

16

Gene Editing, Potential Persons, and Eugenic Concerns

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If any one age really attains, by eugenics and scientific education, the power to make its descendants what it pleases, all men who live after it are the patients of that power. They are weaker, not stronger: for though we may have put wonderful machines in their hands we have pre-ordained how they are to use them. —C. S. Lewis, *The Abolition of Man*¹

Dr. Francis Collins, director of the National Institutes of Health, used this quote from Lewis on June 18, 2018 at the end of his remarks to the National Press Club in Washington, D.C.² I watched and listened to Collins give his remarks online on June 22, 2018—the day a BioLogos email with his talk link hit my inbox—just a few minutes after attending the 25th anniversary celebration dinner for the Center for Bioethics & Human Dignity, just a few hours after delivering a version of this paper.³ Collins introduced the quote from Lewis this way:

As I was preparing this lecture, I took out a book I haven't read in a little while, by C. S. Lewis—it was

The Abolition of Man—and it's a little chilling. He wrote this book in the context of the Nazi eugenics horror, and points out sort of what it means to really to *change our very essence*.⁴

When he quoted Lewis' phrase "the power to make its descendants what it pleases," Collins inserted a question to his audience—"does that sound like *gene editing* of embryos?"—and after finishing the remainder of the quote, Collins concluded:

So, with that, I hope all of us in this conversation this evening, and in other opportunities, can both celebrate the advances which are

breathtaking and have so much promise to give hope to families who are desperate for those answers, but also figure out how it is that we, as children of God, need to take that responsibility with the greatest seriousness and respect that we are fearfully and wonderfully made, and we might want to think very hard about *remaking ourselves in that way*.

I agree with Collins. We should celebrate breathtaking advances. We should take our responsibilities seriously. We should think very hard about all this. And part of that means asking when gene editing can "change our very essence."

In what follows I shall tackle the following questions before connecting them to eugenics:

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1. What is the moral status of gene editing?
2. What is the metaphysical status of gene editing?
3. How do potential persons relate to gene editing?

The first question asks if what gene editing accomplishes is morally good or bad, right or wrong, virtuous or vicious—or at least *more* morally good than bad, *more* right than wrong, *more* virtuous than vicious. The second question asks an even more basic question: precisely what does gene editing accomplish—does it merely (merely!) bring about a life-altering change in an existing individual, or does it instead bring a completely new individual into existence? The third question asks how the complex concept of a “potential person” connects up with the first two questions about gene editing.

My thesis below shall be that once we think hard about these three questions, we can responsibly support some gene editing of human persons, whether it occurs before or after conception, without changing our very essence.

Question 1: The Moral Status of Gene Editing

Thinkers rightly spend much effort answering the first question, but sometimes without recognizing how much it may depend on the remaining two. So I will invert that priority here,

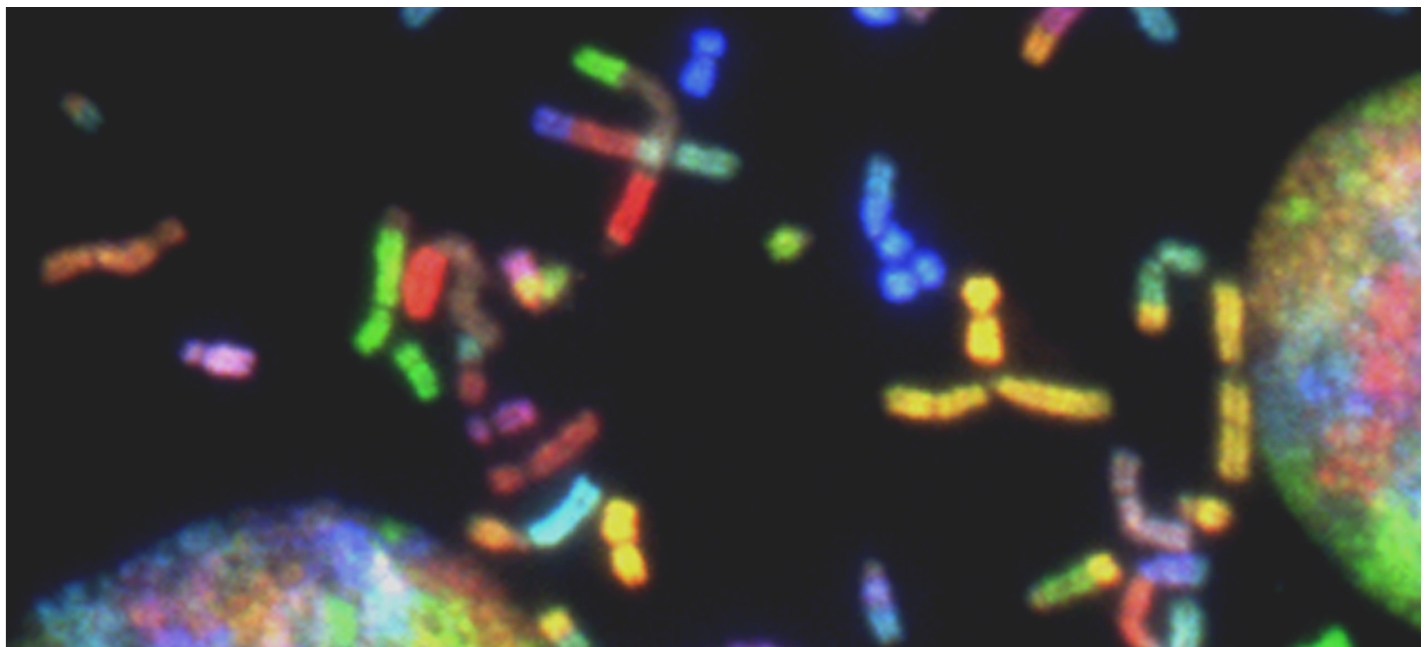
spending only a moment on the first question and then more time on the others. Here is my answer to the first question, followed by short teasers of the answers I shall develop to the others:

