

Fall 2020

How we value future generations

Elias Connors Dorf
Bard College, ed7627@bard.edu

Follow this and additional works at: https://digitalcommons.bard.edu/senproj_f2020



Part of the [Behavioral Economics Commons](#), [Bioethics and Medical Ethics Commons](#), [Business Law, Public Responsibility, and Ethics Commons](#), [Finance Commons](#), [Growth and Development Commons](#), [Health Economics Commons](#), [Organizational Behavior and Theory Commons](#), and the [Public Economics Commons](#)



This work is licensed under a [Creative Commons Attribution-NonCommercial-No Derivative Works 4.0 License](#).

Recommended Citation

Dorf, Elias Connors, "How we value future generations" (2020). *Senior Projects Fall 2020*. 14.
https://digitalcommons.bard.edu/senproj_f2020/14

This Open Access is brought to you for free and open access by the Bard Undergraduate Senior Projects at Bard Digital Commons. It has been accepted for inclusion in Senior Projects Fall 2020 by an authorized administrator of Bard Digital Commons. For more information, please contact digitalcommons@bard.edu.

How we value future generations

Senior Project Submitted to The Division
of Social Studies of Bard College

by

Elias Dorf

Annandale-on-Hudson, New York

December 2020

Acknowledgements

I would like to thank David Shein, my project advisor, for talking through my ideas and helping me rein in this project to what it is today. It has been a great and enjoyable process and I attribute that to having you as an advisor.

I would also like to acknowledge Taun Toay who reviewed my project with me and gave me additional perspectives.

Also, I would like to thank my parents for making it possible for me to go to Bard.

Abstract

This project examines how we value future generations. From looking at different ways we value future and present wellbeing we are able to see a tension that arises from having a high value on both. When looking at examples of ways we value future wellbeing we can see that if you value future wellbeing highly it will devalue current wellbeing. Then we look for a justification for valuing one over the other. This leads us into two ways of how we justify valuing either valuation of wellbeing and a discussion of the average and the classical principles of utility. We come to the conclusion that the average principle of utility should not be used and so explore the classical principle. Through the classical principle we look at the repugnant conclusion and determine that the rare disease problem is an instantiation of this conclusion. Through a framework of how we value future wellbeing in the rare disease problem, we are able to use an appeal to innovation to resolve the repugnant conclusion and thus have a justification for valuing future wellbeing over present wellbeing.

Table of Contents

Abstract	4
Introduction	9
Chapter I, The Rare Disease Problem	11
The trouble with people who exist in the future	11
The rare disease problem.....	12
Incentives and systems as different ways to value the future.....	14
Chapter II, Valuing Future Generations.....	17
Innovation and Medicine.....	17
Utilitarianism.....	21
Rejecting the average principle of utilitarianism	24
Frank Ramsey	29
Chapter III, The Repugnant Conclusion and its instantiations	32
The repugnant conclusion	32
How a repugnant conclusion becomes a repugnant instantiation.....	35
Another instantiation.....	37
Rejecting the solutions to the mere addition paradox and the repugnant conclusion.	39
Chapter IV, Innovation	40
A real solution to the repugnant conclusion	40
Patenting inventions as a cost to perpetually increasing wellbeing	44
A social contract to innovate.....	49
Precision Medicine as an example of innovation solving a repugnant conclusion	52
Conclusion	54
Work Cited	56

Glossary

- **Discounting/Discount rate** - Discounting refers to a percentage of a separate number. I use it in the context of discounting a cost as well as discounting wellbeing. A helpful example if you are not used to it in this context is to think of a similar situation of getting a piece of clothes at a discount. It is the percentage or rate at which the price changed.
- **Rare diseases** - Any disease with a population of under 200,000 people in the US. However, I use this term and will often refer to very rare diseases with a much smaller population as a rare disease.
- **Orphan diseases** - This refers to diseases that are being ignored. In developed countries, these are almost always rare diseases; however, it is not exclusive in non-developed countries in that context.
- **Utilitarianism** - This is the theory that actions are right if they promote the greatest amount of happiness and should be a guiding principle of conduct.
 - The classical principle of utilitarianism. I refer to this as the sum principle of utility as a statement of how to calculate that utility.
 - The average principle of utilitarianism. This refers to calculating the average utility.
- **Wellbeing** - This is a state of happiness and contentment.

Introduction

The purpose of this project is to identify how we value future generations. A term I use to be more specific about future generations and how that value manifests is future wellbeing. When I say things along the lines of, valuing future wellbeing higher as compared to lower, it can be useful to think of it as: to what extent is that future better or worse off for the people who would live in it?

I will show different ways we can value future and current wellbeing and what those ways imply. One of the implications that is elaborated on is that when we value future wellbeing highly, it devalues the present wellbeing. We then explore justifications for valuing future over present wellbeing and we look at some of the literature in utilitarianism.

In 1928, Frank Ramsey published a paper in *The Economic Journal* in which he discounted future enjoyments at zero. (Ramsey 543) Using a discount on future enjoyment would be to value it less than present enjoyments. Not discounting it values people's future enjoyments the same as people's present enjoyments. When I later refer to Ramsey valuing future wellbeing highly it is in comparison to using any positive rate when discounting future wellbeing. Ramsey also follows a classical utilitarian view of calculating utility and so in order to figure out a justification for balancing how we view future and current wellbeing we need to look at the shortcomings and paradoxes in the classical principle of utilitarianism.

Derek Parfit, in his book *Reasons and Persons*, demonstrates paradoxical thinking in the classical principle. He calls it 'the repugnant conclusion'. The conclusion is any loss in the quality of wellbeing in a population can be compensated for by a

sufficient gain in the quantity of that population. (Parfit 402) This conclusion comes from the two common sense notions that life is worth living and that we should try to optimize happiness. One of the methods Parfit uses to arrive at this repugnant conclusion is the mere addition paradox, which is a step-by-step way of how we arrive at a world with many unhappy people from a world with few happy people. The mere addition paradox and the repugnant conclusion are problems for the classical principle of utilitarianism. (Parfit 449)

The rare disease problem is an example of how we balance valuing future and present wellbeing. This example of balancing future and present wellbeing is important to understand as it is an instantiation of the repugnant conclusion and later shows how to solve this paradox and find our justification for valuing future wellbeing. To simplify that relation, innovation that happens at the expense of present wellbeing is in favor of an increase to future wellbeing. From the way modern progress has permanence you can end up with a situation where any loss in the quality of the current wellbeing can be made up for with the amount of people you get to save in the future. The rare disease problem gives us a framework for understanding a later transition to a resolution of the repugnant conclusion.

Chapter I, The Rare Disease Problem

The trouble with people who exist in the future

We are able to figure out how to value things in the future and what they mean for us in the present. If we value future enjoyment highly, we might choose to prolong our present enjoyment to achieve it. For example, if we choose to work an extra shift which pays us ten dollars for one extra hour of overtime. We can use that ten dollars to pay for two hours of happiness at an amusement park a few weeks in the future. This is valuing that two hours of leisure at one hour of work. However, the value of that future enjoyment can be independent of the dollar figure as people's situation and income change over time. If we begin to think about things much farther out than the two weeks and add more people that value enjoyment differently. Then the larger amount will make it more complex but many of the same principles as the amusement park can apply. However, what if we try and value the future happiness of people who do not exist yet?

If we try to value that type of future happiness like the amusement park happiness, we run into problems. One of them is that the amusement park situation cannot scale in this way because we cannot know how people in the future will value their enjoyment. Another problem is that we cannot value the future people's happiness because we risk devaluing the happiness of the current generation. An example of this scenario is working an extra hour to pay for an amusement park ticket that someone in the future, we do not know, will use. It can feel almost nonsensical to have the people give up their present happiness for someone's happiness who does not exist yet. So, how should we value future wellbeing? I begin by looking at the rare disease problem and how we value future medicine and its future wellbeing.

