Master thesis

THE POLITICS OF IMMORTALITY

The undesirable implications of technological immortality

Universiteit Leiden

Colophon

Written by: Janne Wijdeven

S2382814

J.wijdeven@umail.leidenuniv.nl

Supervisor: Jan Sleutels

Philosophical Perspectives on Politics & the Economics

14/02/2020

Universiteit van Leiden

Foreword

Researchers and scientists believe that they are closer than ever to finding a cure for age-related diseases. Via technological innovations, they hope to 'cure ageing' once and for all. This would entail that the human biological lifespan could be extended indefinitely. Quests for immortality have a long record, and recent technological advancements brought immortality once again back in the spotlight. The time has come to critically assess what the consequences of such a technological development would be.

By writing this thesis, I mean to raise awareness of the threat that technological immortality poses to society. This thesis discusses certain issues that need to be addressed by politics in order for immortality to be desirable and feasible. It sets out the steps that societies need to take in order to be adequately prepared for this technological development. Furthermore, this thesis could provide a sense of comfort to fellow mortal human beings who worry about death. I will argue that death is a fundamental part of life, and that we should be grateful for our mortality. For the purpose of this thesis, I have been reading a lot about 'death' during the last eight months. I have read and thought more about this topic than any human being could possibly enjoy. A bit depressing at first, but after many hours of hard work I am proud to present my thesis. A thesis that is more than an objective literature study: it is an ode to life, and since death is a part of life, it is also a tribute to death. It discusses the art of living, the most beautiful art of all. I hope you enjoy reading my thesis as much as I enjoyed writing it.

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Preface

'The last enemy to be vanquished is death' (Adler 2018, p.105). Human beings have been fantasizing about conquering death for a long time. Today, due to a rapid progression of technology, the possibility of becoming immortal is closer than ever. According to futurologist Raymond Kurzweil we are merely decades away from developing the required technology (Kurzweil 2005, p.22). This claim is supported by many scientists (Vaupel et al 2004, p.339-351). It is very realistic that the tools to control ageing processes, or to achieve technological immortality, will be provided soon. The time has come to stop writing off the possibility of immortality as being a myth, and start to seriously consider its possible social-political consequences. In this thesis, I defend the claim that *technological immortality shall have undesirable implications for society*. While Kurzweil and many others find the idea of indefinitely extending the human lifespan appealing, I argue that immortality raises pressing issues that need to be addressed by societies for immortality to be politically feasible. Without adequate solutions to these problems, the consequences of technological immortality shall have an undesirable impact on our social and political lives. Politics is here taken in a broad sense of the word, and is thus not merely referring to a system of political parties or any type of (local) government. By using the term 'politics', I am referring to the desired characteristics of a society. This includes social and moral components like how societies are governed, how they organize themselves and how they deal with the important notions of justice, welfare and happiness. I will argue that technological immortality shall have several undesirable consequences, which will affect our social lives, our policies, our economies, our legislations and so forth. Immortality has shifted from being merely a myth to a realistic option. But is it truly desirable?

It must be acknowledged that there is a possibility that this 'technological immortality' cannot or will not be achieved. Some scientists are pessimistic about its achievability (Coles 2004, p.586) and call it merely 'science fiction'. The mere fact that there is disagreement about this, however, should not be an excuse to stall the discussion on this topic until the technology is actually produced. We should discuss beforehand whether this technology is truly desirable, and societies need to be prepared and fully aware of its risks. Human beings have underestimated the consequences of new technologies before. Take nuclear weapons, for example, and the Cold War that followed after their creation. A war that could have escalated terribly and could have caused the end of humanity, if not for a solid, public debate on its undesirable consequences (Deudney & Ikenberry 2009, p.4). Discussing the implications of technological immortality is therefore very important.

Some of the issues that I will mention in this thesis can probably be adequately addressed by politics, but other problems regarding technological immortality will not be solved easily. Extending the maximum human lifespan shall have immense political and social consequences, but they are not always easy to foresee or predict. Nevertheless, I tried to be as realistic and objective as possible while discussing the possible consequences of technological immortality. This literature study is an original combination of existing literature on the topic of technological immortality and contributes to a deeper understanding of the risks involved. It maps the dangers and threats that immortality could pose on society: a topic better discussed a few years too early than a few years too late.

Method and outline

This thesis combines and critically evaluates existing literature on the topic of (technological) immortality. It discusses the consequences of immortality from a political and societal point of view, drawing on a wide range of philosophical literature, including Friedrich Nietzsche, Shelly Kagan, Thomas Nagel, Bernard Williams, Samuel Scheffler and others. This thesis has four main chapters. The first chapter is primarily meant as an introductory chapter and will shape the context of this thesis. The other three chapters each contain a specific argument (and possible counterarguments) on why technological immortality has negative implications for that specific component of society.

In the first chapter I identify a number of prejudices regarding the essence and meaning of death and life. This is important, since it will entail that many proponents of technological immortality base their desire on irrational grounds. Many proponents of technological immortality view it as a means to overcome death. But why do human beings want to overcome death? Is it because they fear death? And is this fear justified and rational? Proponents often find the concept of immortality appealing, because they either regard death as something negative, and evil, or/and because they regard life as something positive. They value life, and thus they desire extending the human lifespan infinitely. However, I will argue that death in itself cannot be an evil, and life in itself is meaningless. In reality, it is the *good aspects* of life to which proponents of immortality are really attached to. But as I will discuss in chapter 2-4, technological immortality threatens many good aspects of our social and political lives. Its implications often conflict with values we hold dear, and this entails that proponents of immortality mistakenly believe that immortality shall improve their current lives. Furthermore, this chapter will emphasize that there is a lack of consensus regarding the desirability of technological immortality. A great number of people do not support it, and this lack of a consensual agreement on the topic is in itself an undesirable consequence.

In the subsequent chapters, I argue that technological immortality is undesirable by discussing its negative implications for three constitutive parts of human society: human happiness, wellbeing and the economy. These three specific topics correspond with the last three chapters of this thesis. Together they form three separate arguments on why technological immortality could be considered as undesirable. It must be noted that I will discuss them in a random order, and not in order of importance, since it is outside the scope of this thesis to ascertain the relative importance of constitutive parts of a societal structure. Furthermore, I fully acknowledge that a society consists of more components than these three topics (other components include, for example: culture, material products and social organizations). However, it is not possible to discuss the full breadth of topics that compromise the concept of society in the context of this thesis. Therefore, I limited the scope of my research to three main fields or components of society, three fields that are undeniably important for society. Arguably, these three elements of society shall all be under severe pressure if technological immortality were to be achieved. These three fields, or arguments are discussed separately, however, in conjunction with the first chapter, they form the core argument of my thesis: technological immortality cannot not guarantee the improvement of our lives. Instead, its implications shall have an undesirable impact on our societal and political values and developments.

Justification of the method used in this thesis

Biologically speaking, human beings are a species with an average lifespan of +/- 80 years. This simply means that each of us will die. The main cause of our death is the process of aging: the cells in our body tend to perish after a while, causing our organs to stop functioning properly. In this thesis, the term 'immortality' will refer to a state in which human beings developed a technological ability that prevents cells from dying of aging. By finding a means to 'cure aging', and thus by removing our main cause of death, human beings shall be biologically able to live forever: they could become 'immortal'.

In possibility, technological immortality could be achieved via several ways. Futurologist Raymond Kurzweil, for example, claims that nanotechnology could do the trick. He predicts that in 40 years, humans shall have specific nanobots traveling through their bodies, intelligent molecules designed to repair damaged organs and cells (Kurzweil 2015, p.39). Another possible way to prevent our organs to die from aging is making bionic adaptions to our bodies. In 2014, scientist already created a 3-D printed electronic membrane (or glove) that can keep a heart beating forever (Gorman 2014). This membrane can be fitted over your heart to keep it beating regularly for an indefinite period of time.

However, the specific way in which aging shall be cured (if it can be cured at all) is still up for debate, and since these specifics are not very relevant for the purpose of my thesis, they will not be discussed any further. Nevertheless, I have to justify why I chose 'curing aging' as a main means for achieving immortality, while there are other possible, imaginable ways to become immortal via technology as well. For example, various speculations have been made about a mind-copying system, enabling us to continue our lives in some sort of newly created virtual world after our bodies have perished. This 'virtual world' option of technological immortality would have very different consequences for society and our political lives compared with the 'curing aging' option. As I mentioned in the previous section of this introduction, I refer to the term politics in the broad sense of the concept, including aspects like the way in which human beings interact. One could imagine how the form of human interaction would change drastically if we were merely able to communicate with each other via a virtual world. There are, indeed, other possible forms of immortality imaginable, but these two, curing aging and mind-uploading, are generally considered by futurologists to be the most likely achievable options (Pearson 1998, p.100-119). Unfortunately, since both possible options of immortality will have totally different implications for society, I could not include both in my thesis. Separate theses could be written about both options, but I can only write one and covering both options of immortality would make the scope of this thesis too broad. I could have chosen to focus merely on the consequences that they have in common, the general (negative) political consequences, but I am afraid this thesis would have been very short in that case. Instead I chose to elaborate on only one possible form of immortality and its (undesirable) consequences: curing aging. The concept of 'curing aging' is a bit more conceivable or imaginable for humans than the concept of living in a virtual world, and this makes it somewhat easier to predict the possible consequences and implications.

In this thesis, I will strictly focus on the possibility of *scientific immortality,* or immortality enabled by technology. It does *not* include the possibility of religious immortality, or the concept of an eternal afterlife granted by any sort of almighty being. I decided to exclude religious immortality from my thesis because,

in my opinion, discussing this option of immortality would lead me from a (more or less) scientific pathway to an even more speculative one.

Furthermore, the focus of this thesis is limited to concepts of immortality in Western thought. Many Eastern philosophers and thinkers might have had interesting opinions on this topic as well, but I did not want the scope of my thesis to be too broad. Therefore, I decided to narrow down my focus to Western traditions and perspectives, partly because I am simply not familiar enough with Eastern philosophy.

The main claim defended in this thesis is that technological immortality shall have an undesirable impact on society and our political lives. I fully acknowledge that desirability is a subjective term. What is desirable for one person, might not be desirable for someone else. The Cambridge Dictionary defines desirable as: '*worth wanting or having*',[1] but whether or not something is worth wanting or worth having remains a matter of personal taste. While individual opinions on the desirability of immortality could vary, I believe that there are things that could be considered as generally undesirable for society. When I am using the term 'undesirable', I am referring to a state or event which most people in society would regard as 'not wanted', or as objectionable. I will use the term 'undesirable' to refer to a situation in which a development or event is not in accordance with values that a society, in general, holds dear. While my thesis is mainly focused on the undesirable consequences of technological immortality for society, I will also touch upon issues which are not necessarily relevant for society perceived as a functioning whole, but that are of pressing concern for their individual members. A society would not exist without its members: its fundamental elements are the individuals living in it. Therefore, applying an individual approach now and then seemed fitting.