1. The moral status of gene editing, like the moral status of any tool which amplifies elements of our heart with consequences in the world, is a function of those elements and those consequences—and thus some types of gene editing can be morally good, right, and virtuous, while others can be morally bad, wrong, and vicious.⁵
2. The metaphysical status of gene editing, like the metaphysical status of any tool that makes changes to things in the world, is a function of both the nature of the things changed and the nature of the envisioned changes—and thus gene editing will sometimes merely (merely!) alter an existing individual, will sometimes bring a completely new individual into existence, and (perhaps most important) will sometimes do something that we honestly do not know how to classify.
3. The concept of “potential persons” is multiply ambiguous and prone to mislead, but when we come to gene editing, we can clarify, and avoid being misled, as long as we remember the motto “potential persons are different than persons with potential.”

I should note that in addressing these questions I seek to bring together several lines of previous research that includes more developed arguments for the following claims:

- All human persons have the sort of serious moral status that you and I each have from the moment of our biological beginning until the moment of our biological end.⁶
- Christian bioethics corrects a distorted secular individualism with a Christian affirmation of individuals grounded in faith, hope, and love.⁷
- Three of the best Christian arguments against germline genetic engineering in humans are ultimately unpersuasive.⁸
- Genetic origin essentialism—roughly, the view that your original genetic code is essential to who you are—although widely assumed to be true, may actually be false.⁹
- Genetic technology may complicate the distinctions between human and nonhuman organisms,¹⁰ but applying “theological realism” can help us navigate such issues.¹¹

Finally, a few clarifying/summarizing remarks on my answer to the first question will set the stage for what follows. When I say that the moral status of gene editing is a function of “the elements of our heart”



and their “consequences in the world,” I aim to draw on both those approaches that accent the character of agents and those approaches that accent the outcome of our choices. Choices, characters, and consequences all count. When I include the phrase “like any tools,” I aim to help us see gene editing as similar to, and continuous with, more familiar technologies—like tents, toothbrushes, toilets, and tablets (whether made with stone or silicon). Gene editing is neither sacred nor profane; it should be judged soberly like other techniques in biology or medicine or everyday activities—like sheltering, eating, sanitizing, and communicating. And when I contrast some gene editing as “morally good, right, and virtuous” with others that are “morally bad, wrong, and vicious,” I mean that some gene editing may occupy the apex of these overlapping categories (e.g. where a morally virtuous person does a morally right thing and it leads to a morally good state of affairs), other gene editing may occupy the nadir of such categories (e.g. where a morally vicious person does a morally wrong thing and it leads to a morally bad state of affairs), and yet much gene editing may fall within the range between these extremes (e.g. where a morally “mixed” person does a morally right thing but it sadly leads to a morally bad state of affairs in a given case). This range will be important to keep in mind when we look at eugenic concerns, since our tendency is sometimes to see a given gene editing procedure occupying or leading towards the best or worst historical or hypothetical extremes.

Question 2: The Metaphysical Status of Gene Editing

What is gene editing? I follow conventional definitions of this phrase. Merriam-Webster defines gene editing as “the use of biotechnological techniques to make changes to specific DNA sequences in the genome of a living organism.”¹² The NIH “Genetics Home Reference” page defines it similarly:

Genome editing (also called gene editing) is a group of technologies

that give scientists the ability to change an organism’s DNA. These technologies allow genetic material to be added, removed, or altered at particular locations in the genome.¹³

I shall not expand these conventional definitions—centered on what scientists do—by including other human activities by non-scientists that might change an organism’s DNA, even if such activities might also be said to “edit” a “gene” (for example, a recent study asks “can a father’s cannabis use alter the epigenome inherited by his offspring?”¹⁴). Still, as these conventional definitions illustrate, gene editing actually includes many different types of “techniques” (Merriam-Webster) or “technologies” (NIH) that allow genetic material to be “added, removed, or altered.” Indeed, at the end of the NIH piece, we find a concise, helpful summary of how various types of gene editing in humans raise various types of ethical issues:

Ethical concerns arise when genome editing, using technologies such as CRISPR-Cas9, is used to alter human genomes. Most of the changes introduced with genome editing are limited to somatic cells, which are cells other than egg and sperm cells. These changes affect only certain tissues and are not passed from one generation to the next. However, changes made to genes in egg or sperm cells (germline cells) or in the genes of an embryo could be passed to future generations. Germline cell and embryo genome editing bring up a number of ethical challenges, including whether it would be permissible to use this technology to enhance normal human traits (such as height or intelligence). Based on concerns about ethics and safety, germline cell and embryo genome editing are currently illegal in many countries.¹⁵

I recognize one might quibble about the words in this passage and the boundaries

of its distinctions. (For example, are not germline cells and embryos technically “somatic” cells too, inasmuch as they are parts of the body of the organism? Is not enhancement of normal human traits also a possibility with gene edits that do not occur in the embryo or the germline cells?) However, as long as we keep an eye on the reality of what is being discussed, and are not misled by an innocent decision in how we label that reality, we can do well in discussing the metaphysical status of gene editing.

I said above that the metaphysical status of gene editing, like the metaphysical status of any tool that makes changes to things in the world, is a function of both the nature of the things changed and the nature of the envisioned changes. Let me illustrate this by starting with two familiar non-genetic examples before moving on to gene editing.