The rare disease problem

The drug creation system places a cost on current wellbeing in order to have an increase in future wellbeing. That cost is being passed on to current wellbeing with things such as patents and drug costs. This is aimed to increase wellbeing for the distant future, like after a patent expires, but arguably diminishes the wellbeing of current people.

To further understand this, we need to first understand what rare diseases are. Simply put, they are a disease population where only a small number of people have the disease. Their existence creates a problem as virtually no one wants to innovate for a disease that affects only an extremely small amount of people.¹ People are not able to make money from it, so there is little motivation to search for cures or treatments in the first place? One example of how we tried to get people to go after these ignored diseases is the Orphan Drug Act. The act grants seven years of market exclusivity and tax credits for up to half of the research and development costs. This hopes that high incentives bring about innovation into these small populations of diseases that are being ignored. (Yin 1060)

The Orphan Drug act, from a pure innovation standpoint, was a success: companies now fund trials for what were previously lost causes. (Yin, 1073) The Orphan Drug Act and patents are examples of incentives that values people's future wellbeing to a high degree. The downside to this is the negative effects on current wellbeing: monopolies that induce high prices. There are many examples of this: a treatment for

¹ Rare diseases are classified as a disease population under 200,000. When I say an extremely small amount, I am referring to situations like orphan diseases where there is such a small amount of people that it is ignored.

Gaucher disease costs around one hundred and fifty thousand dollars; Soliris costs between two hundred thousand and four hundred thousand dollars. Health insurance companies usually tolerate the burden of these cost. The person being treated pays a minute fraction while the insurance companies cover the whole cost. This relationship exists so that the cost to the current wellbeing is not unbearable. However, because of the incentives it is lowering the wellbeing of the current population in exchange for future wellbeing. The current generation has to trade-off between lower prices and fewer rare disease treatments or higher prices and more rare disease treatments.

Rare diseases now make up a significant portion of the drug industry in the US. The US has outshined other countries in new drug creation. (Keyhani, et al, 2010) A system that does not hold those same incentives could lose that type of innovation. However, could we see that as being better? If we take the view that future wellbeing should be thought of highly and the corresponding view that innovation must be kept, then this system is good for society. What if the level of innovation was lowered? Then this would require people with those life-threatening diseases to be asked to prolong a potential treatment. Implying their wellbeing has a lower value placed on them. This is a deadly trade-off in which it can seem that neither outcome is preferable. In this situation, the future wellbeing of these small populations is being pitted against our current wellbeing. From this example we can see how we view future and current wellbeing and their relation to one another. Incentives are an example of a distinct view of future wellbeing and show how we balance these values.

Incentives and systems as different ways to value the future

Valuing future wellbeing highly in a capitalist system allows for innovations in things that seemingly require it. For industries like environmental and energy industries, the valuing of future wellbeing can be looked at similarly to medicine. If we are to get out of a problem like climate change, innovation is necessary. This can be used as another example of valuing future wellbeing highly in order to innovate into wellbeing.

Innovation leaves a bunch of opportunities for things to be improved. As soon as innovation happens, there should be a rush to improve as many lives as possible with it. That statement can be seen as a loaded statement as improvement and possibility are two things with large variability. There is also the absence of failure in that statement. Failure can be thought of as opposed to success. This can be useful when thinking about how we can define or measure innovation. It will also help us think about how innovation happens and how an idea can turn into something that improves lives.

The attitudes towards future generations can help us figure out how we justify valuing future wellbeing and present wellbeing at the same time. The rare disease problem is an example of privileging the future population, arguably, at a cost of the current population's wellbeing. We can have a visceral disagreement with the level of innovation and also have conflicting values of future and present wellbeing.

The problem of people having conflicting values for future generations is not set to any one system it is innate as the perspective stems from us. Different social systems can have incentives systems that produce different values on future people. If society's priority favors the current generations, then the incentives will match those with lower

costs. So, in a system with socialized medicine or a centralized system, the cost will be lower on the current generation without the same incentives.

Innovation starts by people putting resources into projects for some sort of future wellbeing. If there are less incentives for these projects then there are less active resources, capital as an example, for these projects. How important is active capital in innovation? By definition, a centralized system or government restricts expendable capital, which is an incentive for invention, therefore minimizing reasons to innovate. Acting capital is directly connected to the speed at which people or a system innovates. (Solow 10,11) This is the intrinsic difference between a centralized and a decentralized economy or, in other words, a question of who has the money.² For innovation to happen under a decentralized system, the trust of other intentions and values needs to happen. (Kotz, p10). A capitalist system can operate as a trustless system not requiring the need to depend on others values. Trust, in that way, will always be uncertain; so a trustless system has been the most compatible to date for incentivizing innovation and valuing future generations more highly. However even in a system that is more compatible with valuing the future generations highly we can still have conflicting values of future wellbeing.

The problem of having different values for future generations can be seen inside our industries. We can change our value of future wellbeing for different industries which seem problematic. It seems problematic as it is the same as stating that different human beings and their wellbeing should be valued differently based on nothing except their proximity to the desired industry. If we do that, different future people will matter

² It seems again like the rare disease problem is inescapable if you value future wellbeing in this way.

more than others, and there is no real basis for that claim. Why should the person who will die one hundred years from now of a disease be valued less than a person who will die one hundred years from now of something else? If the current cost is similar and we can innovate into both, shouldn't their future wellbeing be valued similarly if not the same? Can there be a set of rules that can be applied to figuring out different peoples' wellbeing, or must they be valued the same? It seems like some level of consistency is necessary when valuing future wellbeing. However, if people can value the current generation over the future generation, they will not be able to escape the rare disease problem.³ Valuing the current generation over the future means lowering incentives that are burdening current generations. These different values create a philosophical problem of how we value future generations compared to the present generation.

³ If we take the inverse for these industries and disincentivize innovation, then presumably the cost on current wellbeing will go down. This would mean however those insurance companies would cover drugs at a lower cost and energy sectors would not need changing. This would alleviate the burden on current generations and current wellbeing while accounting for future wellbeing at a lower value. This also seems to have a host of problems, the most preventable of which is the inability to innovate out of problems. The idea of not innovating, however, is not totally without support.

Chapter II, Valuing Future Generations

Innovation and Medicine

Innovation is important for figuring out how to balance valuing future wellbeing as it is a method for escaping the rare disease problem as well as an example of how we value future wellbeing. An invention, which we will discuss more on this later, is a point in time in which new ideas create something that has not existed before. Invention always comes before innovation. Valuing innovation, then, is, in turn, valuing future inventions. Incentives on invention around rare diseases are one method for escaping the rare disease problem.

When we value future people to a high degree, we are able to have our actions today reflect our valuation of them. So, if we decide to spend less money in one area, it reflects our value of future people and vice versa. For rare disease populations, their disease will continue within them, and in a lot of cases, they will pass on the disease to their children. There are future populations who will get the disease, and if the world population continues to grow, so will that disease population. If the future people who have the disease are valued highly, then that tells us we should do something that will result in them getting treatment or a cure.

One mode of thinking is that the consequences of innovation are worth the incentives to achieve them. That the cost to improve future people's wellbeing are worth the potential expense to current wellbeing. Patents are a way that we show this. The idea behind a patent is that if you figure out something that no one else has done before

(like a cure or treatment for a disease), then you own it, and no one can copy what you have done for period of time. When the patent expires, anyone can create that thing. Patents prioritize the immediate creation of new ideas and things. The creation of that thing is prioritized over the general unauthorized use by anyone who did not create it. This is an incentive that places a high value on people in the future; it assumes that the benefit of having innovation happens now rather than later and will help most people. Patents are an attempt to spur and create innovation.