Lastly, it should be noted that technological immortality could have several positive and 'desirable' consequences for societies as well. For example, immortality will lead to an aging population and since most illegal acts are performed by society's younger members, crime rates are expected to drop significantly (Haigh and Bagaric 2002, p.3). However, further positive consequences are not included in this thesis, since the aim of my thesis is merely to defend the claim that there are undesirable consequences: that it is not all bread and butter. Lastly, I do not wish to claim that technological immortality is in itself undesirable: some of the issues at stake could possibly be solved by politics. I am not claiming that adequate solutions cannot be found, I am merely claiming that *without* adequate solutions, technological immortality shall have an undesirable impact on society. I am not advocating against technological immortality in itself, I am advocating against the *undesirable* consequences of immortality. This thesis aims to increase awareness on the possible negative outcomes, and I want to urge society to start looking for solutions for the undesirable consequences, if they can be found.

[1] Definition of "desirable" from the Cambridge Academic Content Dictionary. Retrieved from: https://dictionary.cambridge.org/dictionary/english/desirable

Chapter one: irrational prejudices & a lack of consensus

Immortality is a widely discussed topic. The debate about it can be traced back to the Ancient Greeks. In his dialogue '*Phaedo*', or '*On the Soul'*, the Greek philosopher Plato discussed the idea that the human soul is immortal. The dialogue took place on the deathbed of Socrates, who took comfort in the idea that while his body might perish, the most important part of him (his soul) would live on (Plato 2009, p.19). The idea that the soul 'lives on' in an eternal afterlife forms a main element in various religions as well. A more technological, or rather: biological approach to immortality can be traced back to Francis Bacon. Around 1603, the scientific philosopher stated that the ultimate end of all knowledge was '*a discovery of all operations and possibilities of operations from immortality (if it were possible) to the meanest mechanical practice'* (Bacon 2011, p.222). Immortality is somehow appealing to many human beings, but is this immortality of the soul, or immortality in any other form, truly something that we should hope or strive for? In order to answer this question, I shall first examine the nature of death and life.

The thought of death terrifies many individuals, but is death really such a horrible thing? Or is the prolongation of life necessarily a positive thing? By exposing certain common prejudices about death and life, I will argue that many proponents of immortality base their positive attitude towards it on irrational grounds. The debate on the desirability of immortality is far from being settled. For a new, life-changing technological development to be desirable, we need to make certain that enough people actually desire it. This sounds pretty logical, but the point is: if societies were to implement a new system or technology that only a small part of its population finds desirable, protests and a divided population could be the result. The lack of a general consensus on the desirability of technological immortality can already have an undesirable effect on society. It is not in accordance with societal values to implement extreme controversial changes while many oppose them. Doing so could threaten the unity of a society's population and causes civil unrest.

One could question whether a broad consensus on the desirability of immortality is truly necessary. After all, it seems improbable that the technology shall be forced upon each member of society. It seems perfectly possible that individuals shall have a choice in the matter: those who do not support the technology shall probably not be forced to become immortal. It is likely that they could still opt for a biological death. But, as I will argue, immortality yields extreme adaptions of societal systems. It will have severe consequences that will affect large parts of society and its individuals, including the opponents of immortality. This would entail that even those who do not plan to use the technological development will have to suffer its consequences. The undesirable consequences of technological immortality will provide good reasons to oppose it, while, as I will argue in this chapter, proponents of technological immortality cannot truly make a solid case. For technological immortality to be desirable, we need to make certain that there is (A) enough support for it, and (B) that this support is well-funded. By using the work of distinguished philosophers like Thomas Nagel, Zygmunt Bauman, Arthur Schopenhauer and more, I will argue that both (A) and (B) could be questioned.

Many human beings believe that an indefinite extension of our biological lifespans would be an obvious good. After all, very few people look forward to their own deaths. Death is often seen as something evil,

while life is generally seen as something good. Therefore, if we were able to achieve personal immortality, proponents would claim that we should seize this opportunity. But are these considerations truly rational? Proponents of technological immortality often base their claim (that immortality is desirable) on one of these propositions (or both):

1. That death is a negative thing,
   And/or:
2. That life is a positive thing

In this chapter, I will argue that (1) is false: death cannot rationally be a bad thing, and that (2) is not endorsed by everyone: many distinguished philosophers do not agree with the notion that life in itself is a positive thing. According to one of them, Thomas Nagel, we do not long for mere organic survival: it is the extension of experiencing the good aspects of life that we often desire. As I will argue in the next chapters, technological immortality might enable us to extend our lifespan indefinitely, but it cannot guarantee the survival of these 'goods of life' as well.

These two beliefs or premises are not merely endorsed by advocates of immortality: entire parts of our societies are constructed around them. Hospitals and medicines are mostly focused on the prolongation of life. Life is generally considered to be intrinsically valuable, and death is considered to be an evil. This tendency is also visible in our justice system: murder is considered to be one of the worst crimes, while laws suggest that people's lives should be protected as much as possible. These propositions align with our common intuitions about justice, but are they philosophically correct and rational?

1.1 Against premise (1): death is a negative thing

In this section, I will examine if death could be rationally considered to be an evil or negative thing. By combining work of different distinguished philosophers, I will explore the essence and meaning of death. For only if we could come to a better understanding of the nature of death, could we discuss if it is worth all the trouble to overcome it. Many people fear death, but is this fear justified? And do they really fear death, or do they fear the loss of life? In order to examine whether death is indeed a negative thing, we must first clarify what exactly death is. At first glance, the question 'what is death?' seems simple, since almost everyone is familiar with the concept in one way or another. But, as philosopher and sociologist Zygmunt Bauman stated: '*We all 'know' very well what death is, until we are asked to define it. Then the trouble starts'* (Bauman 1992, p.2, 10-13). Bauman argues that it is ultimately impossible to give a solid definition of death because it stands for non-existence, it is a final void. We can merely describe it as the ultimate opposite of 'being', or as a phenomena that transcend the reach of communication.

Some people might claim to have an idea on what it is like to be dead, but they can never truly imagine it. Death itself is not perceivable. Phenomenologist Edmund Husserl claimed that all perception is intentional: it is an activity of the perceiving subject (Husserl 1931, p.46-51). Herein lies the difficulty: we cannot even claim that death is an absolute nothing, for we could only know if 'there is nothing', if we could perceive this 'absence of perception'. But when we die, there is no more perceiving subject to perceive this absence of perception that is death: dying is the end of all perception. In other words, according to Husserl and Bauman we cannot perceive our own death since when we die, there is no subject anymore that is able to perceive things. This entails that we will never know what it is like to be

dead. We cannot know it while we are alive, and neither will we experience it when our days are done. Death 'is' not a thing, it cannot truly be experienced, so why do we still we fear it? In his letter to Menoeceus, Epicurus asked the same question. Epicurus claimed that death is '*nothing to us'* (Epicurus somewhere between 341-270 B.C., p.3). According to Epicurus, a wise man does not fear death, since if death is there, it means that I am gone so it is impossible for me to meet her. So why should we worry?

There are several reasons why people could worry about death. They could fear death because they expect it to be a painful event. But then they do not necessarily fear death itself, they fear the pain. They could also fear death because they fear leaving their friends and family in agony. But then again, it is not truly death that is feared, but the pain it creates, only in this case not their own pain but the pain inflicted on others. They could also fear death, because they do not want to stop living their lives. But as Thomas Nagel argued, that does not necessarily makes death a negative thing: it only makes life a positive thing.

Philosopher Thomas Nagel dismisses the idea that we fear death because it is a mysterious and therefore terrifying prospective state. He illustrates this by claiming that it is just as impossible to imagine yourself being totally unconscious, as to imagine yourself being dead (Nagel 1979, p.2). Yet Nagel noticed that people who are averse to death are often not really averse to unconsciousness (for a short time, however). So it is not 'the unimaginable' per se that causes us to fear death, since we do not tend to fear other unimaginable things. The trouble is, according to Nagel, that life familiarizes us with the goods of life, which death deprives us of (Nagel 1979, p.7). These goods are, for example: activities, desires, values and thought: they are constitutive elements of a human life.

Death in itself is not a thing, and therefore it cannot be an evil thing. We might think of it as a negative event because we value life, and the loss of life would be a terrible loss to us, but because death is a mere blank it cannot have value, neither positive nor negative (Nagel 1979, p.1). Death itself is thus not an evil: it is the loss of life rather than the actual state of being dead that is objectionable for us. Furthermore, we do not object to death merely because it involves long periods of nonexistence. For example, none of us existed before our births, but few regard that as a misfortune (Nagel 1979, p.3).

Based on these arguments I conclude that proponents of technological immortality cannot rationally endorse premise (1): that death is a negative thing. But can they rationally endorse premise (2): that life is a positive thing?

1.2 Against premise (2): life is a positive thing

In the previous section of this chapter I argued that proponents of technological immortality cannot rationally base their desire of immortality on the premise that death is a negative thing. But could they rationally claim that immortality is appealing because life is something positive? In this section, I will discuss whether it is truly life itself that is desired by proponents of immortality. Do they long for mere biological survival? Or do the advocates of immortality really value the 'goods' of life instead? In other words: does life have any intrinsic worth?

There is not yet a broad consensus on the intrinsic value of life. Philosopher Arthur Schopenhauer, for example, dismisses the idea that life can be a positive thing. Schopenhauer claims that to live is to suffer. He interprets death as the purpose and aim of life, as a release from this suffering (Schopenhauer 1966,

p.136). To live is to want things, and these wants are mostly unfulfilled. Humans are will-filled living beings, but for one wish that is fulfilled, often at least ten are denied. According to Schopenhauer, life's suffering lies in desiring, wanting and fearing. In other words: in willing. Life is not something positive, it is a delayed dying: a temporary reprieve from death (Schopenhauer 1996, p.300). We could be evolutionary programmed to have a negative attitude towards death and a positive attitude towards living. Perhaps there is a specific 'will to live' gen in our DNA, that enabled our species to sustain and thrive. This 'will to live' could cause us to have a biased attitude towards death and life: it tricks us into believing that life has intrinsic worth. But the mere fact that we often think life has intrinsic worth, does not make life intrinsically and objectively meaningful.

One could object that this 'will to live' does not seem to be present in every human being. Human history is full of heroes sacrificing their own lives for others, for glory or for religious motives, not to mention the more frequent tales of suicide. Is the fact that many humans are able to commit suicide not an argument against this 'will to live'? According to Schopenhauer, the opposite is true. It is a conformation of this will instead. To understand his line of reasoning we need to take a closer look at Schopenhauer's perspective on life and death. Schopenhauer believes that death is a welcome release of a life full of suffering. Since Schopenhauer also believed that your body is the manifestation of the will to live, destructing this body by means of suicide would seem as an act of achieving freedom from this will to live and from the suffering. But this freedom cannot be achieved (Schopenhauer 1966, p.473). Suicide will not offer an escape from the willing, because the concept of 'escape' would imply survival or persistence from a worse state to a better one. To commit suicide is to accept that you have a will-to-live, since it is an attempt to escape it. It is your will that is willfully seeking to end itself in order to escape the negative implications of living (and willing). The suicidal person understands that he wants to live, he understands that he has a preference for the condition of being alive rather than dead, but he tries to escape this 'will-to-live' by ending his life. Since ending his life would not result in a state in which the individual is free from having a will, (since after dying, there is no individual anymore), he cannot really escape the will-to-live (Schopenhauer 1966, p.515).