First, some of us have been on either the receiving or giving end of the following sort of statement from a parent to her teenage son: “who are you and what have you done with my son Billy?” The statement is not meant literally, since the parent does not really think that a brand new individual has somehow replaced Billy; rather, the point is that the behavior Billy is now displaying—often behavior the parent finds frustrating—is so different than his previous behavior that the parent is trying to accent this difference by echoing lines that come from science fiction movies like *Invasion of the Body Snatchers*. What explains Billy’s behavior is not actually an alien body swap, but some combination of nature (like hormones), nurture (like friends), and decisions (like choosing to stay awake the past 48 hours). Human nature, whatever else it is, allows for a human boy to change into a human teenager without ceasing to lose his humanity (the protests of Billy’s parents notwithstanding). Likewise, if all goes well, Billy will emerge from adolescence into adulthood. Adolescence is a phase of human life that an individual can both enter and exit.

Second, contrast this with the way many people speak to their children at an open-casket funeral: “Grandma Susy is not here, but she is in a better place now.” Most who speak this way mean it fairly straightforwardly. Of course, the gloss they give may be more or less like the apostle Paul when anticipating his own death (“I desire to depart and be with Christ, which is better by far; but it is more necessary for you that I remain in the body,” Philippians 1:23–24, NIV) or the death of his Christian audience (“we . . . would prefer to be away from the body and at home with the Lord,” 2 Corinthians 5:8). Still, most people who speak about grandma Susy this way would say, if the question was put to them, that the corpse in the casket is not strictly the same individual as grandma Susy, even though it was continuous with Grandma Susy. Human nature, whatever else it is, allows for a human woman to die without losing her humanity and without becoming her corpse. Although some religions might treat such embodied life almost parallel to the way we treated adolescence above (namely, as a phase of the soul that an individual can both enter at the beginning and exit at the end), the traditional Christian understanding has treated “before life” asymmetrically to “after life,” since the traditional Christian view has excluded the idea that the human soul pre-exists apart from the body, even though it has included the idea that the human soul continues to exist apart from the body after death.

Adolescence and death are fundamentally different kinds of changes, at least when you cash them out in terms of the individuals we can perceive with our senses before and after the relevant change. Adolescence is a change in which an earlier individual (a boy) persists continuously through space and time as a later individual (a teenager), while death is a change in which an earlier individual (a woman) does not persist continuously through space and time as a later individual (a corpse). Since adolescence and death are such different kinds of changes, if there was a tool that caused adolescence,¹⁶ it would have a

different metaphysical status than a tool that causes death.

The same point is true of gene editing. Some types of gene editing—for example, altering a minor bit of DNA in a somatic cell edit of a grown woman—seem to be like (causing) adolescence, because they involve a change in which an earlier individual (a human organism) persists continuously through space and time as a later individual (the same human organism after the edit). In the last few days of finishing up this article, I read about the first US patient to get gene editing for sickle cell disease—things are looking very promising so far, one year after she began the process, and she certainly seems like the same individual, though one who has been through significant and positive changes in her biology.¹⁷ However, other types of gene editing—for example, radically reprogramming the DNA in a one-celled human zygote so that it now has a genome that is as close as biologically possible to the genome of my dog Simba—seem to be like (causing) death, because they involve a change in which an earlier individual (a human zygote) does not persist continuously through space and time as a later individual (a canine zygote). (I crafted this example with the hopes it would be purely imaginary by the time this piece goes to press, but I realize that as legal and cultural opposition to such things change, today’s science fiction may become tomorrow’s science fact).

Importantly, it will often be unclear how to classify what a genetic change accomplishes. For example, would a genetic edit of a canine zygote having the genome of (say) a pit bull, in such a way that it eventually has the genome of a poodle, have the effect of ending one individual while bringing into existence another individual (in other words, more like death than adolescence)? Would a

genetic edit of a human zygote having the genome of (say) Barack Obama, in such a way that it eventually has the genome of Hilary Clinton, have the effect of transforming an individual without replacing it with something else (in other words, more like adolescence than death)?

it will often be unclear how to classify what a genetic change accomplishes.

In short, gene editing will sometimes merely (merely!) alter an existing individual, will sometimes bring a completely new individual into existence, and (perhaps

most important) will sometimes do something that we honestly do not know how to classify.

But gene editing is not the only sort of process that can do something we honestly do not know how to classify. To illustrate, consider the differences between the following four cases:

1. the surgical separation of two conjoined twins who were born joined at the head
2. the surgical removal of a human head from the remaining parts of a living human body
3. the surgical severing of the corpus collosum (the bundle of fibers connecting the left and right hemisphere of the human brain) as a treatment for epilepsy
4. the surgical amputation of a leg

Whether or not the procedures in question would be medically or ethically justified in a given case, most of us would quickly agree that (1) involves separating two individuals who are merely connected to each other, and (4) involves separating a part of an individual from the whole. (3) is slightly more complicated as many thinkers have recognized, yet we lean towards viewing it as beginning and ending with the same

individual. But (2) is perhaps the most interesting of the group, since we are pulled between five competing intuitions. Since the individual we start with, which we might name Starter, seems to “split” or “divide” or undergo “fission” into two individuals, which we might name Head and Remainder, the five intuitions are:

- (a) Starter survives as Head, not as Remainder.
- (b) Starter survives as Remainder, not as Head.
- (c) Starter survives as both Remainder and Head.
- (d) Starter survives as neither Remainder nor Head.
- (e) Starter does not survive.

