glover in his *Choosing Children* is more moderate than Harris and makes a competent analysis of ethical dilemmas involved in germline intervention. He discusses the meaning of "disability," different parents' different concerns about their children's disability when deciding to design their babies, and what the society and parents owe to their children by removing the disabilities. However, the overall analysis in the relatively short book (128 pages) is largely made in the conceptual realm dichotomized by Kantian and utilitarian philosophies, which, we find, is narrow in the scope of the investigation, thereby making his work ill-fit to be an extensive guide on the subject.

By contrast, Green's book, first of all, is readable. The language he uses is accessible to a general readership. Second, he presents a wide range of stakeholders about the issue of genetic intervention in our society, ranging from the gene doping of sports industry through government regulations to parental interests in designing their babies. Third, he holds a moderate pro-enhancement position like Jonathan Glover. But unlike Glover, Green resorts more to common moral sense rather than a few philosophical contentions. All these features of Green's work make a great threshold guidebook for ethics of germline intervention. We hold that our project here is to produce a good comprehensive material for the study of ethical issues on germline intervention as well as useful commentary on Green's book. However, given that there have been further developments in the field of genetics since Green published the book, we will review his work against the backdrop of the current development of medical scientific technology.

FOUR TYPES OF GENETIC INTERVENTIONS

To begin, it is important to understand what type of medical interventions we are talking about when we engage in the ethical debate. As Green introduces in Chapter 3, there are four types of genetic intervention: *somatic treatment*, *germline treatment*, *somatic enhancement*, and *germline enhancement*. Somatic treatment is the only type that no one ethically objects to because, being somatic cell modification, it aims at treating disease in an existing person without changing the person's gene makeup. Accordingly, it does not change the genes of next generation and thus unproblematic with Recombinant DNA Research Advisory Committee (RAC), one of the departments of the National Institutes of Health (NIH), and with the Center for Biologics Evaluation and Research (CBER), a center controlled by the Food and Drug Administration (FDA). In the U.S., the NIH's RAC reviews and oversees proposals for human trials involving gene modifications, while the FDA's CBER regulates drugs and therapies related to the gene modifications in the market. Until recently, the governmental organizations have allowed only the first type.

The second type, germline treatment, has been controversial because, although it has a therapeutic purpose, it permanently alters the patient's genes so that its modified genes can be passed down to the person's children. However, in July 2017, the FDA has legalized selling of the genetic drugs for germline treatment targeting on a type of leukemia.² While the researchers and drug companies have engaged in fierce competition since then, the overwhelming oppositions from bio-conservatives have been pouring onto the airwaves, print, and online.

The third type, somatic enhancement, is considered problematic by many because, though it does not alter an individual's genes, it provides added benefits to the individual who is otherwise normal. Some typical examples for this would be the creation of superathletes, the issue of gene-doping, or the manufacturing of supersoldiers, etc. It is possible that in the future the somatic gene enhancement becomes legal in the professional sport though it is unlikely to happen in amateur sport, for the former is considered an entertainment. On the other hand, enhancing soldiers' combat abilities to a certain extent by the somatic gene enhancement is likely to happen in the future, but creating a fuller sense of supersoldiers may not occur. Given that artificial

¹ Iain Brassington, "Enhancing Evolution and *Enhancing Evolution*," *Bioethics* 24 no. 8 (2010), 395 [395-402] doi:10.1111/j.1467-8519.2008.01703.x

² Denise Grady, "FDA Panel Recommends Approval for Gene-Altering Leukemia Treatment," *The New York Times*, July 12, 2017, accessed July 20, 2017, <https://www.nytimes.com/2017/07/12/health/fda-novartis-leukemia-gene-medicine.html>.

intelligence technology is making a rapid progress, it will be cheaper as well as legally and ethically much more unproblematic to manufacturer superrobots with AI.

The last type, germline enhancement, is deemed the most controversial of all because it seeks to benefit a perfectly normal individual as well as, like germline treatment, involves the permanent gene alteration of the next generations. Although this paper deals with all four types in general, we pay particular attention to the second and last types (i.e., germline therapy and enhancement), the interventions to be made in germline cells (sex cells), that permanently alter genic makeups of future generation, because we have relatively a unilateral social consensus on what to do with the first and third types.

RONALD GREEN'S ARGUMENTS FOR GERMLINE INTERVENTION IN *BABIES BY DESIGN*

We introduce here Green's arguments shown in his *Babies by Design* in detail. Methodologically, the book allows the fictional media to give examples of the positives and negatives of gene enhancement and draws on scientists and ethicists to help explain both sides to the gene enhancement. As mentioned above, Green is not an extremist in two opposite ends (i.e., gene antagonists and gene enthusiasts) though he is more disposed than opposed to the gene enhancement and thus belongs to the bio-liberal camp as opposed to the bio-conservative. He understands that in our society there are fears to genetic modification which include the fear of a greater separation between the haves and have-nots, apocalypses that could occur from the insertion of malfunctional genes, and social and familial disturbances related to it. However, despite all the worries and scary scenarios, he thinks that the reluctance to change is an obstacle for the future of humans and thus that we should move to legalize genetic therapy and enhancement.

Throughout the book, Green is highly critical of what social scientists call the "status quo bias" and proposes to overcome it. He says that we humans "tend to resist change and favor the status quo" and that the bias is prevalent in the conservative religious people's resistance. He also argues that this bias couples with the bio-conservatives' mistaken assumption that "the human genome in its present form represents the highest expression of human biological possibility."³ In other words, our biological nature has advanced as far as it can go, so we do not need more advance.

As a firm believer of evolutionary biology, Green asserts the idea of human nature in evolutionary continuum and progress, which is open to numerous possibilities. He states that human genome "has continued to evolve rapidly beyond the appearance of anatomically modern human beings about 200,000 years ago."⁴ We are the genetic product that the Nature has produced over a long period of time, and the gene modification occurred according to the dictates of the Nature. We were, once, passive recipients of the change. However, we are now, for the first time in human history, the active cause of gene alteration. In sum, our genes change and evolve anyway, so there are no convincing reasons that we must not be in control of our own genes. Thus, it is important, Green argues, to talk about genetic manipulations and the use of technology in a manner of benefitting us like preventing disease and enhancing human life.⁵ In the following, we will articulate Green's arguments in detail.

Chapter 1 "Creating the Superathlete."

In this chapter, Green discusses issues concerning genetically enhancing human performance in athletes. Drawing on Kevin Joseph's novel *The Champion Maker* (2003), Green explores the nature of modern sport as a business entity, the athletes' heightened competitiveness and willingness to take risks to succeed athletically, the abnormal tools that athletes already use to enhance their abilities, such as technological enhancement (special suits and training machines), dietary enhancement (prepared by nutritionists and cooks), chemical enhancements (drugs that athletes use including steroids). Then, he questions: Would gene enhancements only make the game fairer because legalizing gene enhancements would make no single person better off, given that the athlete's native ability which the individual is born with is the main determinant of athletic success?

However, he shows a reservation for the following reasons. First, just like the case of chemical enhancement, there are safety as well as control issues. Since athletes are tempted to use to excess anything that gives them an edge, we cannot control its abuse and thus it is not safe. Second, no one will be better off while everyone's risk is heightened. Last, it will fundamentally change the nature of sport itself. Olympic gold and boxing champion will be determined not by the natural talent combined with hard-work of the individual athlete, but by scientists. In the end, there will be no sport but science. Green does not make a clear conclusion but ends the chapter with an emphasis on the unfair nature of sport. Sport is the province of genetic elite and thus not a fair game from the beginning because life's genetic lottery decides who would become a winner or loser. But he revisits this issue and shows his position on this briefly in Chapter 6.

³ Ronald Green, *Babies by Design* (Yale University Press: New Haven, 2009), 9.

⁴ *Ibid.*, 13.

⁵ *Ibid.*, 13-16.

Chapter 3 “Drawing Lines.”