That human beings have a will to live does not entail that life has intrinsic value. It is this will to live that merely tricks us into believing that life has intrinsic value. Other philosophers, like Jean Paul Sartre, have also claimed that life in itself is valueless. In his book 'Being and Nothingness', he writes that '*Life has no meaning a priori*' (Sartre 2003, p.58). According to Sartre, it is up to the individual to give life meaning, and value is nothing but the meaning that you choose.

Zygmunt Bauman describes the aim for immortality as a coping-mechanism for the implications of existentialism. Our mortality reminds us of the futility of life. Many humans prefer to forget about death, to perceive life as worth living and meaningful, instead of being incapacitated by purposelessness. Bauman argues that living such an illusory life is a formidable human achievement, the purpose of all purposes, and claims that the whole of human culture and the totality of social organizations co-operate to achieve this goal. They would not admit that most things we do serve the purpose of creating this idea of 'a meaningful life' in a world which is, by itself, devoid of meaning. Admitting this would make the achievement, which mostly consists of forgetting its true reasons, less effective. According to Bauman, mortality and immortality became practiced life strategies, deployed by all human societies in one way or

another. Our future death reminds us of the fact that we are mere biological, purposelessness phenomena and thus we strive and hope for immortality to avoid thinking of these unpopular matters (Bauman 1992, p.7-10).

Apparently, the thought of immortality, or the thought that there is more than our current, relative short 'meaningless' life, improves the quality of our lives. We simply do not like the thought that 'this' is all there is. We want to believe that life has intrinsic worth, but, as I discussed, merely this belief cannot make life truly intrinsically meaningful. And thus, proponents of technological immortality cannot rationally base their position on the thought that life is a positive thing: life has no intrinsic meaning.

Thomas Nagel provides support for the idea that life is intrinsically meaningless by stating that it is not the longing for mere organic survival that causes individuals to find immortality appealing: many people would be indifferent between an immediate death and immediate coma followed by death a few years later (without reawakening). We do not simply wish to live longer in order to live longer, we would not desire a longer lifespan if we were in a coma. This example shows us that it is not mere a prolongation of our biological, organic existence that proponents of immortality desire. It is not life itself that is desired by proponents of immortality, and it is not life itself that has intrinsic worth. Proponents actually desire to experience the good things in life for a longer period of time. Death is an ''*abrupt cancellation of indefinitely extensive possible goods*'' (Nagel 1979, p.7). Immortality would be useless if we could no longer experience these goods things in life. Ironically enough, as I will argue in the upcoming chapters, it is precisely technological immortality that could threaten our experiences of these 'goods of life'. Happiness and wellbeing, for example, shall be under severe pressure in a world where people could become immortal.

It is the hope of immortality and a belief in the value of life that makes death no longer as serious or frightening. Such a belief puts our minds at ease, it stops us from worrying over our own mortality and this makes our current lives easier. But this is not a solid, rational argument for achieving technological immortality, since it does not necessarily entail that technological immortality is intrinsically desirable. It merely makes the *belief* in the possibility of technological immortality desirable. In other words: if we mainly want to achieve technological immortality because this would stop us from worrying over our own mortality, do we really need to achieve technological immortality if the mere belief in the possibility of it already does the trick? Simply believing in the possibility alone gives us peace of mind, and thus there is no need for society to actually achieve technological immortality as long as its members share the belief that they could possibly become immortal one day.

Believing that death is a negative or evil thing or believing that life is intrinsically meaningful is not rational and seems incorrect. We simply cannot rationally base the desire for immortality on a fear of death, or a false belief that life has meaning on its own. Therefore, we cannot conclude that technological immortality is intrinsically desirable.

1.3 Conclusion chapter

In this chapter I claimed that advocates of technological immortality often regard death as something negative, and/or life as something positive. I used literature of Thomas Nagel, Zygmunt Bauman and other philosophers to argue that death cannot rationally be considered to be a negative state, since it is technically not a state that we could experience at all. Furthermore, I argued that life is not intrinsically meaningful. It is up to an individual to create a meaning, purposes and values (Sartre 2003, p.58). As Thomas Nagel argued, advocates of immortality often desire a prolongation of experiencing the goods that life has to offer, rather than a prolongation of life itself. In other words, we do not simply want to continue to live, we want to continue living a meaningful life. But living longer or even living forever does not necessarily makes life really more meaningful. For technological immortality to be truly desirable, a mere prolongation of our biological lifespans is not enough. We need to ensure that we would be able to continue experiencing the 'desirable' or good aspects of life during our infinite lifespans as well.

In the upcoming chapters I will argue that not only is technological immortality uncapable of guaranteeing a continuation or extension of the values that we, as a society, hold dear: it even threatens these values. It is often assumed that technological immortality enables us to live a longer, meaningful life. As I will argue, technological immortality does the opposite. It will derive our lives of its meaning and it undermines specific values that we, as a society, hold dear.

By exposing certain prejudices about death and life, I argued that technological immortality is not intrinsically desirable. Rather, technological immortality is undesirable (and thus not in accordance with our values), because implementing it while many do not support it would not be in accordance with our values. This might sound obvious, but what I mean is the following: we value democracy and the unity of our people. Without a consensus on desirability, and without enough support, implementing technological immortality would be very undesirable because it conflicts with values (such as democracy) that society holds dear.

Chapter two: living a meaningful life and happiness

Thomas Nagel argued that it is not the removal of death that makes technological immortality so appealing to many: it is the extension of experiencing the goods of life (Nagel 1979, p.1). Advocates of immortality do not want unconditional immortality. They do not strive towards mere organic survival: they want to continue living a meaningful, happy or desirable life. As discussed in the previous chapter, human beings tend to have the idea that they are living a meaningful life, necessitated by their yearning for happiness. However, life itself, a-priori, is not necessarily meaningful: it is us humans that create this meaning, by creating and attributing a specific amount of values to things. Therefore, extending our lifespans to an infinite level does not necessarily entail that our lives become more meaningful. In fact, in this chapter I will argue that rather the opposite is true: technological immortality shall deprive life of its meaning, it shall decrease our happiness by inflicting harm on our common values and it shall cause a disturbing disruption of our perception of time.

The main argument of this chapter is that quantity does not guarantee quality: on the contrary, the more we extend our lifespans (the quantity), the less quality (or: the less meaning) our lives shall have. I shall defend this claim by arguing how immortality shall decrease our happiness and deprive life of its meaning in two regards: values (section 2.1) and time (section 2.2).

In section 2.1 I will argue with the help of philosophers like Samuel Scheffler, Martha Nussbaum and Friedrich Nietzsche that technological immortality shall cause the downfall of values, and thereby it derives life of its meaning. Keep in mind that I use the term ‘desirable’ to describe a situation or event that is in accordance with our values. If we live infinitely, would we still place value on certain moments, when we know that we can re-experience such moments a thousand times more? I will argue that it is precisely our mortality that enables us to make use of value-systems: it is death, that enables us to value life.
In section 2.2, I will make a similar argument, but now based on the effects of immortality on our perception of time. I will argue with the help of philosophers like Aaron Smuts and Bernard Williams that, if we would have an unlimited amount of time, boredom and a loss of motivation for action shall be the result.

2.1 Values

In the introduction of this thesis, I referred to the term ‘undesirable’ when a development is not in accordance with values that a society, in general, holds dear. For technological immortality to be desirable, we need to ascertain whether our values are preserved when we reach the phase of immortality. The content of values tend to vary among different cultures. Since life is intrinsically meaningless, values and meaning in life are constituted by human beings placing value on a specific thing, state or event. Value is a relative term: it is that, which we attribute meaning to. Philosopher Ludwig Wittgenstein explained this subjective character of values by arguing there is no such thing as an ‘absolute value’. We can speak as much as we want about "life" and "its meaning," and believe that what we say is important. But these are no more than expressions and can never be facts, resulting from a tendency of the mind and not the heart or the will (Iczkovits 2012, p.46). Values are characteristically subjective, not

objective. A value comes into existence when something is valued, when a person or a group attributes meaning to something. Now, we have to ask ourselves the following question: in an immortal state, would we still be able to attribute meaning to a specific event or occurrence, when we know that we could experience the same moment a thousand more times during our infinite lifespan? Would such an event still be of value to us? Human beings tend to value events or things that are relatively unique, or rare in contrast to their normal, everyday lives. For example, we tend to value the sun more when it has been raining for weeks. But do we still value the sun as much when it has been sunny for over a year? When the human lifespan becomes infinite through technological immortality, we can logically expect a decrease in unique and rare (or valuable) experiences. And thus, the number of things or events that we would value shall decrease. According to psychologist Shimon Edelman, happiness can only be attained by an open-ended pursuit of new experiences. But in the context of longevity, happiness becomes hard to attain (Edelman 2018, p.1). After living for a couple thousands of years, there are probably very few possibilities for 'new experiences' left (the further consequences of this lack of new experiences shall be discussed in the next section of this chapter).

In his book '*Death and the Afterlife'*, philosopher Samuel Scheffler also argues that immortality could cause the downfall of values. According to Scheffler, values are not merely a constitutive part of human happiness, they are a constitutive part of what makes us human. Scheffler claims that our lives are: '*so pervasively shaped by the understanding of them as temporally limited that to suspend that understanding would call into question the conditions under which we value our lives and long for their extension'* (Scheffler 2016, p.96). His argument can be summarized in the following way:

> **(A).** Central to our common conception of human life (including our conception of values), is the idea that our lives are temporary: they will come to an end.
> **(B).** An immortal life does not come to an end.
> **(C).** Thus, in an immortal life, central elements of our conception of a human life would be lost.
> **(D).** If immortality results in a loss of central components of our conception of human life, it is unclear whether this form of existence is still 'human'. The concept of 'immortal human' life might be incoherent.

One could thus argue that there is no such thing as an immortal *human* life. According to Scheffler, the confidence in our values depends on our status as mortal human beings who live temporally, bounded lives. Immortality would undermine this confidence. Concepts such as illness, loss, harm, risk, injury and danger derive much of their meaning and content from the recognition that we are mortal: that we could die someday. In a life without a prospective death, these concepts could lose their meaning. In our current lives, we spend much effort in trying to avoid, prevent, minimize, overcome, survive and learn from these concepts. To some extent, these efforts define our priorities and constrain our choices (Scheffler 2016, p.96).

A possible critical objection to Scheffler could be: 'so what'? Immortality might indeed deprive these concepts of their meanings, but these are all negative concepts. We could easily go without concepts such as illness, risk and danger. This seems rather desirable to many! The problem, however, is that when these concepts lose their meaning, their 'opposite concepts', like health, gain, security, safety and benefit shall lose their meaning as well. These 'positive concepts' will become meaningless: what would be the worth

of safety if there were no threats? This idea is supported by famous philosopher Martha Nussbaum. Nussbaum argues that any initially desirable form of immortality would provide humans with a sense of invulnerability. This invulnerability would make our existence unrecognizable, and our lives less human: how could invulnerable human beings develop close friendships while friendships are often premised on a willingness of mutual self-sacrifice? Nussbaum argues that without risk, for example, one could not develop virtues such as courage (Nussbaum 1994, p.227). Immortality would threaten much of what we value in virtues and relationships. Therefore, it shall deprive life of its meaning.