Choosing among these options inevitably raises the question: what sort of thing is Starter? If Starter is simply the sum of his physical parts, then (a) is out (since Head is only one of those physical parts), and (b) is out (for the same reason), and (c) looks good (since Remainder and Head, taken together, add up to be the sum of the parts), and (d) and (e) are out. If Starter is whatever part contains the brain, then (a) is correct. If Starter is whatever part is the human organism, then (b) is (arguably) correct. If you want to know where Starter’s soul went in this procedure, “since once I know that, I can know where Starter goes,” then you remember the lesson from grandma Susy a few paragraphs ago.

My point here is not to identify which of (a) through (e) is the correct approach. My point is just to illustrate how the metaphysical status of any tool that makes changes to things in the world is a function of both the nature of the things changed and the nature of the envisioned changes. In case (2), the nature of the thing changed—Starter—is a key element for determining what happens—does Starter survive, and if so, as what? But this is also true in cases (4), (3), and (1)—indeed, Starter could have been the initial individual in (4) and (3), or one of the resultant individuals in (1).

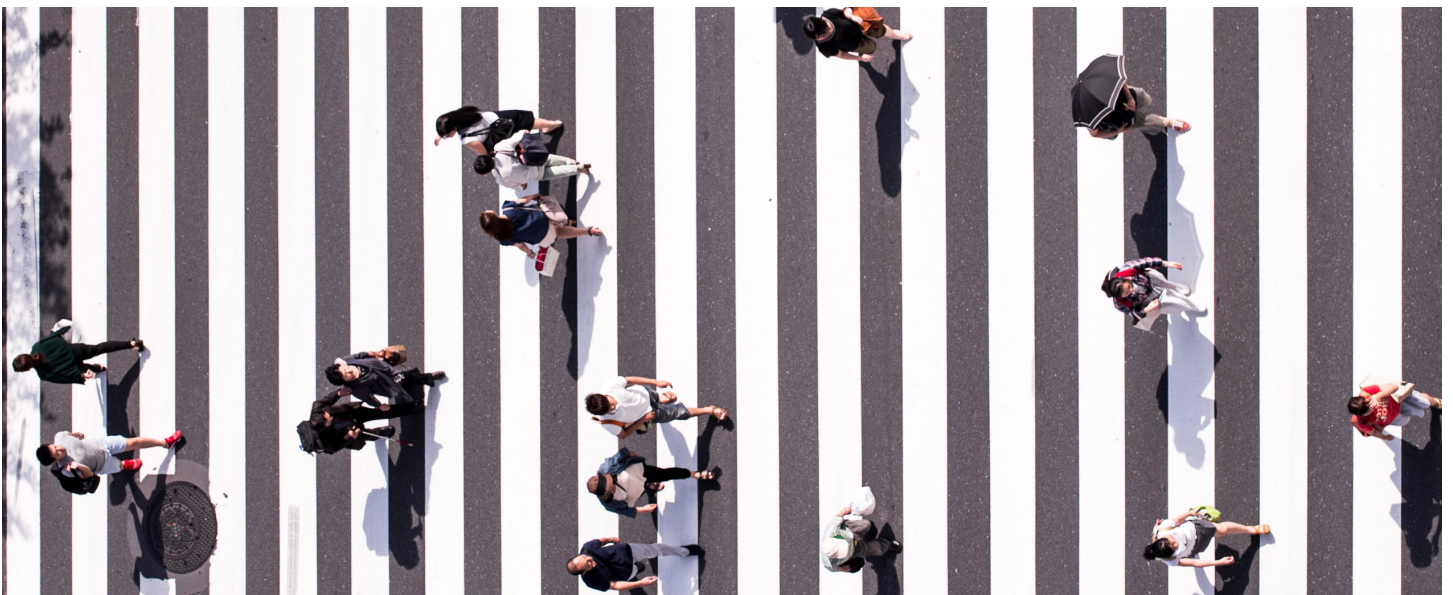
To summarize and connect this back with gene editing: I began this section by affirming current definitions of gene editing, and rehearsing how careful thinking about adolescence and death help us see that the metaphysical status of a given case of gene editing depends on both the nature of the changes it aims for and the nature of the thing those changes are made on. A range of cases where we do not know what to say about a given change are present both inside and outside of discussions of gene editing. As the pit bull/poodle and Obama/Clinton examples illustrated above, and

as the next two sections of this paper will illustrate below, there are cases of gene editing that provide rough parallels with some of the issues in cases (1) through (4) and with approaches (a) through (e) involving an adult human organism. Still, whether or not there are gene editing cases that provide rough parallels with cases (1) through (4), and with approaches (a) through (e), the point is that the metaphysical status of any *gene editing* tool that makes changes to things in the world *like human organisms or their parts* is a function of both the nature of the things changed and the nature of the envisioned changes.

the metaphysical status of a given case of gene editing depends on both the nature of the changes it aims for and the nature of the thing those changes are made on.

Question 3: Potential Persons and Gene Editing

Gene editing sometimes imagines changes that will affect not merely individuals who *already* exist, but individuals who do not already exist but *will* soon exist, and/or individuals who do not already exist but *may*, or *may not*, exist, depending on whether and how a particular gene editing goes. This is one place where the language of “potential persons” sometimes enters into discussions of gene editing.



Yet to adequately talk about how potential persons relate to genetic editing, we must recognize that “persons” and “potential persons” are already phrases with a complicated range of usage within discussions about many beginning-of-life issues.

You and I are *persons*. But agreeing to this still leaves much unclear.