Chapter 2 “How Will We Do It?” focuses largely on scientific aspects of the issues ranging from Mario Capecchi’s tool of using homologous recombination to works of Mark Hughes, the pioneer in the selection technology of preimplantation genetic diagnosis (PGD) and in vitro fertilization (IVF). Thus, there are no ethical issues there. Moving to the next chapter, “Drawing Lines,” it discusses where we, as a society, stand or should stand ethically. As introduced above, Green addresses in this chapter the four types of gene modifications: somatic treatment, germline treatment, somatic enhancement, and germline enhancement. Then, in the end, he argues that it is problematic to draw the line between the treatment and enhancement in a way that the former is ethically and legally permissible while the latter impermissible. There are two reasons for that: one is practical/pragmatic and the other conceptual. The practical problem is that, once therapeutic gene modifications are legalized, it is very hard to stop the expansion of its use for enhancement because, when the FDA approves a drug for a class of condition, U.S. law does not prohibit doctors from prescribing it for other purposes. Botox and Viagra are good examples. For the conceptual problem, somatic prevention using vaccines is a prime example, says Green. Vaccines are treatment in the sense they seek to cure disease, but enhancement at the same time. For almost no one is naturally immune to smallpox, measles, etc., the vaccines improve the genetic condition of an individual by altering people’s DNAs. In this way, the line between genetic therapy and enhancement collapses.

Green argues in favor of legalizing germline gene vaccines for HIV/AIDS, sickle cell disorder, and cystic fibrosis, the second type of genetic modification above. He does not find a convincing reason that eliminating the inherited defect and disease from the family line should be ethically undesirable, especially when the FDA approves of preimplantation genetic diagnosis (PGD). Green asserts that through the PGD, parents are already allowed to choose a healthy embryo to remove the defect or disease from the family line. We believe that Green must be pleased with the FDA’s decision in July 2017 to legalize the production of the therapeutic germline modification, the gene therapy for leukemia. Green also emphasizes that the germline therapy conducted in a certain form is compatible with the view of the Roman Catholics and evangelical Protestants; germline intervention conducted not in the level of embryos but of gametes (i.e., sperms and ova) should be permissible because they believe that an embryo is a human person, not a sperm or egg.

Green also weighs in on the fourth type, germline enhancement. He talks about the moralization of beauty drawing on the variety of many interesting psychological experiments. Parents treat their own children differently based on how cute or pretty they are, juries favor attractive defendants over ugly ones, teachers evaluate beautiful children’s prospects more highly than plain-looking ones, etc. In other words, people think that being beautiful is ethical. If this is the case, Green argues, it is natural for parents to wish to have children, at least, who are not ugly for themselves as well as for the children’s future. Although we do not have current technology to produce a “face-to-order,” the lab scientist through PGD can already inform the parent about the likelihood of what colors of eye, hair, skin, future height that the chosen embryo will have. In the future, the entire features of the child including intelligence will come under our control. However, we need to be very cautious of legalizing this type of gene enhancement, Green says. The primary concern is safety. We do not know what will happen despite our confidence. The second is a social justice concern. What if African American parents prefer their child with whiter skin, as Asian Americans want to “Westernize” their eyes and Jews want to fix their “Jewish nose”? After putting all the collective effort to fix social evil, we may let people flee from discrimination rather than fight for justice. Meanwhile, Green argues, legalizing the germline prevention to remove too-short-height may be less controversial because it does not concern racial prejudice and because we have almost unanimous social consensus that extreme shortness is abnormal and thus to be avoided though it may just be a problem of physical attractiveness. Obesity is an interesting case because germline therapy to treat it can be considered both prevention and pure enhancement because it is both health and appearance problem. Green also talks about longevity and enhancing intelligence as well.

However, with all this, Green puts a caution again. All gene modifications are risky. There are side effects and scientists can make mistakes. Particularly, when it comes to germline modification, an extreme caution is required, for a clinician by his or her mistake can create a new genetic defect or disease which could be passed on to the next generation.

Chapter 4 “Challenge and Risks.”

In Chapter 4, Green considers possible risks that may come along with genetic modifications. At the start, drawing Greg Bear’s short fiction “Sisters,” Green poses the question of whether our zeal to improved human qualities invites terrifying consequences. Then, he introduces a sui generis feature of human genome – that is, the human genome is of highly modular nature. [Note that genome is the sum of an organism’s entire genes which are the individual units consisting of chromosomes made of DNAs. Thus, a genome is equivalent to a person as a biological whole while genes are breakdowns of the genome] Consisting only of 25,000 genes, human genome exhibits the great variety of phenotype expressions as the genes show different forms depending on how the

parts are spliced together and produce different proteins.⁶ Also, as explained in the phenomenon known as pleiotropy, Green says, a single gene contributes to more than one trait, so a targeted change in one gene can have “beneficial effect side effects in many parts of the body but also can cause unintended harm.”⁷ For instance, an “improvement in mood can be accompanied by enhanced susceptibility in cancer.”⁸ On top of that, the external influence of environment causes the suppression or activations of some genes.

For example, 5-HTT is the gene found to be responsible for depression and bipolar; people with a short form of the gene are likely to suffer from anxiety and suicidal thought and vulnerable to stress. However, right parenting (e.g., educating to develop an innate personality or moral character) and an enhanced environment (like work environment with less stress) can help the individual overcome the psychological problem. Thus, we are the outcome of the complex and fluid modular behavior of genes which interact with significant environmental variables. Then, how could we ever permit germline modifications? Green asks.

However, he prefers modest advance rather than shunning it. What we need is weighing evil against good. Then, he talks about the conservative view of genetic modification for longevity extensively reviewed in the report by the 2003 Bush Administration’s bioethics council. The council clarifies that the scientific research should aim at enhancing life’s functionality at all levels and stages. It should not be just adding years to life. And the council advises that the research should be discouraged due to the known concerns: people with extended life will delay stepping into their parents’ shoes such as having families or producing children, there will be increased promiscuity in society, young people could see their elders blocking their career path, etc. However, Green finds this advice to be a status quo bias. He criticizes the council for the irrational fear to resist change and preference to stay in where we are. He believes that the status quo bias stems from the unjustifiable assumption that we do not need change because our biological nature has advanced as far as it can go.

Green uses the psychologists Bostrom and Ord’s reversal test to examine the council. Would it be better if we reduced the present life expectancy, 78 years, to the 1900’s standard, which is 48 years? If no, then this is a status quo bias. Green believes that the conservatives’ apprehension or fear of gene modification permeates their thought. Given that the status quo bias can prevent us from making endless advancements and improvements for us, Green emphasizes, what we need is a balanced weighing of good against evil.

He adds a social aspect or implication to the debate. Manic depression and bipolar disorder tend to run in families, and researchers are trying to find a way to eradicate the diseases in a future generation. However, there are some people who enjoy the diseases due to their known connections to creativity and psychological thrill. Some people find the produced roller-coaster moods exhilarating, and many writers and artists use them to create their works. Then, should we keep the diseases for the social benefit of retaining the artists and writers? Green says that we should understand that this powerful impulse can also produce tendency of gambling and bankruptcy along with artistic achievement in society. Green affirms, in the end, that we need a balanced weighing between foreseeable evil and good.

Chapter 5 “Guardians or Gardeners.”