Steve Jobs, founder of Apple, once said: '*remembering that I shall be dead soon is the most important tool I have ever encountered to help me make the big choices in life: almost everything- all external expectations, all pride, all fear of embarrassment or failure- these things just fall away in the face of death, leaving only what is truly important'*(Jobs 2005). The thought of our death, or: our mortality helps us to put things into perspective. It is an effective tool, which helps us to figure out what is important: what we should value and what not. Our mortality is an effective value system in itself. A system we could lose to immortality.

Friedrich Nietzsche explored the idea that life gets is meaning from death by describing a though experiment, famously known as the 'eternal resurrection of the same'. In this thought-experiment, Nietzsche invited his readers to imagine that they have to relive their current lives over and over again, for innumerable times. There will be nothing new in it: every tiny aspect, every thought and every joy of your life will return in the same sequence (Nietzsche 2006, §341). Would you like this idea, or would you hate it? Nietzsche's thought-experiment is meant as a tool to help you put aspects of your life into perspective. Nietzsche invites his readers to take a critical look at their own, current lives. The 'art of living' forms a central component in his philosophy. Nietzsche spent a large part of his life studying and criticizing Christianity for this reason: he noticed that believing in a form of afterlife caused people to value their own, current lives less. The promise of an eternal life has removed the 'fear of death' for many Christians, but it is precisely this fear of death that enables us to make our lives meaningful. We need to appreciate and challenge this fear, since it serves an important function. The belief in an eternal (after) life would entail a loss of aim: aiming to make the most of your life. Since this concept of 'aim', is used to project value into the world, the world would look valueless if we lost it. If mankind were to be immortal, the focus of his relationship to life and death is removed from the world in which he lives and dies. '*So to live that there is no longer any meaning in living; that now becomes the meaning of life'* (Nietzsche 1969, §43).

Achieving technological immortality is often seen as the ultimate victory of mankind over nature, but according to Nietzsche, nothing is further from the truth. The pursuit of immortality does not strive to rise above and overcome mankind's fundamental nature: it does not aim to overcome our natural cowardice. Such a culture, in which fear is accommodated instead of being challenged would be a disastrous culture, Nietzsche claims. Similar to the arguments made by Martha Nussbaum, Nietzsche argues that pursuing to remove death denies mankind the possibility of confronting his or her terms of existence. Without confronting our fears and without the victories we could find in this confrontation, we shall feel ourselves be nullified.

Proponents of technological immortality have an unending biological life as their goal, regardless of the life that is being lived. But like in the case of the Christian belief in an afterlife, striving towards more

quantity of life through technological immortality entails a loss of quality of life: by removing our fear of death, instead of challenging it, we are removing our aim to make the most out of our lives. Without this aim, we could no longer attribute meaning to life. Evaluating your life is of critical importance to Nietzsche. He even claims that most people actually die too late, instead of too early, because they have never learnt to live. In fact, Nietzsche claims that most of us should never have been born in the first place. Instead of doing everything to escape death we ought to practice the art of going at the right time and celebrate our dying as something that we freely embrace (Nietzsche 2005, §XXI). We must learn to understand how to live *and* how to die. People striving towards immortality, according to Nietzsche, understand neither.

For a development to be called 'desirable', it needs to be in coherence with the values that a society holds dear. But in this section I argue that technological immortality shall cause an overall decrease in values. One thing that a society values, is the happiness of its citizens. But since our happiness often depends on the amount of value we could attribute to things in our lives, and technological immortality decreases this amount of value, technological immortality shall have a negative impact on our happiness, and possibly on our humanity as well.

To summarize my argument: human beings need to have the idea that they live a meaningful life, in order to be happy. But technological immortality will not make our lives more meaningful: it shall cause a decrease in values and thus it shall deprive life of its meaning. Removing the fear of death instead of challenging it makes our lives risk-free. But we must value death, in order to value life, as Nietzsche argued. Our lives could only have meaning when these lives are valued, but life itself is valued less if the possibility of death is removed. Life gets its value through death, and thus without death, our lives would be value- and meaningless.

2.2 Immortality and time

The perception of time is a curious thing. Perceptually, every year of an individual's life seems shorter than the previous year, because each passing year represents a smaller and smaller portion of your life. It seems as if time is relative, in the same way that a gift of a hundred euros would be significant to a homeless person, but meaningless to a millionaire. Time is one of the primary reasons why human beings want to increase their lifespans: they want to have more time. Having more time would increase your opportunities to achieve your personal goals, or it would enable you to experience the good aspects of life a bit longer. The problematic part, as I will argue, arises when we would get to a point at which we would have too much time: when we increase our biological lifespans to an infinite extent. In this subchapter, I will discuss two main consequences of a shifted perception of time due to technological immortality: a loss of motivation for action and boredom.

This subchapter is imbedded in the argument that 'living a meaningful life' is an essential feature of human happiness, and that a development's effect on human happiness is a solid benchmark for attributing desirability to it. Similar to the argument made in the previous section, I will defend the claim that technological immortality will not make us happier or our lives more meaningful. Instead, by its shifting perception of time it shall make us less happy and our lives less meaningful.

2.2.1 Motivation for action

Futurologist Raymond Kurzweil is a proponent of technological immortality, but he recognizes that an immortal society would have to face certain challenges. The biggest challenge would be dealing with a shifted perception of time. According to Kurzweil, it is precisely death which gives meaning to our human lives, since it is death that gives importance (*and value)* to time. Thus, he claims, time would become meaningless if there were too much of it (Kurzweil 2000, p.32-37). Humans often find themselves procrastinating. In an immortal setting, procrastination shall reach whole new levels: why should anyone go to school now, or finish a specific project today if they would have an eternal lifespan to do it? If they have literally all the time in the world? The idea that life is temporary drives people towards goals.

Professor Aaron Smuts claims that immortality shall ultimately lead to motivational collapse. He argues that there are two possible scenarios when an individual becomes immortal: either his capabilities remain the same over time (Smuts calls this: Fixed Abilities), or the individual is able to constantly improve his or her abilities (Non-fixed abilities). However, Smuts argues that both scenarios are undesirable, since both of them would lead to a decreased motivation for action (Smuts 2011, p.141).

In the *first scenario*, the individual has 'fixed abilities'. When our capabilities are fixed(or: limited), at one point during the individual's eternal lifespan, he or she will logically reach a plateau in terms of what he or she can achieve. Individual will reach their intellectual limits. In other words: the individual will exhaust all of his or her potential. If our powers are limited, the number of significant projects that we are capable of completing is finite, but the time span of an immortal life is infinite. When pursuing any goal, or undertaking any activity, there are two possible outcomes: either the individual will eventually achieve his or her result, or he or she would forever fail. The latter would be very undesirable: failing at a given task over and over again is very frustrating and would soon cause a loss of motivation (Smuts 2011, p.146).

But is a situation in which immortal individuals reach their goals any better? Such an immortal's success at any possible significant project, would either be quick(or: easy) or prolonged: if individuals pursue a goal that is perfectly in line with their capabilities, he or she would achieve the goal easily. While a few quick successes may be satisfying, a series of easy wins would become boring quickly. Take playing chess for example: there is little satisfaction in proving that you could repeatedly beat a weaker opponent. The same holds for projects that can be easily accomplished. If the activities that are necessary for reaching the individual's goal are not perfectly in line with his or her capabilities, success is still possible, but it will be prolonged. By mere diligence, or sheer perseverance, immortals could still reach their goals. However, Smuts argues, this has problematic consequences. If the products of creative efforts are not necessarily the result of skill or talent (or anything else we could feel pride in), but the result of mere diligence, we would lose the significance of personal achievement. Knowing one could achieve almost anything via sheer perseverance would be motivationally devasting: achievements and our actions would lack significance, because there is nothing to be proud of any more. This, combined with the fact that it does not matter if one started any particular project now or in a couple hundred years, will cause immortal individuals to exhaust their motivational resources (Smuts 2011, p.141-146).

In the *second scenario***,** the immortal individuals are able to constantly improve themselves. Their capabilities are not fixed, and thus they will not have to worry about exhausting their potential. This continuous improvement of their abilities, together with the ability to live forever, entails that they would

reach a godlike status, an omniscient and omnipotent one. Then, they are guaranteed to succeed in every endeavor. For immortals with unlimited potential, it is equally difficult to fathom what would get them out of bed in the morning. They could achieve anything without meaningful sacrifice or with great ease, and neither would be satisfying (Smuts 2011, p.145). Furthermore, it could be questioned whether we could still identify with this futuristic person that has a totally different set of capabilities than we currently possess. The possible loss of identity in an immortal setting shall be discussed further in the next section of this chapter.

The decisions of an immortal being would, in both scenarios, lack the features for motivation for action. Therefore, Smuts concludes that immortality is undesirable. The characteristic dedication and intensity of human activities are strongly linked to the thought that we are mortal. We are aware that our opportunities are finite, and thus we are forced into action. For example, in choosing a lover or in raising a child, we are aware of the thought that each of these efforts is constrained and structured by finite time. Removing this awareness would change our pursuits, and the meaning of these pursuits in drastic ways (Smuts 2011, p.141-146). In an immortal context, these choices will become easier, or more optional. However, this would cause us to put less effort and striving in them. We can make these choices many more times, and therefore, they shall become less significant.

A critical response to Smuts would be that this seems rather positive, instead of undesirable. When an individual is given an infinite amount of time to accomplish his or her goals, they no longer have to worry about failures along the way: there is ample time to try again, or to explore other pursuits. This would make an individual life somewhat risk free, and many would see this as a blessing rather than a curse. However, eternal failure is frustrating and not very motivating, and neither is the lack of risk (as discussed in the previous section of this chapter). When one knows they can achieve almost anything after trying many times, after a period of time it is inevitable that they will encounter a loss of motivation. This, taken together with the ever shrinking range of significant new activities and projects, and combined with the threat of eternal frustration were he or she somehow incapable of succeeding, would be motivationally devastating for those of limited capabilities. If an individual were to have 'Non-Fixed abilities', or unlimited capabilities, success would come easy, or without sacrifice. This would rob activities of their significance, and this would have a negative impact on our motivation as well.

Human beings are aware of their own mortality, and although the thought of our own deaths can be somewhat depressing, it has a very important function. Proponents of technological immortality might believe that immortality would make them happier, since in that case they would not have to deal with the anxious thought of being mortal any longer. But they are mistaken, since it is precisely our mortality, or: the lack of time that we experience that enables or motivates us to do things that make us happy. It is precisely because we are aware of the fact that our lives will come to an end someday, that we try to make something of our lives. Each possible scenario described by Smuts results in a loss of motivation for action. Having motivation for any action is a very important component for human happiness. People who suffer from diseases like depression often declare that they are missing precisely that: motivation. Since having motivation for action is important for our happiness, technological immortality shall have negative implications on human happiness, and that makes technological immortality undesirable.