First, it leaves unclear whether “person” is being used in a *normative* sense (like “individual with dignity”) or in a *descriptive* sense (like “individual with reason”).¹⁸ For the record: I believe you and I are “persons” in each of the senses just mentioned. But there is nothing incoherent about saying that an individual is a person in some descriptive sense but not in some normative sense: for example, that you have reason but not dignity.

Second, it leaves unclear whether “person” is being used as what logic teachers call a *substance* sortal or a *phase* sortal. Sortals are nouns that serve as concepts for describing the world. A substance sortal applies to an individual at every moment of its existence (traditional examples are “human” or “dog”). A phase sortal applies to an individual at only some moments of its existence (like “teenager” or “puppy”). Those who say you began to exist some time before you became a “person” are using “person” as a phase sortal. For the record: while I believe the best and most consistent use of the term “person” is to use it as a substance sortal, it seems to me that the term “person” is sometimes used as a phase sortal, sometimes used as a substance sortal, and sometimes used with no clear commitment either way.

These two distinctions for using the word “person” intersect in the following table:

	Descriptive sense (ex: “individual with reason”)	Normative sense (ex: “individual with dignity”)
Substance sortal (like “dog”)	1	2
Phase sortal (like “puppy”)	3	4

Again, for the record: I believe the best use of “person” combines 1 and 2, and my practice reflects this; but I also think it wise to be alert to whether others share this belief or not.

There was a time when you and I were *potential* persons. But agreeing to this still leaves much unclear.

First, because of the distinction between phase and substance sortals, merely affirming that there was a time when you and I were potential “persons” leaves unclear whether that time was before you and I began to exist, or whether that time was after you and I began to exist but before we became persons. The latter option is only an option for those who are using “person” as a phase sortal. Those who use “person” as a substance sortal usually either avoid using the phrase “potential person” at all or else mean by “potential person” something like *future* person or *possible* person.

Second, whenever an account uses the term “person” in the *descriptive* sense as a *phase* sortal, it needs to be clear on whether being a *potential* descriptive person is sufficient for being a *normative* person. For example: if only individuals with reason are “persons,” is having the potential for reason (= being a potential reasonable individual = being a potential person) sufficient to have dignity?

Persons are individuals that possess certain kinds of properties—call them person-making properties. Different accounts of the person-making properties abound. I have argued elsewhere that whichever account of the person-making properties we choose to focus on, it is important to formulate those properties so that they include not merely immediate capacities (for

example, the capacity to love God right now), but higher-order capacities (for example, the capacity to *develop the capacity* to love God right

now) as well.¹⁹ I believe that bringing in “potential” to the discussion at precisely this place helps remind us how (for example) human infants, fetuses, and embryos are “persons with potential” rather than “potential persons.”

And yet, it is helpful to have something like the phrase “potential persons” (even if you do not like that particular phrase) because it is helpful to have ways of talking about the types of individuals I mentioned at the outset of this section: (1) persons who do exist now, and (2) persons who don’t exist now but *will* in the future, and (3) persons who don’t exist now but *could* in the future. So, while I am neither a dictionary nor a dictator when it comes to how to use words, here is a flowchart for how we might refer to such persons *without* using the phrase “potential persons”:

(Q1) Ask: Does Paul exist now?

Yes > Paul is now an *actual* person.

No > (Q2) Ask: Will Paul exist in the future?

Yes > Paul is now a *merely future* person.

No > (Q3) Ask: Could Paul exist in the future?

Yes > Paul is now a *merely possible* person.

No > Paul is now an *impossible* person.

Note, an *impossible* person here is not to be confused with your relative who sometimes almost earns this title but (alas!) is an *actual* person.

Some types of genetic edits are thought to affect only current actual persons. Some types of genetic edits are thought to affect persons who are now merely future persons, but will one day be actual persons, but this can happen in at least two ways. Either the edit confers some benefit upon the merely future person, so that when they become an actual person, their life is better than it would have been without the edit (as we shall see, this way of framing it is a bit controversial). Or else the edit effectively downgrades their status to that of a merely possible person: the edit makes it true that the person will not be able to become an actual person in the future. Finally, in a reversal of this

last scenario, some types of genetic edits are thought to affect those who are now merely possible persons, by effectively upgrading their status to that of a merely future person: the edit makes it true that the person will become an actual person in the future.

To summarize before moving on: unfortunately, the phrase “potential person” has been used by some to advance inadequate views on various beginning-of-life issues (e.g. the view that a human embryo is merely a “potential person” and thus does not have the right to life). But even those of us who reject such inadequate views might still think the phrase “potential person” has a coherent and useful role to play within discussions of gene editing, as long as we are careful and clear about what we mean to commit ourselves to by it. Still, for those who prefer not to use the phrase “potential person” at all, there are alternative ways of addressing all the relevant issues within gene editing using alternative formulations, as the next section will illustrate.

Question 4: Gene Editing and Eugenics

Calum MacKellar, in “Gene Editing and the New Eugenics,” discusses issues related to these three questions we have been unpacking above with both clarity and care.²⁰ But I think he runs into a problem that can be fixed with a friendly amendment. The relevant part of his discussion starts with a distinction between “numerical” and “qualitative” identity changes and then uses this distinction to explore whether different types of gene editing (like “somatic” and “germline”) are “eugenic.”

MacKellar distinguishes between two sorts of identity and related identity changes:

1. *Numerical identity* . . . examines the number of persons who exist and whether they are distinct.
2. *Qualitative identity* . . . examines

similarities between the same individual in different settings or between distinct individuals.