Opening with Aldous Huxley’s 1932 novel *Brave New World*, Green discusses the role of parents in their child’s life and the fear that gene modification will change the organic familial culture. That is, the status of parents will be changed from guardians of love to state’s gardeners. Drawing on *Beyond Therapy*, the report by President’s Council on Bioethics, Green lays out four major reasons that the bio-conservatives believe this will be the case. First, parental love will be replaced by the parents’ critical evaluation of what features the children will have or not. Second, there will be a lack of personal freedom and self-esteem in the engineered child. Third, genetic manipulations will take away our right to make our own choices for the future. In other words, the world will be more deterministic. Last, parents will not treat their children with the same respect as if they were a person. For example, parents will confuse the person with the trait. Green answers to the criticisms by his simple motto: “Parental Love Almost Always Prevails” (PLAAP). He adds that, though the critics’ worries make intuitive sense, their mistake stems from lack of understanding the complexities of the real world. Scientifically, given the highly modular nature of human genome, modifying a certain DNS is not equivalent to creating a certain trait. And again, in life, parents will love their children no matter what. He gives a list examples that the parental love prevails. Parents always work for the best interest of their children, love their children born with disabilities, etc. Besides, he criticizes the council for setting up a false dichotomy between the future world of deterministic gene modification without human freedom, and the present natural world with freedom. Fundamentally, this is the status quo bias, Green says. In the end, he concludes that genetic manipulation will help parents to understand their children only better and lead them to a successful

⁶ Ibid., 86.

⁷ Ibid., 89.

⁸ Ibid.

life. In this way, the parents will be a combination of both guardians and gardeners. The parents help to direct children, but also have the right and ability to influence them based on their desires, likes, and dreams.

Chapter 6, "Will We Create a Genobility"

Borrowing the term, "genobility," that the lawyer-bioethicist, Maxwell Melhmann, coined in his 2003 book, *Wondergenes*, Green attempts to respond to two issues, i.e., social justice and its related problem of eugenics. To take up, first, the problem of social justice, he presents three main concerns of the impact of gene modification that the bio-conservatives may pose. First, the affluent will use gene modification to gain power over the poor which will produce a growing separation between the haves and the have-nots. Second, the gene modification could destroy basic respect for each other. We will see ourselves fundamentally different from each other because of the two-class system, those socially, economically, and genetically advanced, and those not. The last is a worry that focusing on gene technology here and now would create a direct negative impact on the poor. In the current situation where so many people are dying due to their lack of accessing basic medical care, we will spend an enormous amount of money in developing the genetic technology to assist those already enjoying all the social and medical privileges.

As he engages in an interesting dialogue with the world-renowned bio-conservatives, Melhmann, Michael Sandel (the Harvard philosopher and a member of the President's Council on Bioethics), and Francis Fukuyama (the Stanford professor of political science), Green takes a cue from his former teacher at Harvard, John Rawls, to dismiss the conservative worries and argue that gene modification is aligned with social justice in the Rawlsian sense. In a nutshell, the social justice that Rawls envisages is this. Life is already unfair in the sense that some are naturally born with better genetic traits, inherencies, etc., so we do not run in a race from the same starting point. If so, the best possible social justice we can obtain in any human society would be to allow its citizens to accumulate their own wealth based on their talents, skills, and money, *yet* on the rules of competition formed in a way of benefitting the most vulnerable members of the society (Rawls' Difference Principle). Green believes that the government can regulate the gene therapy and enhancement in accordance with the Difference Principle by letting the government provide everyone access to the genetic technology in a way of increasing the number of genetically enhanced people in society. In this case, Green is convinced that gene modification could actually help repair many of the social issues and minimize the separation between the haves and the have-nots. In the same vein, Green mentions how we should go about regulating sport industry. He is opposed to allowing gene enhancement for an individual athlete to win. But when every athlete's ability is enhanced in general, it will be a social asset. Nevertheless, all this will not be easy, Green admits, because people are always reluctant to give up their privileges.

About the second issue, the possibility that the idea of eugenics will arise, Green answers as follows. Although the foreseeable problem of eugenics is clearly there, first of all, the "eugenics in its bad twentieth-century form" that the Nazis propagated will not occur again. Second, the "critics tend to ignore the presence in current practices of the thing they worry about happening in the future."⁹ Selecting our own sexual mates naturally, using the currently available technologies like PGD and IVF, etc., eugenics is what we have in mind and do already. In other words, he does not see the point why people worry about the bad or not-so-ideal things that we are practicing right now would happen in the future.

Chapter 7, "Playing God,"

Green points out the status quo bias that religious believers have, i.e., the biased belief that the way we are genetically right now is the best form created by God and thus we shall not change it. Further, he ridicules the religious communities for their concern of Do-not-Play-God-with-genes. "[For] many people the risk of provoking God's anger by genetic engineering is anything but funny." "[It] is hard to see just what the prohibition on 'playing God' means and whether it makes sense."¹⁰ Green also satirically quotes Leon Kass, the former head of the President's Council on Bioethics, "[genetic interventions] are humankind's contemporary replay of the Tower of Babel episode."¹¹ Being puzzled by the 1997 telephone survey that 70% of people chose God, neither doctors nor parents, as a proper authority to control children's genetic features; Green shows a concern that even those not religious tended to share the religious people's viewpoint. But the trend is changing. The current public opinion is much more accepting of the genetic intervention while the religious authority is still recalcitrant about their position.

Green understands that the theological authority sees human genome sacred, thereby not being played with by human intervention. But he argues that there are no strong arguments or even consistency among theological authorities to explain why the human genome is sacred and why the genetic intervention should be viewed nefariously. He points out that the 2003 theological

⁹ Ibid., 164.

¹⁰ Ibid., 171, 172.

¹¹ Ibid.; Leon Kass, *The Beginning of Wisdom* (New York: Free Press, 2003), 217-243.

commission headed by Cardinal Ratzinger then (Pope Benedict XIV) approved germline treatment in sperm-producing cells. Thus, what boils down to is that the religious authority is only opposed to germline enhancement. He claims that, given now that most religious authorities (Christian, Jewish, and Muslim authorities) allow for genetic modification to prevent diseases, there are no rational reasons for them to deny genetic enhancement.

Green points out how the religious conservatives make an alliance with the environmentalist movement to say that, when human beings disturb how nature operates to satisfy shortsighted human needs, there will disaster. Then, he presents the interesting discussion between the religious-minded scientist, Dr. Hurlbut, and the secular atheist, Dr. Sweeney, about the interpretation of the workings of the Nature in terms genetic intervention. While Hurlbut sees the Nature working by the benevolent purpose of the Creator and thus not to violate its own rule, Sweeney sees the Nature just out there as the organized sum of biological and physical aggregates, devoid of any meanings, and thereby things can be done to improve. As a result, the process of aging, e.g., is natural and to be accepted in humility, for Hurlbut while, for Sweeney, it should be conquered by human efforts because the Nature does not tell us anything about it and, apparently, no one wants to age and die. Green understands the conversation occurring within a larger context of the struggle between evolutionists and creationists. For evolutionists, the human genome was created and evolved through the organic process of natural selection while creationists believe that the genomes are God's creations. Though Green is a member of the atheist evolutionist camp, he recognizes imperfections of the evolutionary theory, such as the existence of useless parts of human genome and bodies unexplainable by using the theory of natural selection. And he foresees the battle between the two opposing groups continue in the future. In the end, Green asserts that germline intervention is necessary to manipulate flaws and fix the social standards and beliefs that we constantly experience.

Chapter 8 "Choices Ahead"

In this last chapter, Green explores the tension between the governmental control on genetic modification, and the parental wishes to obtain what they want to achieve to the extent that they would travel to jurisdictions outside the government's power. He discusses the parents' desires to use the reproductive and genetic technology for purposes other than therapeutic and preventive purposes, such as sex selection, and the government authority's effort of controlling or banning the practice due to their concerns about serious imbalances in sex ratio and to the fear of slippery slope. Due to the widespread preference for boys that exists particularly in the developing nations, it is estimated that there would be "a hundred million fewer living women than would have been produced without sex selection."¹² Also, permitting sex selection may lead to testing for non-disease traits. However, Green believes that a regulation of this type is not working, as he refers to the "paradoxes of unenforceable prohibitions." "Regulations that fail to elicit widespread support not only are ineffective but also, by inviting lawbreaking, tend to aggravate the very wills they are designed to prevent."¹³ And Green provides his own moral verdict on the case by prioritizing the parental autonomy over the governmental beneficent/non-maleficent concerns. He says, "Parents' wishes are an important part of our moral equation. They have weight and should be respected so long as the child is not likely to be seriously harmed."¹⁴ He asserts that we should create a system where pluralistic and diverse voices can be heard, rather than one powerful governmental authority of oversight and restraint. In this way, parental freedom can be made responsible without subjecting them to the government's control.