2.2.2 Boredom

The shifting perception of time that immortality necessarily yields shall cause us to get bored after a while. Not only shall we have less motivation to undertake any action, but at one point in time we shall have achieved everything that we still did have motivation for. So not only does technological immortality causes us to have less goals, the goals that remain will be achieved at some point in time: and then all that is left, will be boredom. According to philosopher Shelly Kagan, immortality might cause us to live forever, but we could expect our characters to remain basically the same over time (Kagan 2017, p.234-246). This entails that we retain more or less the same interests, desires and goals that we currently possess. As a result, over an infinite stretch of time, we would find an eternal life unbearably tedious and boring. Bernard Williams also argued that an immortal life would necessarily result in a listless, bored and apathetic life. Williams explored the conditions that eternal life has to satisfy in order to be considered as desirable. For immortality to be desirable for me as an individual, two conditions need to be met (Williams 2009, p.81-92):

(1) *Identity Condition:* the person living in the future (at any point) needs to be the same person as me.
(2) *Attractiveness Condition:* the type of life that this person lives must be a life that I want; in other words, a life that is appealing or desirable to me.

The problematic part, however, is that these two conditions cannot be met at the same time. If my future self is indeed ME, and thus sharing my current goals, interests and projects, having an indefinite amount of experiences shall lead to boredom or detachment. According to Williams, human beings need to have sets of categorical desires in order to experience a meaningful existence. But over the course of an infinite lifespan, one will come to a point at which all desires are satisfied. (Williams 1973, p.90). Furthermore, boredom is also created by the fact that at one point, nothing could happen to an individual any longer that has not happened to him or her before. There are no more new experiences, and thus life would become boring, and a boring life is not appealing or desirable. Now we could imagine possible solutions to solve this boredom, and thus satisfy the Attractiveness Condition. Williams gives an example: we could imagine a new technology that could effectively remove 'higher consciousness': by reducing our level of intelligence to the same level of other animals, we could make 'boredom' literally unthinkable. But in this case, the Identity Condition is not met, since your consciousness is a part of you and such a life would thus constitute a complete loss of self.

Another possible solution to the problem of boredom, would be a technology enabling us to forget specific things. This would enable you to watch the same movie over and over again and still not get bored by it. But in this case, the Identity Condition is also not met: to avert boredom, a huge deal of forgetting needs to take place. Our memories are a part of us, and without them, it cannot be said that we are still the same persons (Williams 1973, p.90). American bioethicist Leon Kass claims that the more we use technological adaptions on the human body to change human function and form, the more we compromise our dignity and identity (Kass 2001, p.1-11). We are human beings and not machines. If we want to keep our humanity, we need to be critical of new technological inventions that could compromise our identities.Psychologist Edelman makes a similar remark in his appropriately named journal '*Identity,*

Immortality, Happiness: Pick Two'. According to Edelman, any loss of memory implies a disruption of the constructed identity (Edelman 2018, p.7).

To summarize William's theory: if it ought to be 'me' who lives forever, boredom is inevitable and thus the Attractiveness Condition is not met, since a boring life is not something that I could desire. If boredom does not set in, because of adaptions on my brain made by technology in order to prevent boredom, that it is no longer 'me' who lives forever: in this case, I would become a different person. And thus the Identity Condition is no longer met. Furthermore, if it is not 'me' that lives forever in this case, the Attractiveness Condition is not met either, since immortality is, in that case, not a really attractive option for 'me'. And thus, Williams concludes, there is no sort of life that could be good or desirable forever. Any kind of life would eventually become boring and tedious: an endless life would thus be a meaningless life.

Nagel argued that proponents of immortality strive towards an infinite lifespan because they are attached to the 'good things in life'. But according to Williams, if we were to live forever, there is no significant or desirable property which such a life would have more of (Williams 1973, p.89). We could apply Aristotle's remark about Plato's 'Form of the Good' here: '*nor will it be any the more good for being eternal: that which lasts long is no whiter than that which perishes in a day'(*Aristotle 2009, p.1096B4).

A shifted perception of time due to technological immortality raises further societal issues. For example, our justice system needs to be heavily revised. Take prison sentences for example: the manner in which we punish criminals is very sensitive to fluctuations in the human life span. After all, a prison term of a few years has a relative small impact when you expect to live over a 1,000 years, let alone in the context of an immortal lifespan. Then, even a thousand-year term of imprisonment is inconsequential (Haigh & Bagaric 2002, p.1-11). The concept of lifelong sentences also needs to be reevaluated in an immortal setting. Being sentenced to stay in prison forever would be highly unethical. Furthermore, Dr. João Pedro de Magalhães, microbiologist at Liverpool University, argues that it would be impossible for states to afford keeping criminals in prison for thousands of years. Alternative forms of sentencing are required, but feasible, desirable alternatives remain to be found (Magalhães 2017).

2.3 Conclusion chapter

In this chapter I argued that increasing longevity (or: the quantity of life) shall threaten the quality of our lives. With the help of philosophers like Scheffler, Nussbaum and Nietzsche, I argued that life gets is meaning through death. In an immortal society, individuals will find themselves unable to attribute value to things and events, resulting in a meaningless, and unhappy life.

Furthermore, proponents of immortality find the idea of having an infinite lifespan desirable because immortality would give us 'more time'. But immortality is more likely to do the opposite: it shall make the entire concept of time superfluous and redundant. Immortality shall cause us to lose motivation for any action, and our lives would get intensely boring after a while.

Chapter three: wellbeing

At first sight, 'curing aging' seems to have a positive effect on our wellbeing: after all, in an immortal world people no longer have to suffer from age-related diseases. In this chapter, I will argue that technological immortality merely enhances our wellbeing to a limited extent. Implications of technological immortality could even threaten certain aspects of our wellbeing. As I argued in the second chapter of this thesis, technological immortality could lead to boredom and a loss of motivation for action. These consequences could have a negative effect on our human vitality: consisting of our will to live and our energy level. In this chapter, I will discuss the effects of immortality on our wellbeing more extensively.

In the first section (3.1), I will argue that technological immortality might give us short-term relief from suffering (by curing age-related diseases), but it shall only be a matter of time until we are struck by different diseases.

In the second section (3.2), I will discuss the topic of euthanasia (and a fulfilled life). Furthermore, removing ageing as our natural death cause could result in suicide to be the new number one death cause.

In the third section (3.3), I will argue that without ageing as a natural death cause, our deaths would probably be painful. The likeliness of experiencing very painful and deadly events shall be increased during an immortal lifespan. Furthermore, the thought of death becomes even more loaded in an immortal setting.

After presenting my three arguments, I will discuss a possible objection to my claim (3.4), based on hedonistic theory.

3.1. Being ill forever

Imagine a situation in which you are biologically not able to die, while being trapped in a box lying on the bottom of the sea for eternity. Would there be any human being alive that would opt for such a situation? Many scientists who believe in the possibility of technological immortality view aging as a curable disease, making life expectancy limitless. But is a limitless life expectancy really appealing when you cannot experience the goods of life any longer? While curing ageing (or technological immortality) might be able to prevent our biological or organic cells from wearing off, they cannot guarantee that these same cells are also protected against (mental) diseases. What if you are suffering terribly from a disease like cancer, but it is not life-threatening? You cannot biologically die of ageing, so you are stuck with an incredible amount of pain for eternity. Just like being trapped inside a box forever does not sound appealing to many, being sick or having pain for an eternity is not desirable either. Furthermore, keeping very sick people alive forever would be incredibly expensive for societies. Before focusing on curing ageing, we should find a cure for all present diseases that most heavily affect human beings first. Without these cures, after a couple of hundred years all immortal members of society shall probably suffer from mental decline or painful diseases at one point. And a society merely filled with hospitals is not a well-functioning or desirable society.

We are by no means certain that our level of intellect would remain the same were we to extend our lifespans indefinitely. It could be possible the human brain can only process a limited amount of data: there is only a specific amount of memories that an individual can possess. We are currently unaware of

the effects of an infinite lifespan on our brain processes. Part of our memory could go lost after living and experiencing events for thousands of years. To some, this might be a positive thing. As discussed in the previous chapter, this would enable you to watch the same movie ten times and not get bored by it. But Williams argued that for immortality to be desirable for ME, we need to make certain that the person who lives in the future is the same person as me. Since our memories are a constitutive part of our identity, one could wonder if it is still ME that is immortal, in this case. We need to make certain that longevity does not affect our mental health to a damaging or identity-threatening extent, in order for technological immortality to be desirable. If we cannot find a means to cure all (mental) diseases before we enter the era of technological immortality, our wellbeing shall go downhill fast. This is not only undesirable on an individual level, but could also have negative implications for society. Aside from the enormous medical costs, such a society would have to deal with a severe stagnation in our species' intellectual development.

3.2 Suicide and euthanasia

Since it is highly questionable whether all other diseases can be cured before we enter the era of technological immortality, the topic of euthanasia becomes more important than ever. Contemporary societies are still debating this topic. Euthanasia, or the intentionally ending of life, is often used to relieve suffering and pain. Before removing age-related diseases via technological immortality, we need to make certain that euthanasia is widely accepted and implemented by societies. Currently, some elderly people already experience the concept of having a 'fulfilled life': after living for example, 80 years, they experience the feeling that life has nothing more to offer. Their lives are fulfilled, and they start looking forward to their deaths. The amount of people wanting to end their lives will increase drastically after implementing technological immortality. The loss of motivation caused by a shifted perspective on time, together with the loss of values, shall increase individual's chances to start suffering from depression. If many individuals could experience having lived 'a fulfilled life' after merely living for 80 years, we could expect that every immortal human being shall experience this feeling at one point during their infinite lifespans.

Removing age-related disease as our number one cause of death will only leave the door open for another to take its place. This number one cause of death shall probably be suicide. According to data from the World Health Organization, suicide is already the second leading cause of death among 15-29-year-olds.[2] If there is no longer a natural limit to our biological lifespans, chances are that a bad end is in store for all of us. This does not merely yield negative implications for individuals (the prospect that their cause of death shall probably be suicide instead of, for example, a natural, age-related and painless death while sleeping can be very depressing and terrifying), it shall also affect society as a whole. It could have profoundly undesirable implications for a society's morale when suicide becomes the primary cause of death. According to the World Health Organization, every suicide is a tragedy that affects communities, families and even entire countries. It has negative, long-lasting effects on the people that are left behind (WHO 2018). It could decrease our general state of happiness even further.

[2] Data World Health Organization retrieved from: https://www.who.int/news-room/fact-sheets/detail/suicide

3.3 A painful death

Without age-related, biological deaths, an individual's chance to die a painful death shall be relatively increased. Technological immortality might prevent us from dying of age-related diseases, but it does not truly makes us immortal (as in: unable to die). The likelihood of rare and life-threatening occurrences would be greatly increased in the context of an eternal lifespan. The odds of, for example, being in a fatal traffic accident, being struck by lightning or becoming a victim of a violent, fatal crime are highly increased when you live longer. Without biological causes of death, our deaths shall probably be painful: we shall all die in agony.