A famous invention and innovation we should discuss is the discovery of penicillin or antibiotics. When this is put in different contexts for wellbeing the example showcases different perspectives on how we can view future and current wellbeing. Without antibiotics, we would not be at the population size we are today. If you had to choose between a world where there is a rapid discovery of new things like penicillin or one where there is a slow discovery of things like penicillin, the initial reaction is to choose the world with rapid development. In general, patents and incentives attempt to choose that first world and speed up the discoveries and thus set our own pace on innovation. This tells us that inventions like penicillin and towards similar outcomes can be seen as trying to increase wellbeing.

In the context of future people and their wellbeing, penicillin was discovered in 1928, which is ninety-two years ago. As for us today, who were future people in 1928, we received an immense benefit from antibiotics, and so it is easy for us to use that time scale to view the benefits to our generation. We are the future generation of 1928, and we want the invention of penicillin and all the benefits from that. We were their future generation, and so our future generation would likewise want invention and its benefit. It

becomes more difficult to look forwards instead of backward; however, the same principles of the past are transitive; it is just that they are uncertain. What can be transitive is understanding invention as a benefit to future generations and rapid discovery is preferred to non-rapid discovery ⁴, and innovation is an attempt to have rapid discoveries benefiting future generations.

The idea that discovery can be a consequence of self-interest can be inferred from how we act when thinking about profits in a market-based system. Operating in a capitalist society or, more specifically, the private sector is primarily about creating value for other people, and through creating value for other people, you make a profit. What is noteworthy about this is that value creation comes before profit. The profit is in exchange for the value that was created. So, to benefit themselves, i.e., make a profit, they first must create value for others. (Mackey, p22) If someone tries to benefit themselves and increase their current wellbeing, they must do so in a way that also creates value for others.

Furthermore, placing incentives to increase the benefit to oneself should, therefore, increase the benefits of others. So by placing incentives to profit, an innovation that comes with creating value can benefit others and the self. If we begin to think about this temporally, we can say that the benefit sooner is better than later. If you can knowingly benefit someone sooner (and yourself) without a downside, you would rather do it sooner than later. However, what about the opportunity cost? What if we add some consequences to innovation, like the diversion of resources from other things? If you value future people highly, the answer has to be yes as the benefit of

⁴ Assuming no harm in rapid discovery; we will discuss that later.

something like penicillin existing is better sooner rather than later. We can say that bettering people's lives can be an outcome of innovation over time.

Continuing with the sentiment of opportunity cost, consider that innovation devalues the lives of people currently alive. Penicillin didn't have any immediate effect or uses in 1929 and has been much more valuable in the last seventy years. If we value current generations as not the candidates to benefit from the innovations, there is a real devaluation of the current generation. In 1928 there were about two billion people; today; there are nearly eight billion people. Would we have been right in valuing the people of 2020 the same as the people of 1928 during 1928? ⁵ If in 1928 we thought there would be eight billion people by 2020 and we valued them highly, how would we go about doing that? If each person in 2020 has the current value of one-fourth, both populations would be equal in value. If we value them high, there is an innate risk of devaluing the current generation. There are negative consequences to this as (if we take it to the extreme) someone who lives only for the future generations has little incentives to innovate. However, if there was some balance between them, they would enjoy things benefiting them currently. So, the dichotomy of valuing future people higher or lower is more or less a false one as we cannot practically live in or get to either extreme of a valuation. We need a method to justify valuing future people's wellbeing high or low which utilitarianism will be able to help us with.

⁵ Assuming that everyone's value is one and so equal.

Utilitarianism

Utilitarianism can provide us with a possible justification for valuing future wellbeing over present wellbeing. Utilitarianism is a doctrine of trying to maximize happiness. If something increases the happiness of a lot of people, under utilitarianism it is seen as a good. When something increases the happiness for a large number of people and lowers the happiness for only a few; if the overall happiness is increased than it is good.⁶ So, when you discuss innovation, rare diseases, and all the things that those ideas have to do with, you're talking about figuring out the overall happiness; these determinations can sometimes be murky. The kind of ambiguity of determining the overall is what leads to differing opinions, in other words, how we ought to go about calculating maximum happiness. However, if we can determine that an increase in happiness is a good, then there is a path to a real ethical defense based on utilitarianism. The average principle of utility is one method of solving how we should value future wellbeing. What utilitarianism allows us to do is to criticize valuing future generations highly and also allow for a high value based on if it increases overall happiness. If we are able to determine an overall increase in happiness than we have a utilitarian justification for valuing future wellbeing highly. First, we need to figure out what principle we should use for the maximizing of happiness.

Sikora deals with the differences between the classical principle and the average principle and how we understand the key concept of maximizing overall utility. The difference is in the calculation of utility. The classical principle takes the sum of all the

⁶ Overall refers to a calculation made of whatever maximizes happiness. For example, you can calculate what increases happiness overall based on the per person average or a sum of all the happiness.

happiness that is produced by people as the calculation for how we should increase happiness.⁷ The average principle takes the sum of all the happiness produced by people and then divides it by the number of people to get an average happiness for each person. The difference is a calculation to determine the most overall utility and in our case wellbeing. The average principle is the view that you should do what will bring about the greatest possible *average* happiness level.” Rawls, Rescher, and Broad regard the average principle as superior to the classical principle, and there are considerable grounds for supposing that Mill accepted the average principle.” (Sikora, 409)

One case Sikora brings when discussing how the difference manifests is a couple deciding whether to have two children or six. Whether there are two or six will impact the lives and expected happiness of the children:

Consider the following case. A couple is deciding whether to have two children or six. Whether there are two or six they might expect to have much more happiness than unhappiness in their lives. But if there are two children, let us assume that their average level of happiness would be slightly higher than it would be if there were six children. If these were the only two alternatives, and the question was to be decided in terms of the children’s welfare, I would suppose that the parents should have six children. But if additional alternatives were possible, I might hold that a trade-off would be in order. It might be the case that they should do something that would neither maximize the average level of happiness of the children nor bring about the greatest excess of happiness over unhappiness – that neither the classical nor the average principle should be followed. (Sikora 412)

Sikora, in this situation of a couple deciding between two or six children, is able to distinguish the key conceptual difference between the average principle and the sum principle. If you assume that the two children would have slightly higher levels of

⁷ I prefer to refer to it as the sum principle when discussing it in relation to the average principle.

average happiness compared to the six then according to the average principle you should choose two children. However according to the sum principle, the six children option would have the highest sum happiness and so the choice would be six children in that situation. He then explains that if we add the six children's happiness levels and the sum is slightly greater than the two children's happiness level, if comparing each child, the six children would have one third the happiness. So, if we average out the two children's happiness, we would prefer the average instead of the greater: "In the case in question, I would suppose that the parents should follow the average principle and only have two children." (Sikora 412)

Rejecting the average principle of utilitarianism

Do these principles apply or even help us think about future generations? Even in the case of the sum or average happiness, there is still little talk of future happiness. For example, I would suppose that if future happiness is greater than current happiness, you could justify the greater amount of happiness under both the average and the sum principle. So, we should review Sikora's distinctions to find where the distinctions manifest in the case of happiness over time. Consider Sikora's previous case when you have the decision of two against six children. If we give Sikora the averaging principle and then suppose that the two children have a greater amount of average happiness at the beginning of their childhood, but their overall happiness remains the same throughout their lives, we would say that the six children have less average happiness initially but eventually surpass it based on their average happiness. Should we consider the higher average in the future and so choose six children instead of two? There is a time variation between the two, so there should be a time value of happiness. There are certain problems that come up with using the average principle over time which leads us to not view future wellbeing through the average principle. However, first we need to understand more about how the average principle plays out.

Many arguments can be used to say it's more than possible for the six children to be happier in the long run. For example, more siblings to grow with and play with means greater chances of happiness, or having a sibling causes happiness, so more will cause more. The argument does not make a difference if you concede that there is a possibility for a variation of happiness based on different periods.