Green visits some ubiquitous litigations arising from the developed countries where citizens freely access reproductive and genetic technology, particularly wrongful-birth and wrongful-life litigations, and shows his views on the cases. In the end, he makes four recommendations about what we, as a society, should do to regulate the technology. 1. Genetic interventions should always be aimed at what is in the best interest of the child. 2. Genetic interventions should almost be as safe as natural reproduction. 3. Interventions that only provide a positional advantage should be discouraged and avoided to prevent excess gene enhancement and unnecessary mistakes. 4. Genetic interventions should never reinforce discrimination.

ARGUMENTS AGAINST GERMLINE INTERVENTION: CRITIQUES OF GREEN'S ARGUMENT

Commenting on Green's arguments in general, first, we see him committing the fallacy of non-sequitur in the sense that, though we accept his moderate bio-liberal proposition as acceptable and inevitable, the premises he uses do not largely support it. Given all the terrifying data, possible risks, and uncertainty about the germline intervention Green has elaborated in the first four chapters, we wonder what rational and prudent balances he has provided for his claim that we need to move to legalize genetic intervention.

¹² Green, *Babies by Design*, 199.

¹³ *Ibid.*, 205.

¹⁴ *Ibid.*, 221.

We do not find any strong beneficial reasons in the book to overturn the harm that the use of the gene technology may bring to us, as he presents the case.

The non-sequitur occurs regionally in the text as well. For instance, in Chapter 4, Green takes the case of 5-HTT for a good instance to show that nature can be overcome by nurture, based on the scientific evidence that human genome is of highly modular nature. Then, he questions if we could ever permit germline modifications. Later in the chapter, Green talks about the relative interpretation of one's defect or disease such as manic depression/bipolar due to its known association with creativity [reminiscent of Glover's *Choosing Children*] and wonders if we need to even eradicate it from human race. But he leaves the chapter with insistence on legalizing the gene modification. In Chapter 5, he praises parental love to the extent that parents will always love their children and support them regardless of their disabilities, preferences, and edited genetic makeups. Then he uses this power of parental love to quell the bio-conservatives' fear that the gene modification will harm the family relationship and conclude that we should let the parents use the technology. But if the parental love is so noble and strong that it overcomes anything that happens to their children, why do parents need the technology at all to edit their children's DNAs? Does not Green believe that the parents already love who or what their children are, no matter what? In Chapter 8, he attends to the concerns of the various governmental authorities, i.e., the fear of slippery slope and serious imbalance in sex ratios due to parents' sex selection. But he concludes that the parental wishes should be weighed more than the government control and thus the technology should be utilized in a way of giving more power to the parents. The only reason Green provides is that the governmental control will fail. This is a practical inevitability but not moral reason to sanction it.

Second, he rightly argues that the best option to allow the genetic technology is to let everyone access it. And he is realistic about how the technology can be accessible to all, that is, increasing the most number of people benefitting from the technology in society. However, two problems exist. The first is a conceptual problem. It is not certain how this way of seeking social justice can be aligned with John Rawls' Difference Principle that Green believes it is. In other words, why does this proposal of Green's benefit the most vulnerable people in the society? Green does not answer. The second is a practical problem. Green is too naïve to argue for everyone's access to the genetic technology. Speaking in the U.S. context, we do not currently have the universal healthcare system and perhaps we never will. Compared to the other rich countries like France, Germany, Japan, South Korea, etc., the reason that it is so difficult for Americans to agree upon the universal healthcare plan is that the market capitalist value runs deep in our society. It is a general tendency that we value market distributive justice more than social justice. For us, concerning how to distribute limited medical resources, we tend to let market justice (i.e., supply and demand determine price) to respond to it. In fact, Green shows the concern in Chapter 6 that the rich will not easily give up their privileges. If so, it is rational to believe that the equal opportunity of gene therapy and enhancement for most people, if not all people, will never happen in the U.S.

Third, we wonder if Green himself has the status quo bias. Green throughout the book talks about the status quo bias as the most serious flaw of the bio-conservatives' arguments and even in some bio-liberals' argument. His focus on the status quo bias is its positive version – what has been a status quo is good or best, so we do not need to change it. However, Green seems to have the negative sense of the status quo bias. Namely, what has been a problem as a status quo will not get worse in the future, so we do not need to take care of the problem. We suspect that Green's non-sequitur, shown above, is rooted in the negative status quo bias he has. The reason that Green thinks we should move forward to the legalization of germline therapy and enhancement after presenting in detail what can go wrong in terms of unforeseeable problems, technological imperfection, human errors, etc., is because he seems to believe that the possible disaster would not happen in the future because that scale of disaster did not occur in the past. This negative status quo bias that Green has permeates throughout the book. In Chapter 6, Green dismisses the possible concern of eugenics by arguing that we should not worry about it because people are presently practicing eugenics anyway and because its worst kind that historically occurred with the Nazis and will never happen again. In Chapter 8, too, this attitude of thought repeats. The slippery slope and population sex ratio are clearly problematic. However, we should let the parents do what they like to do because we cannot stop it in the presumption that the problem will not get worse than now.

Last, Green's understanding about the formation of theological doctrines is largely mistaken. His lack of knowledge about how the religious hierarchy interacts with the scripture and cultural change to respond to social ethical issues within its directed framework of biblical hermeneutics is astounding particularly because Green has earned a Ph.D. in religious ethics at Harvard. But it is understandable because he is not a systematic theologian but bioethicist. In Chapter 7, Green attempts his own version of biblical exegesis on the Book of Genesis to figure out whether germline enhancement is theologically permissible or not and concludes that there cannot be any uniformed views arising out of the text, while introducing differing views of theologians on the text and the issue. Then, he concludes that the theological views and decisions are inconsistent if not arbitrary. However, what Green does not realize is that what he has observed is nothing but the normal process of sound intellectual moral reasoning that both secular and religious ethicists engage in.

In secular as well as religious ethics, the authority of "tradition" exists. In religious ethics, the tradition is the ecclesial hierarchy's interpretation of the scripture such as the Catholic Church's Magisterium, whereas in secular ethics the authority of

tradition is some famous scholars' theories or views like, for example, the philosopher John Rawls' theory of social justice on which Green relies. And in the both secular and religious ethics, the movements that challenge the authoritative traditions exist. As the movements or voices grow, more than one tradition of authority exists within the field. For example, despite Green's endorsement of Rawls' view of distributive social justice, the rival philosophical tradition, Robert Nozick's libertarian justice theory, shows a very different picture of what social justice is or should be. For Nozick, Rawls' understanding of the government's role in taking control of citizens' welfare by distributing and re-distributing its wealth, which enables Green to say that the government must ensure that all citizens access genetic technology, is wrong. In a just society, the government cannot take money from its citizens and redistribute. As long as one accumulates wealth by the fair game that everybody plays in the society, it is unethical for the government to interfere with the private holdings and transactions. If Nozick is right, then the government in the just society should privatize the gene therapy and enhancement market. The exact same is true for religious ethics.

While the conservative theological tradition like the Vatican authority interprets the scriptural text in a way of opposing germline intervention while the liberal theological traditions like the member organizations of the World Council of Churches (WCC) which include most mainline Protestant churches (e.g., the Lutheran, Methodist, Presbyterian, etc.) show different hermeneutical understanding of the same scriptural text in favor of the human germline intervention. In other words, the two theological camps have different applications of "Playing God" to the biblical text though they do agree that human beings should not play God with genes because the genes are sacred.