3. If a procedure results in *numerical identity changes*, then a new individual is brought into existence who would not otherwise have existed.
4. If a procedure results in *qualitative identity changes*, then the original individual continues to exist.²¹

With somatic gene editing, which “takes place with the aim of addressing a genetic disorder on a mature embryo, foetus, child, or adult,” MacKellar claims “numerical identity would remain the same though the qualitative identity would be changed.”²² But with germline gene editing, which takes place “with the aim of . . . intentionally changing the genes of children and descendants,” MacKellar initially claims such modifications “are inherently eugenic in nature.”²³ Yet he soon qualifies this, arguing that “there may be distinct categories dependent upon the stage of development at which the editing is being considered.”²⁴ It is worth attending to his categories, while considering what he thinks may make some of them eugenic.

With gene editing of very early embryos, MacKellar favors a cautious agnosticism about where to draw the line among a spectrum of possible cases:

If gene editing takes place on a very early post-conception human embryo . . . it would be *difficult to know* whether any *significant* genetic change would bring about a completely new individual or whether the original embryonic individual continues to exist and is simply modified.²⁵

If the genetic modification does not give rise to any *significant* change in the already existing embryo, it would no doubt be seen as similar to somatic gene therapy in which the original individual remains.²⁶

If the gene editing procedure *substantially* modifies the genome of a very early embryo . . . [it] may then be considered to end the life of the original embryo (a form of death) while creating another. Indeed, if this did happen, then a clear eugenic element would exist since it would mean preferring one new being over another based on the quality of his or her genome.²⁷

In contrast, with gene editing of sperm, eggs, and during fertilization, MacKellar rejects any spectrum and hence any need for agnosticism about where to draw a line:

If a genetic modification takes place either on the sperm and egg cells before they are used for conception or during fertilization resulting in the formation of a one-cell embryo, a new individual, who would not otherwise have existed, is being brought into being. This would happen because any change (no matter how small) of any of the variables in bringing an individual into existence would result in a very different individual existing in time. In other words, any individual brought into existence through these procedures would be a totally different person, from a numerical identity perspective, to the one who would, otherwise, have existed.

If such a conclusion is accepted then this again has a clear eugenic element since a new individual is being brought into existence in preference to another who may, for example, have qualities which were seen as less valuable than the ‘new’ individual. What is being proposed, therefore, is not a form of therapy. No existing person is being treated for a disorder. Instead, it is making sure that only certain persons are brought into existence based on the quality of their genomes.²⁸

These excerpts put us in a position to state a twofold problem with MacKellar's otherwise commendable approach at this point. First, it is unclear why he views the *effects* of different sub-types of germline gene editing as differently as he does. Second, and relatedly, it is unclear why he views an ethically problematic eugenic element tracking the *effects* of certain procedures more closely than the *intent* of those procedures.

Regarding the first point, the difficulty of knowing where to draw the line between procedures causing numerical changes and procedures causing qualitative changes is a genuine difficulty—but this difficulty is exactly the same before conception as after. If a genetic procedure performed on my body at its two-celled stage does not result in a change of numerical identity but only a change of qualitative identity (for example, if I enter the procedure with a life-threatening genetic condition which I inherited from my mother but I exit the procedure without this condition), then a relevantly similar genetic procedure performed on my body's two precursors would not result in a change of numerical identity either, but only a change of qualitative identity (for example, removing the gene from the ovum before fertilization, rather than removing the gene from the embryo after fertilization). This is because, whether the genetic procedure happened before or after conception, it eventually benefits me, because it leaves me better off than I would have been without it. The basic point is that the timing of a genetic change does not make the difference between qualitative and numerical identity. Put differently, if we roughly distinguish between the two stages, one before fertilization (where gametes exist, but not an embryo), one after fertilization (where the embryo exists, but not the gametes), then we can state the basic point by saying that an individual can be benefitted by a genetic modification whether that modification takes place at either stage. In terms of naming sequential events, it does not matter whether we have modification before fertilization, or fertilization before

modification.

Despite his key claim that “any change (no matter how small) of any of the variables in bringing an individual into existence would result in a very different individual existing in time,”²⁹ I remain optimistic that MacKellar may not mean to commit himself to the very strongest versions of the common assumption called “origin essentialism.” For he is evidently willing to admit that an individual's original genetic code sometimes can be altered after conception without thereby eliminating the old individual and generating a new individual in its place. However, it may be that the sort of cases MacKellar is imagining with preconception genetic procedures are cases where these procedures involve using numerically different gametes rather than merely qualitatively different gametes—for example, if the procedure does not happen, then Russell will be conceived using one sperm and one ovum, but if the procedure *does* happen, then *another* sperm and/or *another* ovum will be utilized, and hence the resultant individual will not be Russell but *someone else*—and if this is what MacKellar is imagining, then he may be assuming a weaker version of origin essentialism.

So, then: MacKellar is correct to note the difference between numerical and qualitative identity, and also correct to note that some procedures will produce *effects* that are changes in numerical identity, other procedures will produce *effects* that are changes in qualitative identity, and we may sometimes not know where to draw the line here.

Regarding the second point, MacKellar seems to treat a process as having a eugenic element even when, at most, it has the *effect* of a numerical change rather than the *intent* of a numerical change. But there is a morally relevant difference between *intending* to create a new individual and *effectively* doing so,

versus *intending* to create a qualitative improvement for an existing individual yet *effectively* (but accidentally) creating a numerically distinct individual instead.

To see this, compare how two intents and two effects might intersect:

	Effect = Qualitative change	Effect = Numerical change
Intent = Qualitative change	1	2
Intent = Numerical change	3	4

1. The intent and effect are qualitative change.
2. The intent is qualitative change, but the effect is numerical change.
3. The intent is numerical change, but the effect is qualitative change.
4. The intent and effect are numerical change.