The difference between the two options of children's happiness becomes drastically large when looked at through the sum principle- to the point where if the average of the six children ever matches the two children with happiness levels, then the sum difference would be three times as large.⁸ So, if there was a situation in which the average happiness would, in the future, meet with the two children's happiness, the sum happiness at the time of the increase would have to be two hundred percent greater than the happiness of the two children. This drastic difference is not an oversight in the average principle because it is the desired outcome.

If taken to extremes, the average happiness of two people can be extremely high and still preferable to a population with less average happiness but more people. It seems like the correction to this extreme would be, at some point, to consider the sum principle. The two should not be mutually exclusive.^{9 10}

At some point, we should distinguish between the farthest average happiness and the closest. The people who make the decisions based on the average principle are the parents of the children; if the point at which the average happiness of the six children becoming greater than the two is very far out in the future; then it is unreasonable to expect them to pick an option that is far out into the future. The reasoning for their perspective could be that it is so far out, and they could no longer be here to experience it. However, if the inflection point happens within the next year then even though the two children are born with a greater average level of happiness which

⁸ You get when you revert the average to sum for the two children at the point the six children reach the same average happiness the two children have.

⁹ The extreme of the sum principle is the repugnant conclusion, which is discussed more later.

¹⁰ Perhaps a new principle of discounting the sum happiness would be better.

the six will overcome, it is reasonable to assume that they would choose the six over the two if they choose on averaging happiness.

There needs to be some method of recognizing a distinction between future and current happiness. Parfit recognizes that a discount rate has been used for trying to value effects on future people.

Some writers claim that, while we ought to be concerned about effects on future people, we are morally justified in being less concerned about effects in the further future. This is a common view in welfare economics, and cost-benefit analysis. On this view, we can *discount* the more remote effects of our acts and policies, at some rate of n per cent per year. This is called the *Social Discount Rate*. (Parfit, p. 357)

In theory this would make it so that each year in the future the level of happiness or welfare would go down an increasing amount. The further in the future that happiness is; the more it gets discounted thus making the difference between the original level and the discounted time dependent. A discount rate with utilitarianism has the potential to justify valuing either future wellbeing or current wellbeing over one another.

The initial problem with discounting the average each year is that the average does not consider the number of people. If we have an average level of ten and discount it for one year, it will be less than the one year even though it will not have overcome the other ten. This is an issue in averaging; it is logical to revert to the sum principle in some situations. For example, what would be the decision, and how would it be made, when the parent realizes that the average happiness of the six and two are the same? They would ultimately choose based on the number of children and not the average because the happiness level is the same. There is a reversion back to the sum

principle. It is not pragmatic to expect those parents to be indifferent. This problem also happens when you compare the average happiness of the future people and it is equal to the current average happiness level. You revert to the base of the sum principle and undo the calculation you did for the average principle. So, if the average discounted amount of future happiness is not vastly different from a present average happiness, for the two children, then we can assume there is reversion back to the sum principle. To not revert back; we would have to consciously ignore other human life and internally value the slight increase in average happiness to such an extreme where I believe it to be unrealistic.

Additionally, valuing the future based on the average principle can also have foolish conclusions. Parfit understands this and writes a scenario which illustrates this point.

How Only France Survives. In one possible future, the worst-off people in the world soon start to have lives that are well worth living. The quality of life in different nations then continues to rise. Though each nation has its fair share of the world's resources, such things as climate and cultural traditions give to some nations a higher quality of life. The best-off people, for many centuries, are the French. In another possible future, a new infectious disease makes nearly everyone sterile. French scientists produce just enough of an antidote for all of France's population. All other nations cease to exist. This has some bad effects on the quality of life for the surviving French. Thus there is no new foreign art, literature, or technology that the French can import. These and other bad effects outweigh any good effects. Throughout this second possible future the French therefore have a quality of life that is slightly lower than it would be in the first possible future. (Parfit, 421)

Based off of these two worlds and all the people in them, the average principle would dictate that the second world is better because it has a higher average quality of life.

The billions of people in the first world are worse off for many centuries before they get better. If the billions of people never lived, then the average quality of life would be

better for the French. It would even be worse if those people lived because the French have a higher average now rather than before. This conclusion by the average principle is of course foolish; however, it goes to show why we think it is foolish and it is because of the billions of people who are not in existence.¹¹ We internally revert to the sum principle when we consider the glaring difference between the two worlds, the number of people. We cannot value future generations in any way under the average principle, because of its tendency and likely potential to ignore human life.

Sikora brings up another example of the average principle and discusses an individual who can raise the average happiness to a higher level (Sikora 416). We can extend this argument: if there was the possibility of creating a future person that would bring the average happiness to an extreme amount of average happiness, then what obligation do we have to bring about that future happiness? What if, in doing so, we bring down the average happiness of people alive today to bring this person into existence? If there is no obligation to future happiness, then the average principle would be us trying to maximize the average happiness for only people who exist or whose existence is inevitable. However, no one's existence in the future is inevitable. This cuts both ways, so the possibility of this mythical person should be recognized and accounted for in the average principle. So, we cannot look at a discounted value for future wellbeing through the average principle. If there is a way of discounting wellbeing under the sum principle, then there is a justification for valuing future wellbeing over current wellbeing.

¹¹ Parfit refers to this conclusion of the average principle as an absurd conclusion. (Parfit 449)

Frank Ramsey

Frank Ramsey used the sum principle when viewing future wellbeing. He put forth an equation for optimum saving while trying to figure out how much income a nation should save. Ramsey differentiates between discounting money and discounting future utilities or wellbeing. The distinction between the two is that wellbeing changes based on our enjoyment of money. (Ramsey 1928, 553) We can say that our rate of discount of our wellbeing influences our rate at discounting money. If the rate discounting our enjoyment is zero, then it is “independent of the value of [the rate for future sums of money].” Ramsey 1928 p554) This distinction is shown by how Ramsey does not discount future enjoyment.

One point should perhaps be emphasized more particularly; it is assumed that we do not discount later enjoyments in comparison with earlier ones, a practice which is ethically indefensible and arises merely from the weakness of the imagination. (Ramsey p553)

To Ramsey the devaluing of someone’s future wellbeing is indefensible. Ramsey does not use a formula to discount future enjoyments. He uses a classical utilitarian approach and calculates the sum of utilities over generations. Ramsey calculated optimum savings with a discount rate, however, that formula is only used for that and not future enjoyments. The discount rate for optimum saving was the discount rate approaching zero over an infinite time. (Ramsey 553–555)

Wellbeing not being discounted when viewed from the present moment has been a particular part of Ramsey that has been debated among philosophers and economists alike. However, it leads to an interesting way of valuing future wellbeing. Robert Solow, an economist, agrees with Ramsey. Solow wrote responding to Ramsey,

“In social decision making, however, there is no excuse for treating generations unequally, and the time-horizon is, or should be, very long. In solemn conclave assembled, so to speak, we ought to act as if the social rate of time preference were zero.” (Solow 9)

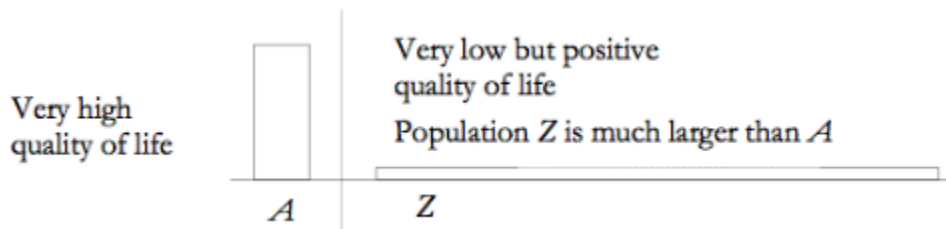
If wellbeing is discounted at a positive rate, then we inherently discount that wellbeing to a lesser extent because the discount percentage is positive. If the rate is zero it leaves an interesting way to value future wellbeing that does not diminish their wellbeing whatsoever. When using a discount rate above zero we treat future generations unequal from our own. This way of valuing future people is a method in the sum principle of utilitarianism and can be seen as a way of calculating maximum happiness. This method is preferred to the average principle