Furthermore, the highly increased chances of aforementioned rare occurrences do not need to be fatal in order to be undesirable. You could logically expect an increase of experiencing painful events if your lifespan is drastically increased. Living longer could entail that you can experience more positive events during your lifetime, but it also entails that you shall have to deal with negative or painful life experiences more often. Objectively, technological immortality shall increase the amount of pain and suffering in your life, and one could question whether that is truly desirable.

In the first chapter of this thesis, I discussed how believing in the possibility of technological immortality could make human beings happier, since it could distract them from worrying over their own, unavoidable deaths. In this section I claim that rather, the increased likeliness of a possible painful death could cause us to start worrying even more. In a society in which its members are immortal via technology, 'death' becomes an even more loaded concept. Nagel argued that if the normal human lifespan were a thousand years, death at 80 would be a tragedy. Now imagine having an infinite lifespan: when you are immortal, death at any age might just be a more widespread tragedy (Nagel 1979, p.4).

A fatal traffic accident would be even more of a catastrophe when you expected to live for at least another thousand years. Since dying would be even more of a tragedy in the context of an infinite lifespan, and because our deaths are more likely to be painful, human beings shall probably adopt a very careful lifestyle. The thought of a painful, catastrophic death might induce anxiety-related issues: the concept of death could become so loaded that some people shall not even dare to cross the street. And one could wonder whether living such an eternal life full of worry is worth living.

However, it could be questioned whether an increased worrying over our deaths is a negative development. A person who does not worry over his or her death at all is more likely to make irresponsible decisions or get engaged in unnecessary dangerous activities, and therefore their average lifespans shall probably be shorter than the lifespan of more careful individuals. As Nietzsche argued, worrying over your death is important: it could encourage you to make the most out of your life (Nietzsche 2006, §278). However, while a small amount of worrying could indeed benefit an individual, various studies suggest that more severe anxiety-related issues could pose a serious threat to a person's quality of life (Eng & all 2005, p.144). Multiple research projects have concluded that anxiety over death could create suffering and impact your quality of life (Sherman 2010, p.99, Ottu 2019, p.440).

3.4 A hedonistic objection

While technological immortality could cause an increase in the absolute amount of pain an individual experiences throughout his or her life, it must be noted that relatively, this does not have to be the case. Those not struck by a painful disease or fatal accident, could experience a greater amount of wellbeing during their immortal lifespans. Furthermore, for some individuals the increased absolute amount of pain one is likely to experience during an infinite lifetime does not weigh up to the benefits immortality can bring them. For them, technological immortality, regardless of its effects on wellbeing and pain, is worth all the trouble. Studies on this topic show different results. A study from bioethicist John Harris suggested that some individuals are willing to exchange their quality of life for longevity, to some extent (Harris 2004, p.527-534). Whereas other studies, for example the one by G.B. Stock, claimed that most individuals prefer a healthier over a longer life (Stock 2004, p.546-551). However, it seems that we are lacking the empirical data to provide enough support for either claim.

According to hedonistic theory portrayed by Jeremy Bentham, wellbeing and happiness could be measured via the aggregate balance of pleasures over pains (Bentham 1830, p.2-10). Hedonic concepts are based on subjective wellbeing: how bad or good our lives are for us depends on the amount of pleasure we experience in our lives, relative to the amount of pain. Therefore, hedonistic theoreticians could argue that an increased amount of pain that people are likely to experience in an immortal setting does not necessarily lead to a decrease in wellbeing. It does not make technological immortality necessarily undesirable, so long as the increase in pleasure outweighs the increase in pain it will remain a net positive experience. Thus, according to hedonistic theory, the argument that I presented in this chapter (technological immortality has a negative impact on our wellbeing by increasing the amount of pain we experience) would not be valid, since their claim is that wellbeing must be measured relatively by balancing pain and pleasure.

However, this hedonic approach to wellbeing is far from being the general consensus. Hedonic theory is often criticized, for example by famous philosopher Robert Nozick. Nozick construes his criticism of hedonism around a thought experiment, the so-called 'Experience Machine'. Nozick asks his readers to imagine a machine that puts you in a sort of coma, a machine that *'could give you any experience (or sequence of experiences) you might desire. When connected to this experience machine, you can have the experience of writing a great poem or bring about world peace or loving someone and being loved in return. You can experience the felt pleasures of these things, how they "feel from the inside". You can program your experiences for…the rest of your life. You can live your fondest dreams "from the inside". Would you choose to do this for the rest of your life?'* (Nozick 1974, p.42).

If the hedonistic approaches to wellbeing and happiness were true, every individual would opt for using this machine. After all, it would give you an infinite amount of pleasure and thus an optimal result of happiness and wellbeing. However, Nozick noticed (and this sentiment is widespread) that many individuals would be reluctant to plug themselves into the machine. The loss of a sense of reality seems to matter more than the amount of pleasure it brings. It seems that there is more to wellbeing and happiness than a simple sum of pleasure and pain, and thus the hedonistic approach does not seem to be an adequate measure of wellbeing.

Contemporary philosopher David Velleman also argued against the hedonic idea that wellbeing must be approached as being additive. According to Velleman, we cannot measure the wellbeing of a life by simply adding up, or aggregating the amount of momentary wellbeing in a life: '*the welfare value of a life is not in general determined by, and cannot be inferred from, the amount of momentary wellbeing that the life contains*'(Velleman 1991, p.2). Instead, Velleman argues that wellbeing depends on the overall structure or order of specific events. Individuals seem to prefer a life narrative that started out negatively and ended up positively over a narrative that started positive and ended up negative, even though in both scenarios, the general amount of wellbeing (the hedonistic sum) would be the same.

The hedonistic approach to wellbeing does not seem to be a valid measuring instrument, and this weakens their possible objection to the arguments that I made in this chapter. Therefore, the impact that technological immortality could have on our wellbeing could still be seen as an undesirable consequence, even though technological immortality could also increase the amount of pleasure we could experience.

3.5 Conclusion chapter

Technological immortality, or 'curing ageing', might have positive effects on our wellbeing to some extent. However, it could also threaten our wellbeing. If technological immortality were to be implemented before all other diseases are cured as well, chances are that after a certain period of time we would all start to suffer from painful, chronic diseases. Furthermore, removing ageing as our number one cause of death merely leaves room for another number one cause of death: suicide. This could have a negative, depressing effect on society.

Living for eternity also increases an individual's chances of experiencing rare and very painful events, like being struck by lightning. This, together with the fact that death will become an even more loaded, catastrophic concept in an immortal setting, could cause us to find ourselves in a continuous, anxious state of preoccupation with death.

Hedonistic theoreticians would argue that relatively, technological immortality shall have a positive effect on our wellbeing since it provides individuals the opportunity to experience more pleasure during their lives. However, as I argued with the help of theories by Robert Nozick and David Velleman, it is questionable whether this hedonic measurement does true justice to the concept of wellbeing. Therefore, the argument that technological immortality could threaten our wellbeing holds.

Chapter four: the economy

In the previous chapters I argued that curing aging could have serious implications for the social and cultural elements of society. Another important component of society is the economy. In this chapter I claim that the impact that technological immortality could have on the economy would be unprecedented: technological immortality shall have an undesirable impact on the economy and our general working life. I will support this claim by presenting three arguments, to be discussed in three separate sections.

In section 4.1, I will argue that technological immortality is likely to destroy the supply and demand balance: curing age-related diseases shall lead to overpopulation.

In section 4.2 I will argue that technological immortality is likely to widen the poverty gap. It seems rather likely that the technology able to cure ageing shall come with a certain price tag.

Lastly, in section 4.3 I will argue that technological immortality yields extreme, undesirable revisions of our current retirement systems.

4.1 Supply and demand: overpopulation

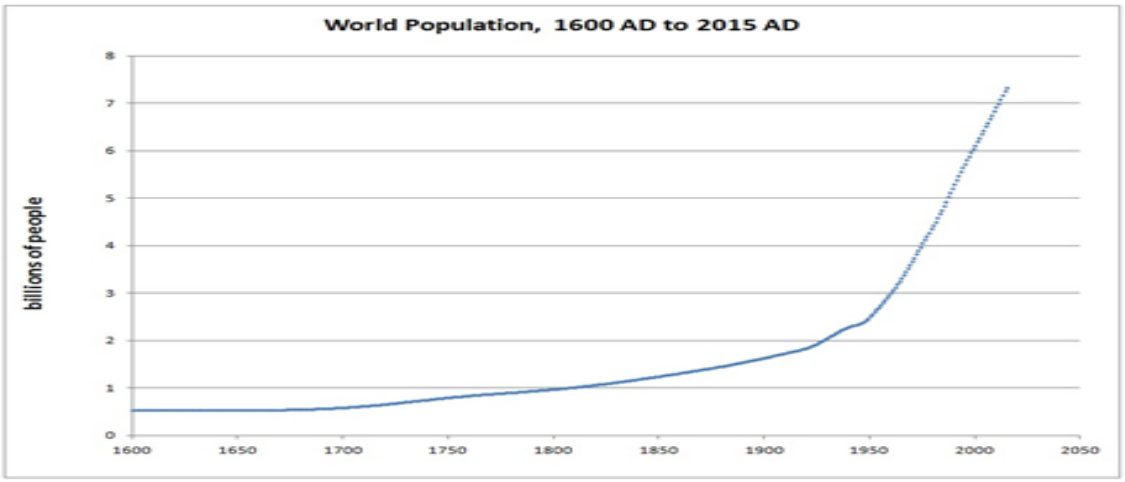
The first reason why technological immortality shall have a negative impact on the economy is because it shall lead to overpopulation. Overpopulation can be defined as the condition of a geographical location being populated with excessively large numbers. This could either take place on a regional, national or global scale, and could cause a severe disruption in the supply and demand balance of natural resources. I will argue that overpopulation is an undesirable consequence of technological immortality by discussing three arguments:

1. Technological immortality is likely to cause overpopulation.
2. Overpopulation is undesirable.
3. There is a possible effective measure to prevent overpopulation, but this measure has equally undesirable consequences.

4.1.1 Technological immortality leads to overpopulation

The current world population lies around 7,7 billion people, and this number is growing significantly each year. From the available data,[3] we may conclude that the world population is following an exponential pattern of growth:

[3] Data and picture retrieved from OurworldinData.org/world-population-growth/



The general consensus amongst scientists is that there are three main causes for a rapid population growth: migration, fertility and mortality (Shelton 2014, p.135 & Chandana 2005, p.134). Most scientists attribute the current exponential growing pattern predominantly to declines in mortality rates. *For a long period in human history, global population growth remained slow because fertility rates and mortality levels were in a close equilibrium. Because migration could cause changes in population numbers on a local, but not on a global scale, we could rule out migration as a causal explanation for this growth. Furthermore, 'the fertility rates merely increased marginally during the last decades, and thus the only primary explanation left for the severe growth of the world population would be a decrease in mortality' (Shelton 2014, p.136).* Scientific discoveries in the field of medicines, for example, increased the biological human lifespan.