Green's argument, in general, is weak though his moderate bio-liberal view is acceptable. As a liberal thinker, he is a proponent of the liberal ideal of "big government" as opposed to the conservative notion of "small government." As shown in the final chapter, confronting the core moral dilemma, i.e., how to resolve the moral conflict between parental autonomy and governmental beneficent/non-maleficent concern, he opts for the policy to give the individual parent more freedom to access the technology and wants the government backing to ensure that every parent has the freedom to access. But he fails to show why this has to be the case, non-sequitur.

Now, we will introduce in the following the bio-conservatives' main arguments against the germline intervention. We made the list of nine arguments and let a dialogue between the bio-conservatives and Green emerge while showing our own critique of it. The arguments we present will not contain comprehensive details but can be an exhaustive list, found mostly in the well-crafted reports by the President's Council on Bioethics, *Human Cloning and Human Dignity* (2002) and *Beyond Therapy* (2003).

First, the current technology is not safe and perhaps will never be safe.

The risky nature of germline technology is two-fold. One is that the technology in and of itself is not or will never be fully developed to prevent possible dramatic disasters. When Dolly the sheep was first introduced to the world in 1997, the animal which seemed perfectly healthy suddenly got ill and died. The technology has much improved since then, but no great confidence can be given when it comes to human germline modification. The other is a human factor. Even with the greatly improved technology, a lab technician by his or her mistake can create a new genetic defect or disease which could be passed on to next generation. Green talks extensively about these issues in Chapter 4, alerting the readers to be aware of the risks, though Green proposes to thoroughly review and legalize the use of the technology rather than banning it.

Second, the consequences of abuse of the technology will be disastrous.

As related to the first problem, the abuse can be discussed in two kinds. The first is abuse by legal users. In our profit-driven market capitalist society, pharmaceutical corporations would push and lobby the government for permission to manufacture and sell their products although they were not proven to be safe or perhaps will never be proven to be safe. Once the FDA approves of the products, the genetic drugs will be used through doctors' prescriptions. However, we are all aware that the doctors, too, are influenced by their own profit-driven motives. In the U.S., the 2010's Physician Payments Sunshine Act, also known as the "Sunshine Act" (which is part of the Affordable Care Act), mandates all doctors to report their payments received from drug and medical device companies and vice versa. However, patients normally do not visit the website to figure out if their doctors' recommendations are genuinely from care for their patients or merely to sell the company's products from which they received money. In fact, there is no way for the patients to be sure about the doctors' true motives behind the treatment or enhance recommendations, for the monetary interests of the doctors, like everyone else, are mixed with a sense of care for their patients. Besides, in a country like the U.S. where patients tend to consider themselves consumers, when the doctors do not recommend the genetic drugs that the patients wish to use, the patients can always go to different doctors to get them.

Also, another important factor that contributes to the abuse by legal users is that most doctors, like everyone else, are the product or victim of occupational habit. When a certain product is approved by the FDA, the doctors just prescribe the drugs

without much thinking about its possible danger. It is a natural human tendency to trust the government body's regulatory actions unless there are reasons to distrust. The current opioid crisis in the U.S. is a good example, and the same thing can occur when genetic drugs are legalized.

The second type of abuse is by non-legal users. An extreme example can be when the manufactured drugs or the technologies fall into the hands of criminal gangs. When that happens, its disastrous consequence in the society may not need explanations. Thus, when we balance the benefits of fostering the germline technological developments and implementing its use against the foreseeable types of abuse introduced here, we must ban the research, claim the bio-conservatives.

In Chapter 4, Green touches upon the first type of abuse as he discusses the pragmatic problem of genetic enhancement drug to be available in the U.S. Once the FDA approves a drug for a class of condition, the U.S. law does not prohibit doctors from prescribing it for other purposes. Nevertheless, Green asks for progress and legalization along with prudent counsel. However, the contentions he shows here and the tone of alert he uses make us wonder if he could really be in favor of the legalization of the intervention.

Third, there is a special problem of consent.

The problem of consent labeled as “special” is the usage of the President's Council on Bioethics. It is a special problem in the sense that this type of consent is unique to germline intervention or human cloning. Of course, consent from any children to be born is impossible to obtain; no one consents to his or her own birth. However, given that the germline intervention or human cloning would potentially expose the future-born to great risks of harm, the consent from the child-to-be becomes a special kind, argues the council. On the other hand, the specialness of the consent can be seen from a different perspective. Art Caplan, the New York University bioethicist, in his review of Green's *Babies by Design*, says, “[There is an opinion that] children should get the chance to be who they want to be without having to carry the burden of their parents' genetically mediated expectations.”¹⁵ In other words, the yet-to-be-born did not consent to carry the psychological burden to satisfy the expectations of their parents.

Green responds to the first problem when he provides moral reasoning for the wrongful-life litigation in Chapter 8. He believes that it is ethically justifiable for the children born out of genetic modification to sue their doctors and even their own parents for their birth defects if they resulted from the doctor's medical malpractice or from parental act devoid of sincere regard for their children's future health and welfare. About the latter problem, Green answers in Chapter 5 that parental love will overcome the problem. He believes that the children will be all right because the parents will still love them in the event that they have not turned out to be the ones the parents expected them to be.

In our assessment, we believe that Green's reasoning to attend to the first problem is sound. Also, as Green may agree, we believe, the genetically pre-planned born (hence forth, PPB) with enhanced traits would not consent to have superior features which they themselves may greatly appreciate. But we would not think that the PPB here have a “special problem” with consent because they enjoy it. Then, why does the special problem of consent exist only in the case which may affect the PPB in harm's way or the PPB may not enjoy their features? We give a hand to the bio-liberals here.

Concerning the second problem above, Green's response is not satisfactory; he commits non-sequitur, as mentioned above. However, the bio-liberals can argue on behalf of Green as follows. In ordinary circumstances, no one wants to have children with the spouses whose genetic characteristics they abhor. We often intentionally select the partners in the hope that our children may resemble the physical and psychological features of the partners. Thus, we all carry the burden of meeting the parental expectation, *yet without knowing it*, because parents do not normally tell their children what genetic traits they wanted to see from them. The parents of PPBs, too, will not talk about their expectations to the children. Also, parents of the natural-born (henceforth NB) as well as of the PPBs, both, have chosen to enhance their offspring, respectively by selecting the sexual partners and by utilizing the available medical technology, in the hope that they can provide the best future for their children. If so, the special problem of consent in this sense loses significance.

Fourth, there are concerns of eugenics and its related effects on society.

We discussed the problem of eugenics above. But to flesh out some details, the term “eugenics” has gained a heinous reputation in our times because of the Nazi's notorious eugenics program. However, it is not only that the idea of eugenics traces back to antiquity but also that, technically speaking, the micro-sense of eugenics, an attempt to enhance our offspring's genetic traits, is what we all do when we look for our mating partners. However, the eugenics the bio-conservatives are concerned about is not the parental

¹⁵ Arthur Caplan, “Review: Babies by Design,” *New Scientist*, Feb. 20, 2008, accessed July 20, 2017, <https://www.newscientist.com/article/mg19726442-000-review-babies-by-design/>.

desire to have better children. It is a macro-concern, i.e., the ethically problematic culture may be created by the policy decision. For example, the Nazi's racial ideology of the ruling of the "Aryan Master Race" encouraged ordinary German citizens, then, to believe that the Germans were the superior race of all and that it was morally justifiable for the Germans, being the Master of human kind, to conquer the inferior race, especially the slavish kind like Jews, and even eradicate them from the earth. The policy of permitting gene modification also may create a socially nefarious culture, the social ideology in which those who are not beautiful, intelligent, and physically strong, are not wanted. Green brings out this problem in Chapter 4 with Greg Bear's "Sisters." In a future high school, the school authority will be trying to stop discrimination against its small student population of NBs because the beautiful and bright PPBs see the plain-looking and average-IQ NBs as tragic and pathetic. However, as mentioned above, Green gives terribly insufficient answers to the problem but merely repeats that the society needs to go in the direction that allows the use of the technology with great cautions. We are not sure if there can be any ethically justifiable reasons to override this problem. Thus, we reckon this problem generally concerning.