Frank Ramsey's discount rate of zero has implications for the rare disease problem. When you value a rare disease population highly, the prices around the drug are high. If there are only one thousand people with the disease, it requires a disproportionately high cost to develop the drug, and in order for that drug to be developed, the people will be charged highly. However, no one will have the amount required that is to be charged. Insurance companies come in to pay those high prices. When these low populations and high-priced drugs get developed, they increase the cost on everyone. So, you have a situation where, when you value people highly, it lowers the wellbeing of other people. If we use the sum principle of utilitarianism then we can say that if some people become slightly less happy in order to make people very happy, then this is a good under this principle. Our previous initial concern when valuing future wellbeing is that it devalues the current generation in favor of future generations. If the current generation has to decrease their wellbeing in order to have a huge

increase in wellbeing in the future than this can be seen as a good. However, there are some problems that come into being when using a classical utilitarian approach.

Chapter III, The Repugnant Conclusion and its instantiations

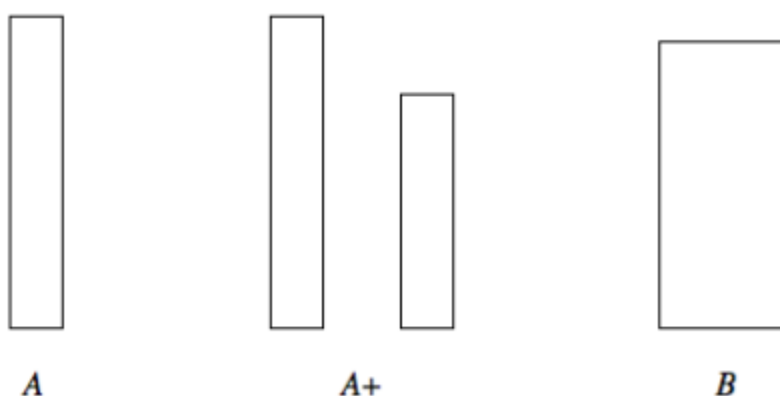
The repugnant conclusion



The repugnant conclusion shows a paradox in utilitarianism; it is the extreme of the classical principle of utilitarianism. Trying to optimize happiness when a population is growing with unhappy people is shown to be incompatible by Parfit. At its core, the repugnant conclusion starts with two utilitarian ideas that are common sense notions: that we should make the world a better place and that life is worth living. These two ideas are at odds and show an extreme disconnect between what we think should happen and what is actually happening. The clearest way of arriving at the repugnant conclusion is through the mere addition paradox. This starts with one population, call it World A, that is extremely happy; we then consider a second population. In the second, world A+, we have an increased number of people; however, a decrease in the happiness for those additional people. If we are under the assumption that life is worth living, this addition is not worse than A.

We then can optimize the happiness and get a new world, world B, in which the happiness of the first population is slightly lower, but the total happiness is higher. This is done with the notion that we should make the world a better place. Now we have a world which is better than world A+. If we repeat this process with B and B+ and do C,

then C+ and D. We will arrive at the repugnant conclusion: a world in which there is greater total happiness but the people in that world are pretty much miserable. (Parfit 419) The very name of it shows the distress you have when looking at the repugnant conclusion because, how can a world with many extremely unhappy people be better than a world with few very happy people? It goes against the same intuition that put forth the two assumptions, to begin with.



There is a utilitarian population problem here. There are other ways to arrive at this repugnant conclusion. Another interesting way is through the contemplation of future people, particularly through two scenarios. First, a pregnant mother suffers from sickness- and if she goes through simple treatment, the treatment will cause her child to suffer a permanent handicap; if she receives the treatment, the child will be cured and perfectly normal. The second situation: a woman suffers from sickness, and if she gets pregnant while she is sick, her child will suffer from a permanent handicap whereas, if she postpones her pregnancy a few months, she will recover, and the child will be born perfectly normal. (Parfit 375, 376, 378) These two situations have the potential to

produce two distinguishably different people. What seems like the common-sense solution, to wait out in both cases, also leads to the repugnant conclusion. The waiting implies that any loss in the quality of lives in a population can be compensated for by a sufficient gain in the quantity of a population, like a woman taking on the illness and thus a loss in quality in order to have her child born. (Parfit 381, 382) This is a problem in the classical principle of utilitarianism and could mean that the sum principle, like the average principle, can meet a tragic fate.

How a repugnant conclusion becomes a repugnant instantiation

The rare disease problem is population Z. Both are results of outcomes in which we want to make the world a better place and also believe that life is worth living. In order to make the world a better place and help these people who had rare diseases, this set high incentives for creating a treatment or drug for a rare disease.¹² Similarly, in the repugnant conclusion's mere addition paradox optimizing happiness was the reasoning for the quality of life to drop. Life is worth living is essential in both cases as it is the whole reason that the mere addition paradox continues. Likewise, it is also the reason for having incentives for invention.

If, for example, there were only one disease that we could potentially have, then we would focus our efforts on that disease, no matter the population of healthy people or people who have the disease. If we then add another disease (and we start with the same assumptions of the repugnant conclusion; that life is worth living and we should optimize happiness), we are now going to figure out which disease we should work on curing. If we start adding more diseases, we begin to see a problem with selecting which disease to go after first.¹³

Now let's assume that we get to choose which diseases to tackle. Under the same assumptions (life is worth living and maximizing happiness), we would choose the diseases that has the greatest negative effect. This would allow us to try and maximize the total number of people whom we can treat and whose lives we can make better.

¹² The orphan drug act for example.

¹³ Assuming all the disease populations are relatively the same.

When we choose this route, we create a logical hierarchy of what diseases should be solved and in what order. However, there is a problem with this: the diseases at the bottom of the hierarchy are not a priority. This means that in the absence of a large population, the disease will not get cured. If a world has one actor who chooses what to go after and they have the choice to try and cure one disease with a population of three or three diseases with the combined population of the three (each having one), they will choose the singular disease because they are trying to maximize people they can treat. Meanwhile, they would have to go one by one for the other three diseases with the same population. This gets to such an extreme that we know how to cure diseases, but they are not worth the effort to tackle. This is an instantiation of the mere addition paradox and the repugnant conclusion. If this conclusion is one that has to be made by classical utilitarian's then it can seem like there is no justification in valuing future wellbeing this way.

Another instantiation

Another example which is useful to look at is insurance, as it is also a conflict of the two notions that set up the mere addition paradox.¹⁴ The rise of insurance allowed incentives and high prices to be where they are in healthcare and, in a sense, lowered quality of life for healthy people. If they are healthy, they will never need health insurance but still have to pay for it however they will only be certain of their health in the future. Health insurance can be thought of as a pool of money that everyone pays into and then when they get sick you get to withdraw from that pool to pay for a service. It is a way to insure the payment of healthcare services. Health insurance acts as a middleman between what the doctor charges and what someone pays.

Zolgensma, a treatment for a fatal muscle wasting disease that kills children in infancy, cost over two million dollars for the one-time treatment. Health insurance companies step in and absorb the cost of these high-cost drugs. (Tozzi 1) The reason the drug company is able to charge that much is by charging these pools of money, aka insurance companies. This creates an ability for a small disease to have an untreated market and thus a motivator for drug companies to figure out a way to treat that market.