So, then: it is important to notice the difference between 2 and 4. Each involve the effect of producing a numerically distinct person. But only 2 involves the intent to produce one. My proposal here is to re-consider whether a procedure really deserves to be treated as problematically “eugenic” if its *intent* is qualitative change rather than numerical change—even if it turns out that, as a matter of metaphysical fact, its *effect* is indeed numerical change rather than qualitative change.

Interestingly, MacKellar's discussion of what makes a procedure eugenic sometimes *does* put weight on the intent of the parents:

If parents do decide to avoid having a child affected by a serious genetic disorder, based solely on genetics factors, there is a very real sense that such a decision is based on the perceived quality of life of people who already exist and not on the

worthiness and inherent dignity of their lives.³⁰

It should be noted that a decision not to have a certain kind of child may also be based on other factors, such as a genuine psychological, financial and material inability by some parents to cope with a very seriously disabled child. *Such a decision would not then be eugenic in nature.*³¹

And he is often willing to take a charitable approach to that intent:

Naturally, it is difficult not to have a lot of sympathy towards parents who have children affected by severe disability and suffering or to know the extent of the anguish they are going through. But, if one asks these parents, it is always the disorder and not the very existence of the child with the disorder that has been the cause of so much heartache. Most would never say that they wished their specific child had not existed. On no occasion, would they indicate that they would have preferred to exchange their child for another, healthier, one. They just want to find a treatment for their child.³²

This charitable approach towards interpreting the intentions of the parents can and should be extended to those who might want genetic procedures done during fertilization or earlier, at least until there is reason not to do so. Perhaps advocates of such procedures are not committed to a philosophical position of genetic essentialism, and so they see the improvement of gametes as a form of pre-conceptive microsurgery that improves the bodily structures of an individual

human person before he or she gets his or her body.

Conclusion

An appeal to human dignity, by itself, does not resolve the necessary discussion about the changes wrought in the puzzling case of Starter discussed earlier in this paper. You and I might agree that every human individual, including Starter, possesses an inherent and inviolable dignity for every moment of their biological life—and yet diverge on whether the envisioned procedure on Starter respects that dignity, because we disagree on whether the procedure effectively causes Starter's death (as approaches (d) and (e) suggested) or continues Starter's biological life (as approaches (a) and (b) and (c) suggested). And even if we agreed that the procedure continues Starter's biological life, we might diverge on how to measure its benefits for Starter, because we disagree on whether Starter survives as Head (a) or Remainder (b) or both (c).

Similarly, an appeal to human dignity, by itself, does not resolve the necessary discussion about the changes wrought by a given case of gene editing. You and I might agree that each human has dignity from conception until natural death, and yet diverge on whether a contemplated gene editing tool respects such dignity, because we disagree on whether the

tool ends a human individual's life, or we disagree on how to measure its benefits for the human individuals it claims to benefit. Accounting for these alleged benefits requires special clarity and care in those cases where the envisioned changes from gene editing happen prior to the beginning of an individual's existence—whether we call that individual a “potential person” at that precise moment or not. Such accounting also requires such care in such cases when the intent of the genetic change, and the effect of the genetic change, may vary independently of one another.

I began this paper with a 2018 talk by geneticist Francis Collins. Today I listened to Collins and theologian N. T. Wright, at the end of their joint BioLogos webcast discussing Christian approaches to the coronavirus, each

pick up guitars and sing a song they had written.³³ While I am no geneticist or theologian (and no singer or songwriter, either), my approach towards these topics in general, and to MacKellar's paper in particular, is meant to be irenic and conciliatory. To echo both Collins and Wright, today's task of clarifying a faithful Christian approach to emerging gene editing opportunities is one that requires celebration, responsibility, hard thinking—and collaboration. ●●●

an appeal to human dignity, by itself, does not resolve the necessary discussion about the changes wrought by a given case of gene editing