This exponential, significant population growth has already had severe consequences. In some parts of the world, South-East Asia for example, overpopulation has become a serious issue. The rapid growth of the population has damaged the balance of supply and demand. There are simply not enough natural resources for the growing number of people (Mishra 2002, p.1). Life extension, especially technological immortality, shall spread this problem to the rest of the world. Technological immortality shall diminish or even exterminate the causes of natural deaths (by curing ageing), and this shall cause a rapid growth in population. To summarize my argument:

Premise 1. Overpopulation is caused by a rapid growth in population.
Premise 2. The predominant cause for a rapid population growth is a decline in mortality rates.
Premise 3. Technological immortality shall logically cause a drastic decline in mortality rates.

Therefore, technological immortality shall lead to overpopulation.

Technological immortality shall disrupt the balance (or equilibrium) between birth and death rates. Overpopulation will be the result, and as I will argue in the next section of this chapter, this could have undesirable implications.

4.1.2 Overpopulation is undesirable.

After arguing that technological immortality is likely to cause overpopulation, it is relevant to emphasize how negative or undesirable overpopulation could actually be. I have distinguished two main reasons why overpopulation would be undesirable. Firstly, it could have a severe impact on the climate. Secondly, it could have a damaging effect on our wellbeing. Furthermore, I will argue that not only are the effects of overpopulation generally undesirable, overpopulation and its damaging effects on our climate and wellbeing would even contradict the whole aim of technological immortality. Curing ageing, or technological immortality means nothing if we would all die from the effects of overpopulation, or from the damaging effects that immortality could have on our planet.

Overpopulation is likely to have severe ecological consequences. Among the effects shall be a loss of biodiversity (when a growing number of resources is needed, over-fishing, over-grazing and deforestation are often the result, (Katz-Balmes 2016)) water pollution and scarcity, air pollution, habitat destruction, global warming and climate change (Mishra 2002, p.2). Our collective ecological footprint shall exceed the world's carrying capacity. It could cause unrepairable damage to our environment and could even cause societal or ecological collapse (Ehrlich 1990, p.39).

A fast-growing world population creates the need for heavily increased food production, since there are more mouths to feed. The supply and demand balance of natural resources shall be disrupted. There are currently no solid solutions for world hunger and food insecurity. Technological immortality will magnify these problems to a much greater scale and shall lead to a further exploitation of resources and an increased level of starvation. Furthermore, overpopulation and starvation lead to the social diseases of poverty and unemployment, and this could have a damaging effect on the economy as well (Knaus 1981, p.499-516).

These two concerns are discussed separately, but they are closely related to each other. There seems to be a causal link between environmental quality and life expectancy. The projections of future resource requirements are worrying both for our wellbeing and for the environment. A research by McMichael et al. showed how 40 countries experienced a serious decrease in longevity between 1990-2001 (McMichael et al. 2004, p.1555). This decrease in life expectancy could be explained by increased health risks due to large-scale environmental or ecological changes that are caused by increased human pressure. Environmental quality and human wellbeing are closely related: pollution and depletion of natural resources could increase human mortality (and thus reduce longevity).[4]

For technological immortality to be feasible and sustainable, serious measures to prevent overpopulation are required. Without such measures, technological immortality becomes useless. The whole goal of technological immortality is to increase our lifespans, but this goal cannot be achieved if our lifespans are to be decreased by environmental-and wellbeing concerns caused by overpopulation at the same time. Overpopulation is not merely undesirable, it even contradicts the whole aim of technological immortality. But what would be an effective measure? And how desirable would such a measure be?

[4] This is proven in several studies in medicines and epidemiology, like Elo and Preston (1992), Pope et al. (2004) and Evans and Smith (2005).

4.1.3 Measures against overpopulation are also undesirable

Dr. João Pedro de Magalhães points out that the only realistically, possible solution to the problem of overpopulation would be controlling birth rates. In other words, an effective measure to stabilize the world population when we enter the era of technological immortality would be to prohibit humans from reproducing. Then, the number of human beings living on earth will remain more or less stable over time (Magalhães 2017). This would adequately prevent overpopulation, but I will argue that this is not a desirable solution, based on two arguments:

Firstly, limiting or even prohibiting people from having children would decrease our level of human happiness. Many human beings consider reproducing, and the joy of having and raising children, to be an essential and meaningful part of their lives. As argued in the first chapter, many would prefer 'living a meaningful life' over living an immortal life: we do not simply wish to increase our biological lifespans, we want to continue experiencing the good aspects of life. Arguably, having and raising children could be one of those good aspects of life. Therefore, prohibiting or limiting people from reproducing could have a negative impact on our level of happiness, and thus to many, it would be a very undesirable solution to overpopulation.

Secondly, limiting or prohibiting people from having children would cause a stagnation in our species' genetic development. It would literally stop the natural process of evolution, and this could threaten our entire species. According to the University of California there are many misconceptions regarding adaptation and natural selection.[5] Some people believe that the evolution of our species has already ended, by technological developments enabling us to modify our environments. While we indeed might have invented specific agricultural practices and medical treatments that significantly alter our survival-challenges, evolution still takes place. For example, modern humans tend to live in densely populated areas, and thereby, they face a greater risk of epidemic diseases than our ancestors did. Therefore, the spread of specific gene versions that protect us against these kind of diseases are evolutionary favored. When the population of an immortal society is stabilized by prohibiting people from reproducing, the process of mixing our genes has come to an end, and thereby we are reducing our chances of our species' survival if a new disease were to threaten wiping out the entirety of our human existence. By prohibiting people from reproducing, the progress of our species' adaption and the ability to overcome new challenges would be severely limited, and thus technological immortality could cause an undesirable stagnation in our species' genetic evolution by stagnating the process of adaptation and natural selection.

A society in which its members are immortal through technology, would either have to face overpopulation (which has negative implications for our environment, and thus would not be a sustainable or desirable option) or face the negative consequences of measures against overpopulation, which would most likely include a restriction on reproduction, which would cause a stagnation of our species' genetic development. For technological immortality to be truly desirable, societies need to find adequate measures for preventing overpopulation that are not very undesirable for society on their own.

[5] Retrieved from: https://evolution.berkeley.edu/evolibrary/misconceptions_teacherfaq.php#a8

4.2 Poverty gap

Besides causing overpopulation, technological immortality is likely to widen the poverty gap: the rich shall probably get richer, while the perspectives of poor people remain more or less the same. Primary reason for this is that is extremely likely that the cure for ageing shall initially be only available to a few. The procedure to become immortal shall likely be very costly, and it would take a very long period of time for a society or government to accumulate enough wealth to make the technology financially available to everyone (Magalhães 2017). Therefore, in the first stage of the implementation of technological immortality, only the rich shall be able to become immortal. Their longer lifespans shall give them relatively more time to accumulate wealth: hence they shall become even richer, resulting in a further widening of the poverty gap. This raises severe ethical concerns. I shall argue with the help of two very opposing theories of justice (the egalitarian perspective of John Rawls and the libertarian perspective of Robert Nozick), that a situation in which the technology to become immortal is only available to the rich, is unjust. Since justice is a value that a society, in general, often holds dear, and I defined the concept of undesirable as 'not in accordance with societal values', I shall conclude that the widening of the poverty gap due to technological immortality is undesirable.

There are two main reasons why it is safe to assume that the technology to become immortal shall initially only be available to the rich.
In the first place, this is the case in almost all medical and technological developments. It is difficult to predict the costs of the hypothetical cure for ageing, but almost all technologies and medical treatments resulting from biomedical research are initially very expensive, to such extent that they are not affordable for everyone. However, since curing ageing has a widespread appeal and interest, it is also likely that governments would intervene to make the technology available to the public after a while (Partridge et al 2009, p.3-7). But this would take time. Like other medical breakthroughs, for example in antibiotics, the first phase would be one where only rich people could acquire it. Developing and developed countries already differ regarding life expectancy. Countries with longer average lifespans are already finding their social security systems under increased pressure (Lucke & Hall 2005, p.101). If only the rich and powerful are able to afford the technology to become immortal initially, they will enjoy health benefits that are unattainable for the other 99 percent of society. Furthermore, they will also have more opportunity and time to consolidate power and wealth (Kass 2001, p.8).

A second reason the technology to become immortal is likely to be only available to the rich, is that the whole research quest for technological immortality is already funded by elite billionaires and multimillion dollar companies. Therefore, it seems likely that when a breakthrough is discovered, these companies shall privatize the new technology. A number of Silicon Valley billionaires have pumped a significant amount of money into immortality-related research. The founders of Google (Larry Page and Sergey Brin) invested millions of dollars into 'Calico', a health venture aiming to 'solve death', while billionaire Peter Thiel and Amazon boss Jeff Bezos are backing 'Unity Biotechnology', a research program focused on combatting the effects of ageing.[6] There are numerous researchers and authors who acknowledge that

[6] Retrieved from: https://www.theguardian.com/technology/2019/feb/22/silicon-valley-immortality-blood-infusion-gene-therapy

life extension technologies are likely to be controlled by private industries (Partridge et al 2009, p.3-7). Many of them are concerned about this unequal access and the divides it could exacerbate or create.

Justice is an important value in all societies. Every culture and every society has implemented some form of system to ensure that justice could be executed: human rights, national rights and sometimes religious rights are supported and shared by large numbers of people. Violating these laws or rights is often seen as a serious offense. If justice is indeed an important value for a society, and the widening of the poverty gap due to unequal access to technological immortality is indeed unjust, I could conclude from this that the most likely initial phase of the implementation of technological immortality conflicts with our values, and therefore it would be undesirable. I shall use two opposing theories of justice to support this claim. I shall argue that according to both theories, the widening of the poverty gap due to unequal access to life-extension technologies is unjust.

According to the *egalitarian* vision on justice, as theorized by John Rawls, justice equals fairness. Inequalities in society should only be permitted if they work for the benefit of the 'lower' part of a society: the worst-off people. Rawls distinguished two core principles of justice, based on a thought experiment in which a random group of people are given the task of creating principles that shall govern their society. They are behind a '*Veil of Ignorance'*, entailing that they know nothing of themselves, their natural abilities or their positions in society (Rawls 1971, p.178). According to Rawls, people are self-interested and rational. Since their position in the new society is uncertain and they could possibly belong to 'the worst off' in society, Rawls expected that they shall choose just principles that will benefit everyone (Rawls 1971, p.179). He argued that these people would choose two general principles of justice to structure their society:

> *Equal Liberty.* Each person in society has an equal right to the most extensive liberties compatible with similar liberties for all.
>
> *Difference Principle.* Inequalities (both social and economic) should be arranged in a way that they are (a) to the greatest benefit of the least advantaged group, and (b) attached to offices and positions open to everyone, under conditions of equality of opportunity.

And thus, according to Rawls, inequalities are only permitted if they are in benefit of the worst-off people. If the technology to become immortal would only be available to the rich, this would violate the Rawlsian Difference Principle. The poverty gap would widen, and this would not benefit the worst-off people in society. Furthermore, in a just society following the first Rawlsian principle, every person should have an equal right to the extensive liberties. To strict Egalitarians, who value equality to a great extent, it would already be unjust if a society were to have members who are extremely rich compared to others. Proponents of egalitarianism advocate for a redistribution of justice: accumulated wealth gained by unequal advantages (like race, age, sex or social background) needs to be redistributed. It is safe to assume that they shall not like the idea of some people having access to lifespan-increasing-technologies, while other members of society do not. Privatizing the technology to become immortal shall lead to a situation in which only few people (the rich) could use it. This would only benefit them, and not the worst-off group in society. Therefore, according to proponents of the egalitarian view of justice, the widening of the poverty gap due to technological immortality initially being only available to few, would be unjust and therefore, undesirable.