The insurance population can also be an instantiation of the population Z of the mere addition paradox and so an instantiation of a problem in utilitarianism. When we start from the same place of no diseases, then there is no insurance necessary to cover them because there are no illnesses. Suppose that we then add an illness into the world that only a portion of the population has. If we try and maximize happiness, then we want to help those people with that illness. If the society is set up in the hierarchy and

¹⁴ Understanding these examples will help us understand the potential solution.

the disease is random in who gets it, then insurance would be a way of maximizing happiness. The people who need treatment would get incentives for treatment as insurance makes more expensive medicine affordable and creates a bigger market for the treatment of that disease. Suppose we keep adding diseases into the world and expand the coverage of this insurance. So, one way or another, everyone pools their money with the expectation that, when they get sick, they will be cared for with the help of insurance. With each new additional treatment and coverage to the system, more and more money needs to be pooled to cover expenses making the premiums go up for each individual. This decreases the amount of money per healthy person and spends it on the person with the disease. This line of logic can continue until we get to a population Z of this world where everyone pays highly into the system to support the few, rare, and expensive diseases.¹⁵ Understanding these two examples will deepen our understanding of why we should accept the repugnant conclusion.

¹⁵ A benefit of this is that the innovation can be at an all-time high because a drug's price can be inflated a seemingly infinite amount. However, the amount everyone would have to pay into the insurance pool of money would have to go up. You are decreasing the quality of life for everyone who does not have a disease.

Rejecting the solutions to the mere addition paradox and the repugnant conclusion.

One solution, which we reject, is to value what the world is better based on the least happy people. This would stop the mere addition paradox at A+ because A+ is not better than A as A is the new baseline for valuing the world, and it is less than it was before. Similarly, the average principle of utilitarianism is a solution. If you take the average happiness of world A then you would not think that world A+ or world B is preferable to A as they have average happiness's that are lower than A. This solution would take into account the needs of the current generation much more than future people as it is judging welfare from the least happy people. This would value future people low. However, this is a bit odd as tension comes when you apply this to the rare disease problem. You would tell the rare disease people that life is not worth living because you can't put the incentives in place to value their future wellbeing. This implies that with this solution, life is not worth living and so breaks one of the original notions of the paradox. It changes a core assumption to the repugnant conclusion to say life is not worth living, which seems nonsensical. While stating life is not worth living as a solution is not the worst idea and does resolve the tension, it also eliminates any concern with any assumption or arrivals at the repugnant conclusion. There would be no reason to optimize happiness as life is not worth it. (Anglin 754) If we can fix this classical utilitarian paradox then we have a framework for balancing valuing future wellbeing to current wellbeing.

Chapter IV, Innovation

A real solution to the repugnant conclusion

I want to explore a solution that does not require a break from the two original notions that sets up the repugnant conclusion. Every other solution breaks at least one of the initial notions, that we want to optimize happiness and think that life is worth living. In order to do that we should understand how we escape one of the repugnant conclusion's instantiations and how we value future and current wellbeing. Then we can properly solve the repugnant conclusion.

New medicine that has been discovered has the potential to increase future wellbeing at an exponential rate if we assume population growth over an infinite time. So, the wellbeing of a new medicine that is discovered has the potential to increase drastically and indefinitely over long periods of time. Arguably these discoveries become extremely valuable to wellbeing, and in retrospect, worth the incentives used to bring the discovery into being.

If we assume that a drug is a *perpetual wellbeing asset* for a disease population, then we can use thinking similar to Ramsey to show how we might think about the rare disease population. A perpetual wellbeing asset is a thing that, once it is made, sets a base level of wellbeing for those people to be increased. So, if a disease that didn't have a treatment or research suddenly gets a treatment, then that sets a level of wellbeing for that disease population. If people know that something is effective, and that knowledge is now available indefinitely, it's a new step so to speak that people can

stand on. So, when a treatment gets made for a population that didn't have treatment previously, that drug indefinitely benefits the wellbeing of that population. Even if a company were to stop making the drug, the knowledge of its effectiveness still effects the wellbeing of that population. Now, if we begin to look at things through a long timeline, perhaps even indefinitely, then the creation of these drugs sets a base level of understanding for that disease and that population associated with it.

Once the cat (research or drug) is out of the bag, it cannot be put back in. Once a drug is created for a disease population, it affects not only everyone who has that disease but also everyone who will have that disease in the future. The wellbeing it creates today will continue into the future, but to an even greater amount because there can be indefinite population growth over extremely long periods.

These perpetual wellbeing assets fit nicely into Ramsey's thinking. His equation to value future wellbeing will not go positive: the enormous amount of future wellbeing that creating a drug contains, will not be discounted. So, if we consider the future wellbeing of people under Ramsey's framework, drug creation is critical for an indefinite increase to wellbeing.

If we use Ramsey's no positive discount when valuing future wellbeing and so value future wellbeing highly, then it seems reasonable to assume that the sooner we discover new medicine, the better.

You can argue that If we don't value future wellbeing at a positive discount rate and set it at zero, then there becomes little reason to go after an indefinitely increasing population of wellbeing because, as long as that indefinitely increasing future happens and wellbeing does get discovered, then there is no urgency. If you have two of the

same infinitely increasing wellbeing events, then their value can be argued to be the same, under Ramsey. For example, there is no difference between an event one-hundred years out that increases future wellbeing for everyone forever and the same event one-hundred and ten years out. There is no difference in value if you value future wellbeing the same. You cannot discount indefinitely with a zero discount rate. One solution is to use a negative discount rate. This would increase the value of future wellbeing year over year, making the one-hundred-year option more preferable than the one-hundred-and-ten-year one. So, there is reasoning for urgency and as shown, a greater increase in wellbeing with the increasing perpetual wellbeing asset the sooner they are discovered.

Invention is a term which can be described as bringing ideas or objects together in a way that did not exist before. If we assume that invention can be used to increase wellbeing and we can say that a greater amount of wellbeing can be achieved for any given invention if it happens sooner rather than later, then we can say that invention sooner is better than later. This is true even if we don't assume that invention can be used to increase wellbeing and allows for evil inventions like the atom bomb and so on. There is still an undoubted possibility for positive effects, so incentives based on positive inventions is a way to skew the negative effects. You can argue that all it takes is one terrible invention to do a demonstrable amount of bad, creating too many negative effects. This argument can also be reversed as to be on the other end of the spectrum, where there is such an invention that causes an overwhelming amount of good and positive effects. This would again lead to the assumption that invention is

better sooner rather than later. Ramsey recognizes the impact and value inventions can have.

The probable increase of population constitutes a reason for saving even more, and so does the possibility that future inventions will put the bliss level higher than at present appears. On the other hand, the probability that future inventions and improvements in organization are likely to make income obtainable with less sacrifice than at present is a reason for saving less. The influence of inventions thus works in two opposite ways: they give us new needs which we can better satisfy if we have saved up beforehand, but they also increase our productive capacity and make preliminary saving less urgent. (Ramsey 549)¹⁶

An important clarification, when he refers to saving, he is not talking about saving lives but saving sums of money. The probable population increase he talks about can imply that if we use a rate of zero to discount the probable, indefinitely increasing population their wellbeing will get larger in comparison to the current generation. Ramsey states that it's possible for inventions to put bliss (happiness and wellbeing) levels higher than at the present. The second part of what he discusses is about the cost to inventions from the perspective of spending one's income. This can be thought of as, if invention comes out and people pay the cost for it; the invention can improve people's lives. While this is through the perspective of saving income it is useful in elaborating on the context of patents being a societal cost to invention and so a cost to these perpetual wellbeing assets.

¹⁶ In the paragraph after this he writes about negative rates not in terms of enjoyment or wellbeing but large future costs.

Patenting inventions as a cost to perpetually increasing wellbeing

Patents are a first step of making world Z, of the repugnant conclusion, desirable. If we use patents as a cost to inventions happening sooner rather than later, then we can see that patents are an incentive used for people who want to increase their personal wellbeing. After an allotted amount of time, the patent expires; however, during that time, the patent is a cost for the invention.