Fifth, there is a question about the moral status of human egg and zygote/embryo.

Germline modification, as well as cloning, require a large number of ova. Already in every procedure of in vitro fertilization (IVF), 7 out of 8 fertilized eggs on average are left over because the lab technician chooses only the best one out of 8-cell embryos formed in day 3. In animal experiments, several hundreds of eggs are required to have one successful cloning, although the number of eggs needed is gradually decreasing as technology improves. Also, for the on-going research performed to improve the genetic intervention technique, there should be a great number of eggs donated or purchased. Of course, some leftover eggs or zygotes/embryos will be frozen and stored. However, eventually, the unused ones will be destroyed.

For the religious conservatives in our society, the Protestant Evangelicals and the Roman Catholic conservatives, all forms of the medical technologies that involve "playing with" and "throwing away" zygotes/embryos are morally impermissible, for they are already human persons from a theological perspective; a human person is believed to be born at the moment of conception. However, Green argues that the religious conservatives may have no problems with the research done at the gamete level (i.e., sperms and eggs) because they are not persons yet. However, this view of Green's is mistaken. We will show where he makes an error in the last sub-section.

On the other hand, it should be noted that, apart from the religious interpretation of the moral status of gametes and embryos, it is our common moral guilt that prevents us from cheerfully sanctioning the free utilization of the living human sex cells. Once Stanley Hauerwas, a theologian dubbed as "America's Best Theologian," was asked by a news reporter about his thoughts on a medical ethical issue similar to our case, Hauerwas responded by giving the rhetorical question, "What if it were discovered that fetal tissue were a delicacy? Could you eat it?"¹⁶ In the same vein of thought, we raise the following questions. What if we discovered that discarded or unused eggs and zygotes/embryos were delicacies, could we eat them? What can't we legally allow top chefs in the country to create a human-embryo pasta or human-sperm stroganoff? How many of us feel completely fine with knowing the truth that the lab technicians regularly throw away the discarded or unused eggs and zygotes/embryos down the sink, if not toilet, every time their research or procedure is done? A very few of us would feel ok with it. It is the moral guilt that we share as members of human species which makes us balk at giving a unilateral endorsement for the genetics lab work.

Also, there is a legal issue because of the shared guilt. What are we going to do with the leftover extra eggs or embryos? In the case of IVF, when a few chosen embryos are successfully led to a healthy birth, there are no practical reasons to keep the extra eggs or embryos. Some "owners" pay for freezing and store them while others simply do not pay to keep them so the destiny of the unwanted eggs/embryos is at the hands of the clinic's management. However, supposedly, the so-called "universal moral guilt" may decide on what to do with the extra eggs or embryos. But as you may guess, there cannot be an overwhelming consensus that the guilt directs on this matter and thereby no easy legal decisions thereof. Therefore, we see this problem as genuine.

Sixth, there are problems of exploitation of women and just distribution of risk concerning egg donation.

Related to the fifth objection above, this is a social justice concern. Because research and procedures of germline modification, as well as human cloning, require a large number of eggs, to supply the demand, low-income women are to sell their ova in the name of "donation." This socio-economic phenomenon can be viewed as an exploitation of the economically under-privileged women. Also, given that egg donation involves risks and complications and, in the worst case, the donors may lose one or both their ovaries, the problem is escalated because only the poor women are exposed to the danger. Domestically in the U.S., the egg donors can be

¹⁶ Jonathan Merritt, "Politics, Patriotism, and Pacifism: An Interview with Stanley Hauerwas," *Religion News Service*, July 31, 2013, accessed July 20, 2017, <http://religionnews.com/2013/07/31/politics-patriotism-and-pacifism-an-interview-with-stanley-hauerwas/>

any young women who are 21 to 29 including the female college students who will use the money they receive for tuition and living expense. In developing countries, except for the few rich, any young women of similar age who wanted to boost their family income temporarily will sell their eggs to agencies working for the genetics companies of the developed world. The worst scenario will include young women who sell their eggs to feed their families, which is not an uncommon case in today's rural India.

Bio-liberals' counter-argument will be that this sense of social justice is not valid for two reasons. First, from the standpoint of the sellers and buyers' autonomous rights and the fair transaction between them, and of the market economic justice that supply and demand determine price, there is nothing unjust or unfair with the egg donation. Considering the wide advertisement shown in the year 2017 that an average egg donor in the U.S. who donate once receive about \$6,000, taking the possible risks and complications, which do not occur to every donor, seems fair. Second, if the egg donation is an exploitation, then all wage workers living in the market economic system will be considered victims of the capitalists' exploitation. Those who became regular egg donors to feed their families can be analogous to, for example, nail salon workers who inhale toxic chemicals every day, if not Alaskan crab fishermen who risk their lives to feed their families. Besides, as the technology improves, the safety concern about egg donation will greatly be reduced.

The bio-conservatives may respond as follows. Selling their own ova, and working as a nail salon worker or an Alaskan crab catcher are fundamentally different, in terms of the type of products to sell or services to provide. The egg donors are selling their own body part while the nail salon workers or fishermen do not. However, the bio-liberals can lash back like this. This reasoning of the conservatives turns the subject from social justice to something else. Second, this leads to the idea that women who sell their hairs to wig shops, the egg donors, and possibly the prostitutes (letting others use their sexual organs) belong to the same category of occupations. But our common sense tells us that egg donation, selling hair, and prostitution are all different things.

In the end, the conservatives' argument premised in this way is not as much convincing as it should be. Thus, we can argue on their behalf like this. First, comparing the egg donors with any wage workers or a certain occupation to measure the scale of exploitation is not possible. Whether the occupation of workers is exploited or not depends on the society's evaluation of the occupation in terms of a relative standard of work-environment, work-life balance, wage rate, and the risks involved. And there is a consensus, though broad and intuitive, about what the just or fair working condition is or should be. No one will say, we believe, that a Hispanic illegal immigrant working at the dirty back kitchen of a restaurant for 15 hours a day, 6 days a week with no vacation days with a below-the-state-minimum wage is being treated fairly or justly, despite the worker's immigrant status. Egg donation both in the developed as well as developing countries are not likely to belong to the exploited category. There are much worse occupations or practice than the egg donation out there in the developed and developing worlds. Thus, the exploitation of egg donors should be discussed from a different standard.

Although it is true that only those who are economically deprived sell their ova, a better way of stating the fact is that only a few of those economically deprived sell the eggs. Due to the natural guilt involved in selling one's own reproductive tissues, the egg donation is not a favorable option for an average young poor woman. Bluntly put, it feels weird to sell my eggs as if they are the stools I made out in my furniture shop. In any human society including the market capitalist world, what makes a certain item a merchandise, the good to be bought and sold, is one's labor input either in an intellectual or physical form. When we produce something by putting our own labor in it, there is a positive sense of pride and achievement. We are proud to call the product "my work." Thus, the more distanced our labor input is from the product we are selling, the guiltier we feel about the money we get out of its sale. This, in fact, is the psychological core of Karl Marx's critique of capitalism. We do not feel fair or just about the outrageous, high salary of the corporate CEOs though many of us envy their privileged status. The reason for the feeling of injustice or unfairness is that, though the CEOs' intellectual labor done at the upper management level can be appreciated, the actual products manufactured in a factory and sold in the market has little to do with the CEO's "actual touch." The final products are the outcome of the sweats and busy leg work of the factory workers and lower-level management team. Therefore, it does not seem ethically justifiable to award the business maneuvers of the upper management including lobbying the congress, etc., with a few billion dollars and to pay the lower-level workers a few dollars per hour.