- 1 C. S. Lewis, *The Abolition of Man* (San Francisco: HarperSanFrancisco, 2001), 57.
- 2 Francis Collins and Deborah Haarsma, "Francis Collins Speaks on Genetic Engineering and Christian Faith," *BioLogos*, May 18, 2020, <https://biologos.org/articles/francis-collins-speaks-on-genetic-engineering-and-christian-faith>.
- 3 BioLogos also encourages views about this subject that are explicit about emphasizing familiar pro-life Christian elements. See Jeff Hardin, "Genome Editing and the Christian," *BioLogos*, February 12, 2019, <https://biologos.org/articles/genome-editing-and-the-christian>.
- 4 Collins and Haarsma, "Francis Collins Speaks on Genetic Engineering and Christian Faith," emphasis mine (here and elsewhere). The quote in the video starts at 1:05:50.
- 5 Although they do not express it like I did in the text, I agree with the arguments advanced in Seppe Segers and Heidi Mertes, "Does Human Genome Editing Reinforce or Violate Human Dignity?" *Bioethics* 34, no. 1 (2019): 1–8, <https://doi.org/10.1111/bioe.12607>.
- 6 Russell DiSilvestro, *Human Capacities and Moral Status* (New York: Springer, 2010). See also Russell DiSilvestro, "The Ghost in the Machine is the Elephant in the Room: Souls, Death, and Harm at the End of Life," *Journal of Medicine and Philosophy* 37, no. 5 (2012), 480–502, <https://doi.org/10.1093/jmp/jhs037>; and Dan Weijers and Russell DiSilvestro, "The Morality of Experience Machines for End-of-Life Care," in *Experience Machines: The Philosophy of Virtual Worlds*, ed. Mark Wilcox (London: Rowman and Littlefield, 2017), 183–202.
- 7 Russell DiSilvestro, "The Arc of the Moral Universe is Long, But it Bends Towards Mercy and Grace: And Other Delightful Surprises of a Distinctively Christian Bioethics," *Christian Bioethics* 21, no. 3 (2015), 262–281, <https://doi.org/10.1093/cb/cbv009>. See also Russell DiSilvestro, "My Life Is Not My Own: Individualism and Human Significance," in *Why People Matter: A Christian Engagement with Rival Views of Human Significance*, ed. John Kilner (Grand Rapids, MI: Baker Academic, 2017), 65–86.
- 8 Russell DiSilvestro, "Three Christian Arguments against Germline Engineering," *Christian Bioethics* 18, no. 2 (2012), 201–218, <https://doi.org/10.1093/cb/cbs019>.
- 9 Russell DiSilvestro, "Disability, Origin Essentialism, and the Problem of Differently Constituted Precursors," *Journal of the Christian Institute on Disability* 6, no. 1–2 (2017): 86–112. See also Russell DiSilvestro, "Teach Your Children Well: Origins, Rights, and the Education of 'My' Child," in *Procreation, Parenthood, and Educational Rights: Ethical and Philosophical Issues*, ed. Michael Cholbi and Jaime Ahlberg (New York: Routledge, 2017), 37–52.
- 10 See Matthew Carey Jordan, "Review of *Human Capacities and Moral Status* by Russell DiSilvestro," *American Journal of Bioethics* 12, no. 2 (2012): 49–50, <https://doi.org/10.1080/15265161.2012.647890>; Jason T. Eberl, "Human Capacities and Moral Status by Russell DiSilvestro," *National Catholic Bioethics Quarterly* 11, no. 3 (2011): 596–98.
- 11 Russell DiSilvestro, "A Neglected Solution to the Problem of the Metaphysical and Moral Status of the Human-Animal Chimera," *Ethics & Medicine* 20, no. 2 (2004), 5–23.
- 12 "Gene Editing," Merriam-Webster.com Dictionary, Merriam-Webster, accessed July 25, 2018, <https://www.merriam-webster.com/dictionary/gene%20editing>.
- 13 National Institutes of Health, "What Are Genome Editing and CRISPR-Cas9?" *Genetics Home Reference*, August 4, 2020, <https://ghr.nlm.nih.gov/primer/genomicresearch/genomeediting>.
- 14 "Pilot Project: Effects of Cannabis on the Epigenome of Humans and Rats," John Templeton Foundation, accessed July 25, 2018, <https://www.templeton.org/grant/pilot-project-effects-of-cannabis-on-the-epigenome-of-humans-and-rats>.
- 15 National Institutes of Health, "What Are Genome Editing and CRISPR-Cas9?"
- 16 Or adulthood, or both adolescence and adulthood, depending on how it was used—think of the antique arcade fortune teller machine Zoltar in the 1988 Tom Hanks comedy *Big*.
- 17 Rob Stein, "A Year in, 1st Patient to Get Gene Editing for Sickle Cell Disease Is Thriving," NPR, June 23, 2020, <https://www.npr.org/sections/health-shots/2020/06/23/877543610/a-year-in-1st-patient-to-get-gene-editing-for-sickle-cell-disease-is-thriving>.
- 18 See my discussion of this in *Human Capacities and Moral Status*, chapter 1, section 5, "What Persons Are."
- 19 Russell DiSilvestro, "Reproductive Autonomy, the Non-Identity Problem, and the Non-Person Problem," *Bioethics* 23, no. 1 (2009): 59–67, <https://doi.org/10.1111/j.1467-8519.2008.00681.x>. See page 67.
- 20 Calum MacKellar, "Gene Editing and the New Eugenics," *Dignitas* 25, no. 1 (2018): 3–9.
- 21 MacKellar, "Gene Editing and the New Eugenics," 4, emphasis mine here and elsewhere. MacKellar suggests there can be "a degree of overlap" between 1 and 2, but does not state whether any procedure could ever result in both 3 and 4, so I will ignore these possibilities in my discussion of his position.
- 22 MacKellar, "Gene Editing and the New Eugenics," 4–5.
- 23 MacKellar, "Gene Editing and the New Eugenics," 5.
- 24 MacKellar, "Gene Editing and the New Eugenics," 6.
- 25 MacKellar, "Gene Editing and the New Eugenics," 6. He continues: "In other words, whether the procedure would have a numerical or only a qualitative effect on identity."
- 26 MacKellar, "Gene Editing and the New Eugenics," 6. He says in this context: "It is possible to ask whether an embryo in which a certain number of genes have been edited remains the same embryo or whether a change in numerical identity has taken place."
- 27 MacKellar, "Gene Editing and the New Eugenics," 6.
- 28 MacKellar, "Gene Editing and the New Eugenics," 6.
- 29 MacKellar, "Gene Editing and the New Eugenics," 6.
- 30 MacKellar, "Gene Editing and the New Eugenics," 7.
- 31 MacKellar, "Gene Editing and the New Eugenics," 9, footnote 24.
- 32 MacKellar, "Gene Editing and the New Eugenics," 7–8.
- 33 Francis Collins and N.T. Wright, "A Christian Response to Coronavirus: A Virtual Event with N.T. Wright and Francis Collins," *BioLogos*, July 13, 2020, <https://biologos.org/resources/a-christian-response-to-coronavirus-a-podcast-recording-with-n-t-wright-and-francis-collins>.