With medical inventions, the cost is the patent, and that cost can be extrapolated in a few different ways, mainly through pricing and research and development costs. After an invention happens and a patent is awarded, there are regulations to actualize that invention. Development costs are to get the invention through the regulation and approved for use. The process of going through the regulation can be time-consuming on a patent. If the invention gets approved, it has limited time to use its patent protection before it expires. This can be seen in the pricing of different drugs. To focus on what was discussed earlier, diseases with small populations often have higher prices per person (Drummond 338,339). Soliris costs between three hundred thousand and five hundred thousand dollars per patient per year and are used to treat atypical hemolytic uremic syndrome and generalized myasthenia gravis. It is considered among the most expensive in the world. Not everyone has that much money to spend every year. This is where insurance comes into the picture and can be thought of as a continuation of the cost of the invention. The costs of rare disease drugs get mixed in with insurance premiums, so you have a situation where people who are not getting the treatment and do not know the recipient are paying into a system that pays for treatment. This

situation, the patent and its protection, act as a way to bring the invention into being sooner rather than later.

The costs that then come from the patent are a byproduct of the cost of that invention. It is very easy to get caught up with what happens during the duration of a patent; however, it is essential to remember that the invention, once created, indefinitely exists and so can also indefinitely increase wellbeing as a result. So, with the increase of new inventions comes an increase in temporary costs for indefinite inventions.

This can help explain the inventions and innovations that are happening in medicine with gene therapy and can serve as an example of the tension in the repugnant conclusion. Gene therapy is a new approach to solving DNA mutation problems. The problem with curing a DNA mutation is that there is a mutation causing the disease replicated in every cell. How can you change it in every cell? One of the ideas put forth is that we use an old enemy that can already do this for us, a virus. Gene therapy is the use of a virus to change the mutated DNA in cells. There have been many permutations to this; however, this is the basic idea of gene therapy.

The cost associated with gene therapy has been remarkably high, with development costs being between one billion nine hundred million and five billion dollars and pricing for the drug in the millions. (Loo 25) The results of gene therapy can be curative. For example, the therapy for Hemophilia B, a rare disease, consists of blood transfusions, which has an average price between two hundred thousand and three hundred thousand dollars per year, or between four million to six million in total costs given thirty to forty years as this disease is with you for life. Gene therapy would create a lifetime cure having to avoid blood transfusions and yearly costs. If the pricing of that

gene therapy was over one million dollars for the one-time treatment, then it is arguable that you are saving costs. When we consider that the blood transfusion was patented, then we have a situation where the cost of invention, a patent, is being circumvented by a better invention and better patent. The blood transfusion and the patent associated with it, are having initial potential cost negated.

In addition to the hemophilia example, the research that has been conducted to show that was the problem and then this is the solution was indefinitely put out there.¹⁷ In this case, the problem was that the people with hemophilia could not produce a bleeding protein called factor IX. When this was found out, the solution was to put factor IX into them through blood transfusions, and thus we have our first invention. Through this first invention and the research behind it, there is also an indefinite proof of concept. If we get B hemophiliacs factor IX, they can control their bleeding. This proof of concept then goes to other inventions. What if we can make it so that they produce this factor IX protein on their own? So, gene therapy was used and invented a new solution.

However, there is a remaining question of that cure's price being offloaded onto people who do not have hemophilia. The insurance system makes it so that it is bearable to offload costs onto a pool of people. What if that cost becomes too high? This scenario is not unimaginable. There are many rare genetic diseases. What if we come to a point where we produce so much new treatment and cures for the people with the diseases that the costs become very high for the public? Is there a point where people won't want to pay the costs? This leads us to a situation where you have tension

¹⁷ The problem was not having factor IX.

between life being worth living and optimizing happiness. This is the utilitarian tension that leads to the repugnant conclusion.

Through understanding these examples, we can resolve the repugnant conclusion. The traditional solutions either distort or remove one of the two notions; however, we need to accept the repugnant conclusion and those two principles in order to solve it. If we have our world Z with its mass amount of unhappy people, we can say that one of the goals of the world is to optimize happiness. If we say that this world and the repugnant conclusion, in general, is an extrapolation of these tensions and these tensions exist within us in time, we can also assume that world Z (if it can exist) would exist in time.

The assumption leads to an answer when accepting the repugnant conclusion that resolves the tension: when trying to optimize wellbeing overtime, innovation will occur. There are more people, but this means that there are more people who fall under the commonsense notions to optimize happiness. If people are unhappy, there is a greater amount of people to invent or act to increase others' wellbeing. Likewise, if many people are dying or unhappy, there is now a greater number of people (who think life is worth living) attempting to prevent that. Then because of the nature of perpetual wellbeing assets improving wellbeing with inventions and having an indefinite solution, World Z, overtime increases its wellbeing when accepting the two initial notions. When comparing World Z to World A, there are fewer people to invent and fewer people to innovate. World Z will end up being a preferable world in the long run compared to World A. While this does not appear at first glance and can have given us a negative

visual reaction when comparing the two, there is an inevitable march towards increasing wellbeing that Parfit seemed to overlook.

The best solution to the repugnant conclusion is to accept it and to realize that it is not so repugnant as it initially seems. As the population increases so comes an increase in innovation. For world Z, there are so many people that someone will move to optimize and increase happiness as per the original notion. Similarly, because of the vast amount of people, suddenly, there are more opportunities to increase your own happiness. If the original notion is to assume that we want to optimize happiness, then we must also concede that people will *try* to optimize happiness in the world. There are inherently more incentives to increasing happiness in world Z than in World A. With a larger population also comes a greater chance for people to invent and the ability to innovate into increasing wellbeing. The notion that world Z is not worse than A is counter-intuitive; however, if world Z were to operate in space and time, they would be more innovative than world A. This is acceptance of the repugnant conclusion which will lead us into how we balance valuing future wellbeing.

A social contract to innovate

Switching to a more descriptive mode will help to emphasize how innovation is thought of in a market and further our understanding of the solution. In a market-based system you can have a trustless system. You don't have to trust people to work in your interests. If the desired outcome is to increase wellbeing, innovation, create value, or whatever phrase you want to use, you can have a trustless system that, in order to profit, people have to be reciprocal and accept your increase in wellbeing. If someone is self-interested and wants to increase their own wellbeing, they have to do so in a way that creates value or increases your wellbeing. This is a kind of social contract. It can sometimes be referred to as a double thank you, and this is the market society. The concept of a double thank you is when you buy something like food or a hat, you give them the money, and then they give you the food or hat, and you say thank you, and they say thank you as well, a double thank you.

This is done because it is a voluntary transaction. So in a market with voluntary transactions, a transaction does not have to occur. Someone doesn't have to buy something if they don't want to. Likewise, someone doesn't have to sell something. These two things are what make a market system. The point of this market system is that we all choose to use it.

In the case of diseases, you have a system where someone wants to sell something. If someone patents it and they go through the regulatory approvals, then you have one side that wants to sell something, and you have another side, which can easily be seen as less consensual. Especially with deadly diseases, that is, if you want to have this drug or disease treatment, you have to buy from the guy who's selling.

These seemingly create these single seller monopolies. You have someone who wants to sell and someone who needs to buy. These monopolies are temporary as they end when the temporary patent to the drug has expired. After a patent is done, then it becomes allowed for the market to pick it up and produce it.

So, this isn't a market system, but it can be, and this is where the valuing of future generations comes in if you value future generations highly— getting a patent for that disease sooner rather than later is kind of like a handshake. If we imagine the worst possible treatment of these people then they could exploit those people temporarily. The buyers have temporarily no choice. And that is an exchange for an indefinite increase in wellbeing. If that's the case, it is a clock ticking until it gets put in a market system. If the sellers want to sell it, they have to go through regulatory approval, so if someone goes through regulatory approval with their invention, they have intentions to sell it. When they go through the regulatory approval, and it gets approved and is safe for use, then they could sell it at inflated prices to insurance companies, however, only for a limited time before anyone can make it.