In the case of egg donation, an ovum is not what the woman manufactures out of her labor either in an intellectual or physical form. It is a byproduct of the woman's natural reproductive cycle. In other words, it is part of who the woman is. We put our labor to create the goods and consume them for our survival or pleasure. We are the creators and consumers of the goods. But when selling the byproduct of our body cycle for money, we feel a sense of diminishing self-identity, self-control, and self-esteem. We are not, of course, letting ourselves being sold like in the case of slavery. But we still feel the loss of control or perhaps dignity because we are supposed to generate the goods out of our labor, not letting part of our organs or issues be the products to be used by fellow human beings. We feel being used and exploited. Thus, this is a psychological exploitation first. However, the reason for doing so naturally involves a financial concern or perhaps a dire financial concern, egg donation becomes a case of economic exploitation. The economic system of this world or society drives some women, though not many, psychologically demote themselves up to the point that they have to sell their eggs.

The women who sell their hairs to wig shops and eggs to clinics or labs and the prostitutes all belong to the same category of exploitation in the sense that they sell not the product of their labor but that of what their body produces due to a financial reason. Thus, the prostitution and egg selling are the same kind of self-degradation. But the two are different in the sense that the prostitutes should endure the psychological suffering by creating the coerced, intense false sexual intimacy with their customers, which makes the prostitution a much worse case of dehumanization than the egg donation. Selling hair, too, involves the same kind of self-degradation. However, given that human hair, like finger and toe nails, is expandable on the human body as we regularly remove part of it, it is the least form of self-degradation. In sum, it is true that the risks involved in egg donation will slowly disappear as the technology improves. Nevertheless, the genuine sense of dehumanizing oneself coupled with economic exploitation will remain intact. Green is silent about all this issue.

Seventh, there are problems with the emergence of a two-class system and its related new form of racism.

In the developed world, there will be the new social demarcation line between two classes, the PPBs and the NBs. The rich PPBs with all the enhanced genetic traits may continue to grow to rule the society while the poor NBs with the inferior IQs and unattractive physical features may be making babies in an old-fashioned way and exist to serve the PPBs. Green touches upon this issue. As already shown, here is Green's argument. Because social inequity between the haves and the have-nots has always existed in human society from antiquity, there is nothing we are adding to the existing social injustice by creating the two-class system redefined along the genetic line, says Green. Also, as the government gives equal access to the genetic engineering technology for everyone, the social injustice situation will be less problematic than what it is now.

We revisit and point out four problems with Green's argument here. The first was non-sequitur. Green's main proposition (i.e., we need to legalize germline intervention) is not inferred from the premise that the social justice problem of the rich and the poor has always existed. Second, the argument here did not seem aligned with Rawls' Difference Principle that Green believed it was. The third was Green's practical naïveté about the proposal. It is highly unlikely that the government will take control that everyone will access the technology, particularly in the U.S. where market distributive justice is prioritized more than social distributive justice. The last was that his argument was the result of his negative status quo bias. That is, he believes that things will not get worse than now because it has not been so far. Now, we would like to weigh in on what may cut across the third and last points, from a global perspective.

Green is right that it is ethically the best option for the government to democratize access to the technology if we want to allow it. From a global scale, this is still an option only for a few affluent countries. For the rest of the world, the technology will be available only to a very few rich people. On the whole, the developed and developing countries will be called respectively the countries of genetically superior people and of inferior people. In this way, the economic disparities will be redefined along the genetic-race line. This is a new form of "international racism."

The new racism we are encountering here, however, is what will impact directly on the socio-psychological infrastructure of the entire human civilization. We are now living in the world of Google and YouTube, so everyone, except few exceptions like the totalitarian society like North Korea and the remotest tribal villages in the Amazon Forest, can access and observe the lifestyle of people living in all corners of the world. In other words, the world has gotten smaller. Thus, trends or social changes made in a few affluent countries are not endemic to those nations anymore. The entire world is watching and witnessing the events and puts forward their own opinions about them, and it is apparent that whatever happens in the developed culture will be the "ethical norms" for the developing world. The entire world will think alike and our preferences will be very similar. In this way, the global culture of racism may be endorsed at the popular level. It is obvious that we are not ready for that. We are not even sure what practical as well as legal and professional problems will rise and how to cope with them.

Eighth, there is a concern about the nature of childbirth and child-rearing.

The bio-conservatives have used "manufacturing babies" and "designing babies" interchangeably to denote the inhuman aspect of germline intervention. Emphasizing on the germline enhancement rather than treatment, they address the problem of transforming human procreation into human manufacture. In other words, by using pre-selected genetic design, children are manufactured. What matters here is "human dignity" at stake, say the bio-conservatives. Green's response is shown in Chapter 5. To revisit, he answers that the natural parental love will overcome the possible problem associated with it. Parents will love their children whether they are born with genetically modified features or naturally born or through a culture dish or incubator. In other words, wherever parental love is, the dignity of children will be there. However, we discredited this point of his with the non-sequitur problem. If the parental love is so great that we can overcome all practical problems, we do not need to try to edit our children.

Nevertheless, Green, in Chapter 4, raises some interesting and valid points as he responds to the worry that the manufactured children, PPBs, will be considered of less value than NBs. For Green, the case will be the other way around because, when it comes to genetic engineering, people value children by the outcome, not the origin. Green gives a list of interesting psychological experiments, e.g., parents discriminating their own children based on how pretty they are, etc. Thus, Green may say that, because human dignity is understood descriptively in the way that we treat or respect others, we should worry more about the fact that the NBs may not get proper respect or even be discriminated against PPBs. Green's view here makes sense only if we endorse the descriptive sense of human dignity. Human dignity is an ambiguity term and requires an interpretation and among secular atheists and religious people have widely different notions of how we as humans can be dignified. This way of understanding human dignity is the favorite for liberal Christians and secular atheists like Green. We will examine, in the following, how the human dignity is perceived by the religious-minded bio-conservatives.

Last, there is a problem of the theological sense of human dignity violated in general.

The problem here concerns the violation of some of the traditional Christian theological doctrines. Those outside the conservative Christian community and/or those not sympathetic to their faith might be tempted to simply dismiss the claim as irrelevant or not interesting. However, it should be noted that the traditional Christian theology is the intellectual backbone of the Western civilization and directly related to the current bio-conservatives' position in the West. In the U.S., Christian theology, due to the intellectual endeavors of a great many Christian ethicists, has paved the way on which political governing ideals can be formed and various social policy-making decisions are made. For instance, the 20th century theological ethicist, Reinhold Niebuhr (particularly his 1932 work, *Moral Man and Immoral Society*), helped shape the framework of the U.S. foreign policy. In the field of bioethics, the founding fathers of American bioethics were mostly Christian ethicists or scholars which include Paul Ramsey, James Gustafson, Danial Callahan, Edmund Pellegrino, Leon Kass, Robert Veatch, Margaret Farley, Gene Outka, James Childress, Tom Beauchamp, etc. Especially, Leon Kass and Edmund Pellegrino led the President's Council on Bioethics which produced the writings considered a collection of the best arguments reflecting the Western conservative values while being criticized by the bio-liberals as a surreptitious rendering of the Vatican's position on the bioethical issues.

The bioethics council does not use the remarks or sayings of the Roman Pontiffs or any renowned theologians as the ground of intellectual authority that supports their opinions. But their work evidently displays the views that the Vatican endorses because it is the product of the theological-minded scholars. Thus, the bio-liberals' criticism is close to *ad hominem*. The tension or conflict between the bio-conservatives and bio-liberals vividly shows the divided socio reality in the American society, largely divided along the political party line between Republicans and Democrats. Therefore, learning about the Christian theological value and their understanding of the bioethical issue is highly important; otherwise, we will miss the half of the landscape of American bioethics.

Bio-liberals and bio-conservatives are fundamentally distinct from each other for their understanding of "human dignity." In bio-liberalism whose values are upheld by secular atheists and liberal Christians, a quality-of-life concern largely measures human dignity. On the other hand, for the bio-conservatives whose primary members are the Roman Catholic conservatives and Protestant Evangelicals, human dignity is interpreted primarily through a sanctity-of-life concern. However, the quality of life and sanity of life are not the concerns opposing to each other. Rather, they are two different emphases or modes of bioethical inquiries.