Once that patent expires, you can then consider it an open market and not monopolistic. So, the value of the open market is there. It's just being moved forward until after the patent life, and it's being done in exchange for innovation and treatments. The system, arguably, allows people to temporarily exploit people and then after that is done, the drug will have an indefinite market life. So, the idea of a handshake or traditional kind of market system is not lost. It's not non-existent in this circumstance, but it is instead moved back as a cost to bring it to market. That could only be done by devaluing the current generation.

Now, there is a question of whether the current generation can handle it? It can- through insurance companies and through the kind of inflated prices system that we discussed earlier.¹⁸ The insurance systems are set up to be able to handle it, to be able to get someone who does not have a million dollars a million-dollar treatment.

The average person with the disease will not have a million dollars to get the treatment. So, you have insurance companies that are able to lend a hand. This is all done through an effort of; we need to devalue the future generation to get out of this. The tension of balancing valuing future and current wellbeing; an appeal to innovation allows you to move right through it. So, in a sense, these patents and the costs associated with innovation are like a double thank you to future generations.

¹⁸ Implication of valuing future generations highly.

Precision Medicine as an example of innovation solving a repugnant conclusion

Precision medicine is an example of the innovation that comes out of accepting the repugnant conclusion. Precision medicine is the identification of a cause of a specific problem in the body and then being able to solve that problem with tailored medicine. (National Research 38) ¹⁹ The introduction of precision medicine and its relation to rare diseases is one of the reasons we can deduce such a conclusion to the repugnant conclusion. The use of precision therapies allows for a perpetual increase in wellbeing in places where there was no increase before. ²⁰

These inventions are being incentivized to be created. They can have a perpetual increase to wellbeing when we assume an indefinite population growth. Through the potential for a perpetual increase to wellbeing we can say that a bearable decrease in wellbeing is justified because of the amount of people that can exist from it in the future. Those people existing will also mean that they will have an increase in wellbeing from not being seemingly doomed to misery or death. As this progresses over time, we can expect that diseases that do not have treatments will gradually get treatments. Even for diseases that have smaller populations. Being able to precisely identify the problem for a small population while having existing ways to deal with that problem shows a solution to rare diseases.²¹

¹⁹ This definition is inferred from the example given in this text.

²⁰ An example of a perpetual wellbeing asset could be, ASO therapy, Gene therapy, Gene Editing, PROTAC, and RNAi. Once these inventions are known they have the potential to increase wellbeing exponentially.

²¹ An example of this is finding a specific DNA mutation and using the examples in the previous footnote to arrive at a treatment.

This mode of thinking is a justifiable way of existing in the repugnant conclusion. In the repugnant conclusion, if world Z were to exist than it is probable that the valuing of life and optimizing of happiness over time would lead to a better world than before.²² We are able to see this as probable, with the emergence of innovations like precision medicine.

²² The before is world A of the repugnant conclusion.

Conclusion

My argument can be broken into two parts. The first is a kind of contradiction or tension in how we view current and future generations. Rare diseases are an example of this. The contradiction is, when you want to lower drug prices and profits, then you are lowering incentives and valuing the current generations highly. When we imply that we want to value the current generation highly, we put ourselves opposed to valuing the future generation highly. We cannot value current generations highly while simultaneously valuing future generations highly. It is a contradiction to do both at once.

We can see examples of how we balance future wellbeing by looking at the incentives in place. The main issue with this balance is that it is at the cost of the current generation. Patents come at the cost to incentivize invention and innovation. If you try to devalue future wellbeing, then you're taking away incentives to innovate for that future generation. The recognition of that kind of conflict and tension, to value future generations and also devalue the incentive to grow, is the first part of my argument. So, implying a high value to future generations and a high value to current generations is contradictory because in order to value future generations highly, you have to devalue current generations. If innovation happens at the expense of present wellbeing and the goal is the increase of future wellbeing, then you end up in a situation which is the same as the repugnant conclusion. Any loss in the quality of the current wellbeing can be made up for with the amount of people you get to save in the future. If you have to ask people to not get treatment in the future, then you are struggling with life is worth living and optimizing your current happiness. A justification for how we can balance this problem can be found in utilitarianism, which is the second part of my argument.

The repugnant conclusion is the main challenge to a utilitarian justification, however, by solving that tension; we can also resolve the initial tension of valuing future wellbeing highly. This solution can be showcased by a solution being expressed in an instantiation of the repugnant conclusion, rare diseases. An appeal to innovation is a method that can allow us to solve problems such as the rare disease problem. The way it gets its value is through these systems set up like patents and insurance that happened at the cost of current generations. It is the person who is trying to get an opportunity to increase their current wellbeing and the current generation that this kind of innovation comes about. So, we could circumvent that initial tension by moving through it- not by going to one or the other, but by instead accepting both. By moving through the tension, we resolve it and solve the problem. There will be a devaluing of the current generation, however, the current generation's devaluation comes at the actions of people trying to increase the value to themselves and so trying to increase the value to the current generation. So, through this increase to the value of the current generation, we have this innate value of future generations. This understanding releases the tension and is my proposed solution to the repugnant conclusion. Which as we can now see is not so repugnant.

Work Cited

- Anglin, Bill. "The Repugnant Conclusion." *Canadian Journal of Philosophy*, vol. 7, no. 4, 1977, pp. 745–754., doi:10.1080/00455091.1977.10716193.
- Drummond, Michael and Towse, Adrian. "Orphan drugs policies: a suitable case for treatment", *The European Journal of Health Economics*, May 2014, Vol. 15, pp. 335-340
- Keyhani, Salomeh, et al. "US Pharmaceutical Innovation in an International Context." *American Journal of Public Health*, vol. 100, no. 6, 2010, pp. 1075–1080., doi:10.2105/ajph.2009.178491.
- Kotz, David M. "Socialism and Innovation." *Science & Society*, vol. 66, no. 1, 2002, pp. 94–108., doi:10.1521/asiso.66.1.94.21007.
- Lillehammer, Hallvard, and D. H. Mellor. *Ramsey's Legacy*. Clarendon Press, 2005.
- Loo, Jeffrey. "Industry Surveys Biotechnology", 2014.
- Mackey, John, and Rajendra Sisodia. *Conscious Capitalism: Liberating the Heroic Spirit of Business*. Harvard Business Review Press, 2014.
- Parfit, Derek. *Reasons and Persons*. Clarendon Press, 1987.
- National Research Council 2011. *Toward Precision Medicine: Building a Knowledge Network for Biomedical Research and a New Taxonomy of Disease*. Washington, DC: The National Academies Press. <https://doi.org/10.17226/13284>.
- Ramsey, F. P. "A Mathematical Theory of Saving." *The Economic Journal*, vol. 38, no. 152, 1928, pp. 543–559. *JSTOR*, www.jstor.org/stable/2224098. Accessed 5 Dec. 2020.
- Sikora, R. I. "Utilitarianism: the Classical Principle and the Average Principle." *Canadian Journal of Philosophy*, vol. 5, no. 3, 1975, pp. 409–419., doi:10.1080/00455091.1975.10716120.
- Solow, Robert M. "The Economics of Resources or the Resources of Economics." *Papers and Proceedings*, 1974,
- Tozzi, John, "Gene Therapy Drugs That Cost Millions Have Employers and Health Plans Worried" *Insurance Journal*, 2019.

Yin, Wesley. "Market Incentives and Pharmaceutical Innovation." *Journal of Health Economics*, vol. 27, no. 4, 2008, pp. 1060–1077.,
doi:10.1016/j.jhealeco.2008.01.002.

https://drive.google.com/drive/u/1/folders/14piFH-1rfRqhM_AkIEHBE5Cmgj0i9wXj