For the bio-liberalists or secular bioethicists, what may contribute to low-quality lifestyle (e.g., as physical suffering at the end stage of life, the troubles and complications of life caused by unwanted pregnancy) must be prevented. Thus, physician-assisted suicide must be legalized and abortion, in general, is morally permitted. In this way is the dignity of human life promoted. On the other hand, the bio-conservatives see the sanctity or sacredness of human life as unmeasurable by anything other than being God's gift. Thus, the dignity of human life is interpreted in terms of one's personal history and efforts of faithfully protecting life itself. Thus, one's attitude to embrace pain in the last moment of one's life is noble and redemptive, and abortion, in general, is sinful because it is one's refusal of God's gift, that is, human life itself.

When it comes to the issue of germline intervention, the bio-conservatives' focus is on whether the technology can be used to preserve human life as God's gift and promote its sacred nature, whereas the bio-liberals are more interested in using the technology in a way of enhancing the quality of lifestyle that the future-born and their families may enjoy while avoiding any possible disastrous consequences. However, the bio-conservatives' idea of preserving and promoting the sacredness of human life requires rather erudite theological explanations. First, the doctrine of ensoulment states that the presence of human soul transforms a mere human issue into a "human person." Since the souls get infused at the very moment of conception, the zygotes obtain the full status of human being, which makes abortion in all types murder. Second, the inseparableness of "the unitive" and "the procreative" theologically dictates what a legitimate procedure of childbirth is. That is, the child must be *created* through the physical *union* of a husband and a wife.

The two principles jointly prescribe the idea that children, from the moment of conception, are God's gifts bestowed upon families and that God decides who receives the gift, when the gift will be delivered, and what type of gift (i.e., children with certain character traits as well as disabilities) the couple will get. If so, germline intervention, as well as IVF and PGD, are viewed in a nefarious light. In a culture dish, human life is not considered God's sacred gifts, but a mere issue to be manipulated and played with by lab technicians. As a result, human dignity is profoundly violated.

Earlier, we mentioned what Green believed about the conservatives' position. Green thinks that the theological authority may find it unproblematic that germline intervention is performed at the gamete level (i.e., sperms and eggs) because they are not considered human persons yet. But Green is wrong. The Church endorses somatic genetic modification and even praise for its advancement because it can provide powerful cures for humanity. The Church also sees, as the former Pope, Benedict XVI, affirms, that the research on sperms and eggs, in and of itself, is permissible, though it depends on how the gametes are acquired. However, when it comes to practical applications, germline intervention at the gamete level is almost always theologically not permitted. When John DiCamillo, an ethicist at the National Catholic Bioethics Center, known as the "America's stronghold for conservative Catholic bioethics," responded to the guideline for gene editing by the National Academy of Sciences released in February 2017, he said: "Manipulating sperm and ova requires removing them from a person's body; if conception is achieved with these cells, it is nearly always through in vitro methods. This practice of in vitro fertilization is held by the Church to be ethically unacceptable because it dissociates procreation from the integrally personal context of the conjugal act."¹⁷ In other words, due to the inevitable consequence of violating the principle of the inseparability of the unitive and the procreative, the germline intervention at the level of gametes cannot be sanctioned.¹⁸

THE PROSPECT FOR FUTURE AND THE FINAL EVALUATION OF GREEN'S THESIS

We have come a long way. We have reviewed the arguments for and against germline intervention, respectively through the lenses of Green and the President's Council on Bioethics. *Where are we now as a society and what should we do in terms of a policy decision?* To answer, first, "when we are now as a society," everyone knows that any efforts to prevent or delay the scientific progress are ultimately futile because they are destined to fail. The so-called "scientific determinism" says it all. As our history shows, human intellectual curiosity backed by the powerful market economic force makes scientific advance unstoppable. In the case of germline enhancement, it is expected that the U.S. government's general tendency of bio-conservatism will eventually succumb to the free market demand, as the bio-liberal countries like the U.K. and China begin to dominate the gene treatment/enhancement market. In China, the "stem-cell shots" business (people get counts of stem cells for therapeutic and cosmetic purposes) is already booming attracting millionaires and billionaires from all around the world. As mentioned, the recent FDA's approval for the gene-altering leukemia treatment signals the tide turning in favor of the bio-liberal stance. If this is the case, the debate on what type of germline intervention should be allowed to what extent is unavoidable. Now is a high time to talk about it.

Second, what should we do now in terms of policy-decision? We believe that we should take the same stand as Green does. 1. genetic interventions should always be aimed at what is in the best interest of the child; 2. genetic interventions should almost be as safe as natural reproduction; 3. interventions that only provide a positional advantage should be discouraged and avoided to

¹⁷ Adelaide Mena, "Catholics Shouldn't Totally Reject Human Gene Editing – but It Still Has Ethical Problems," *Catholic News Agency*, April 11, 2017, accessed July 20, 2017, <http://www.catholicnewsagency.com/news/catholics-shouldnt-totally-reject-human-gene-editing-but-it-still-has-ethical-problems-29961/>.

¹⁸ The problems of prostitution and egg donation are discussed in the sixth point above. But they can be viewed in the light of the theological understanding of human dignity. Regarding prostitution, another aspect of human dignity as sanctity of life is seen by reference to the inner unity of the physical and spiritual. "Prostitution does injury to the dignity of human person who engages in it" as it reduces the person to a mere instrument of sexual pleasure. Thus, "sexuality . . . becomes personal and truly human when it is integrated into the relationship of one person to another, in the complete and lifelong mutual gift of a man and a woman." ("The Vocation to Chastity" in Article 6, Ch.2, Sec. 2, Part III in *Catechism of the Catholic Church*, The Holy See website, accessed July 20, 2017, http://www.vatican.va/archive/ENG0015/_P85.HTM). About the egg donation, the donors become a mere product who manufactures eggs as well as accomplices of murder given that the donated eggs and sperms will be used to create embryos the majority of which will be discarded (Mary Hasson, "Egg Donors and the Human Cost of IVF," *Catholic News Agency*, accessed July 27, 2017, <http://www.catholicnewsagency.com/cw/post.php?id=457>). John Hass, the Director of the National Catholic Bioethics Center, says: "At each stage in this 'manufacturing' process, the human embryo is no less a person than the egg donor herself. The Church insists that embryos be treated with the same dignity and respect owed to the doctor wielding the pipette, the egg donor herself, or the would-be-mother anxiously hoping the embryo transfer 'takes.' But each stage of the in vitro fertilization process – which claims to give the gift of life – is potentially murderous; each juncture requires decisions likely to end in the deliberate destruction of human embryos, made in God's image. (John M. Hass, "Begotten Not Made: A Catholic View of Reproductive Technology" United States Conferences of Catholic Bishops, accessed July 20, 2017, <http://www.usccb.org/issues-and-action/human-life-and-dignity/reproductive-technology/begotten-not-made-a-catholic-view-of-reproductive-technology.cfm>)

prevent excess gene enhancement and unnecessary mistakes; 4. genetic interventions should never reinforce discrimination. Again, Green's thesis is a failure because the truth of the proposition shown here, Green's conclusion, is not supported, either deductively or inductively, by all the flamboyant scientific and ethical explanations he has elaborated as the premises. Non-sequitur. Nonetheless, Green fails majestically with all the great scientific details and philosophical insights, which makes his work worthy of recognition and thorough investigation.

The power of Green's proposal is inevitability. If we cannot resist the tide, this is inevitably the best ethical option we can take. If so, Green's moderate bio-liberal proposal here is the most feasible and practical conservative position available to us. However, the force of resistance is too strong because the rich will not easily give up what they have.

last, one may wonder why we cannot resist and stay where we are if the foreseeable future with the genetic progress does not look bright at all. Again, our answer is that, though the future is looking rather tragic, we cannot go back to the past. Our story as a human race is scientifically and economically determined. We are destined to make a progress, perhaps to the point where we eventually destroy ourselves.

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