According to the *libertarian* vison on justice, as theorized by Robert Nozick, redistribution of wealth is not just. People have the right to their wealth and property (if justly acquired). Against the egalitarian view, libertarians claim that redistributive taxation violates the important principle of self-ownership. Libertarians like Nozick believe that human beings have certain basic rights that must not be violated: '*Individuals have rights, and there are things which no individual or group can do to them without violating these rights'* (Nozick 1974, p.34). The core principle for libertarians is liberty: they seek to maximize autonomy and freedom.

According to Nozick, the most important rights are the rights that we have over ourselves. Nozick claims that I own myself, I own my talents and thus I also own what I produce with my talents (Kymlicka 2002, p.109). If other people have a legitimate claim on the fruits of my work, gained by my talents, I cannot really claim that I own them. And thus people have a moral claim to the fruits of their talents, based on our moral right to self-ownership. Nozick derives this right to self-ownership from the Kantian moral notion of treating people as 'ends in themselves'. According to Nozick, this notion entails that, since we ought not to treat people as a means but as ends in themselves, they should not be used or sacrificed for the achievement of other ends without their consent. We are distinct individuals, with our own distinct claims and there are limits to the sacrifices that we can ask of an individual for the greater good: we are not resources for other human beings, and therefore we cannot be forced to redistribute our resources (Nozick 1974, p.167-173).

At first sight, it looks as if according to the libertarian view, there is nothing wrong with the technology to become immortal being only available to the rich: if they earned their money justly, they are entitled to their money and to whatever they could buy with that money. It is not unfair or unjust if they are able to afford something that others cannot. But recall that according to Nozick, first and foremost I have the right to myself. It could be argued that if I have a right to myself, I have a right to live, or at least: to sustain myself. If life-extension or immortality technologies were to be privatized and sold for high prices, these companies are basically 'selling life'. By putting a price tag on life, they are deciding who gets to live longer and who has to die. Then, these companies are violating our core rights to ourselves. It cannot be said that I own myself, if someone else gets to decide if I live or die. Therefore, libertarians would also criticize a situation in which the technology to become immortal is only available to the rich. A similar remark has been made by Scheffler, who claimed that every human being has a natural right to a sufficient share of every distributable good, if its enjoyment is proven to be a necessary condition of living a fulfilling and decent life. According to Scheffler, no human being has a natural right to a good which can only be obtained by preventing another person from having a fulfilling and decent life (Scheffler 1982, p.153).

While these main theories of justice, the egalitarian and libertarian one, often oppose each other, they would both agree on this topic: having the ability to become immortal being only available to the rich would be unjust. Therefore, I conclude that this would be ethically undesirable. Besides ethical considerations, there shall be other undesirable consequences. Having such a life-changing technology privatized could cause civil unrest, and this could lead to severe clashes between the rich and the poor, or between the companies controlling the technology and the rest of society.

4.3 Ageing population and retirement issues.

Curing ageing shall lead to an ageing population. The population of the elderly is already growing fast, and this development creates considerable challenges for societies and governments. The most commonly cited undesirable consequences of an ageing population are pension strains, reduced public health and a stagnation in economic growth, according to Tommy Bengtsson, professor of Economic History and Demography (Bengtsson 2010, p.18). In this section, I will discuss the negative implications of having an ageing population. The main argument will be that an ageing population necessitates extreme revisions to our current retirement systems. Societies are likely to abolish the whole concept of retirements, which shall have a negative impact on the economy.

4.3.1. Retirement

Technological immortality would enable human beings to extend their lifespan indefinitely. The current human lifespan lies between 80 and 100 years, and this range has been slightly increased over the last decades due to new scientific knowledge and discoveries in the fields of medicine. Furthermore, I argued in the first section of this chapter that in order to prevent overpopulation, societies would probably need to limit birth rates. The number of children we are allowed to have needs to be restricted in order to prevent overpopulation. Meaning that in an immortal society, the birth rates shall likely be limited while at the same time, the mortality of the elderly is reduced. Therefore, these societies shall have to deal with an ageing population, and this yields several adjustments regarding retirement systems.

One of the needed adjustments would be increasing the age of retirement, now around 67 years, drastically. This will be necessary because no current society, nor individual could afford a pension for even a thousand years, let alone eternity, after only having worked for 50 years. Such a society would inevitable go bankrupt after just a few centuries. If reproduction is indeed prohibited, and the retirement age would remain the same, after 67 years a society would have literally no working members left to keep society running. Thus, Dr. Magalhães argues, the system of retirement would have to be changed, if not abolished (Magalhães 2017). The age of retirement necessarily needs to increase, but to what extent? If due to technological immortality people will indeed be able to live forever, setting the age of retirement at, for example, 100.000 years would still not solve societies' economic problems. They would, after all, still have to pay the pensions of their members for the rest of eternity. Abolishing the whole pension system would be the most logical option. But adjusting or abolishing the retirement system in light of immortality is not so easily done, for two main reasons:

First of all, societies planning to increase the age of retirement drastically, or even abolish it at all, would face serious backlash from its members. It would obligate humans to work for thousands of years, or even forever, instead of working around 50 years. That is, objectively, a lot more work. For this to be desirable, individuals must really like their jobs. They can, of course change their jobs after a couple of hundred years. But there is a limited amount of jobs that would fit their capabilities and individual desires. It could be questioned if, in this light, technological immortality is desirable on an individual level. There are ethical considerations at stake as well. Abolishing the retirement system could conflict with the societal value that the elderly have a right to 'fair innings', after working for and contributing to society for a long period of time.

Secondly, there are feasibility issues at stake. In chapter 3.1 I argued that for societies to effectively implement technological immortality, we need to make sure that we find a cure for all other diseases first. We should also be able to guarantee somehow that our abilities and mental capabilities would not decline over the years. Merely preventing our cells from dying of aging is not enough, we should also be capable of working for an eternity, in order for societies to keep functioning. Welfare systems, including disability benefits and social assistance, would otherwise be too expensive, and this might impede societies' economic wellbeing.

To summarize my argument: technological immortality is likely to result in an ageing population, which will necessitate severe revisions to our retirement system. It remains to be seen if these revisions are either desirable or feasible.

4.3.2. Two objections

Critics might argue that an ageing population caused by technological immortality shall not only influence the economy in a negative or undesirable way. I shall discuss two possible objections to the retirement-argument and the negative effects of an ageing population.

1. If technological immortality indeed requires adjustments to the retirement systems, is that truly bad for the economy? Working for a longer period of time, or even forever, might be undesirable on an individual level, but when focusing purely on the economy it seems rather positive: societies can spare a huge amount on pension costs. Economies would be thriving!
2. Having an ageing population does not merely influence the economy in a negative way. In his book '*The Longevity Economy: Unlocking the World's Fastest-Growing, Most Misunderstood Market*', Joseph Coughlin argued that an ageing society also brings economic opportunities. For example, it could result in a growing pool of professionals, who are willing to share their talents and expertise. The 'super-experienced' or 'super-talented' people could continue to do their job for a longer period of time, resulting in more expertise and more wealth. This could boost the economy (Coughlin 2017, p.10-19).

In response to the first objection, we should not forget that economy is not merely about money. It is about people as well. Money in itself is useless, it is merely a means and not an end in itself. The economic should be embedded in the social, and not the other way around. According to Karl Polanyi, all economic systems should be considered as a historically specific social organizations. What is the worth of economic growth if there are no people benefitting from it? We all would have to work longer, perhaps even forever (Polanyi, 2001, p48). Furthermore, our career prospects are likely to be negatively influenced by an ageing population as well. Immortal individuals could spend thousands, even millions of years working on the same job, with no prospects of getting promoted since individuals higher up the chain are not moving up either.

In response to the second objection, it has to be recognized that indeed, having an ageing population is not solely a negative thing. However, its benefits do not outweigh its negative consequences. If empowered older people need or desire to continue their jobs for a longer period of time, many industries would stagnate. It would cause a higher unemployment rate if the older, more experienced workers would

refuse to make room. Furthermore, a societies' economy depends partly on young people, for fresh perspectives and new, creative ideas. As Nobel physicist Max Planck argued: '*A new scientific truth does not triumph by convincing its opponents and making them see the light, but rather because its opponents eventually die, and a new generation grows up that is familiar with the idea from the beginning'* (Planck 1968, p.33). Having an ageing population would cause this scientific or intelligent development to stagnate. Having a large-scale ageing population would result into less creative solutions for (new) problems and fewer groundbreaking researches in important fields such as medicine. And it is highly questionable whether such a stagnation in our intellectual development, caused by technological immortality, could possibly have any desirable implications for our economy.

Similar to a stagnation in our species' intellectual development, we could expect technological immortality to cause a cultural stagnation as well. An ageing population would make the current human culture predominant. Culturally, mankind has been evolving at an astonishing pace. Compare our human society thousand years ago with our current society, and one may notice an extraordinary evolution in various cultural concepts. Take ethics for example: the concept of slavery has only been abolished recently. One could wonder if our current generation truly *deserves* to be the last and eternal generation. There are still a lot of unethical cultural behaviors in this world. Fundamentalism, racism and nepotism to name a few. Until we have reached a worthy, ethical and indisputably perfect cultural state with members that *deserve* to live forever, cultural stagnation caused by technological immortality shall not be a desirable development. Without adequate cultural and ethical progress, an ageing immortal population would cause societies to be stuck with undesirable ideologies for eternity.

4.4 Conclusion chapter

In this chapter, I discussed three possible effects of technological immortality regarding the economy: overpopulation, a widened poverty gap and dealing with an ageing population. All three of these aspects of economics could be considered to be undesirable.

Technological immortality shall lead to overpopulation, which could have severe ecological consequences, and could lead to starvation. Having high mortality rates due to overpopulation is not compatible with the goal of humanity becoming immortal. Furthermore, I argued that it is doubtful that the technology to become immortal shall be available to all of us. The technology shall likely be privatized and expensive at first. This shall lead to an unjust widening of the poverty gap. Lastly, having an ageing population could also be considered an undesirable implication of technological immortality on the economy. It could lead to a stagnation in intellectual and cultural development. Is standing still any better than going backwards?

Conclusion

In present Western society, considerable effort is devoted to increasing human longevity. Nutritionists, scientists and doctors all work hard to increase our biological lifespans through healthy diets, medicine and technology. Each year, billions of dollars are pumped into research and projects with only one aim: finding the ultimate way to increase our lifespans to an infinite level by curing ageing. In many nations worldwide, age-related diseases are the number one cause of death. Thus, they currently pose the biggest threat to our species. Our brains are programmed by evolution to aim for survival: we want to live as long as possible and therefore, we strive to remove all elements that threaten our lives. It is a natural characteristic that can be found in almost all living species for a simple reason: species without this focus simply did not survive. Achieving technological immortality would therefore, according to many, be the greatest achievement of mankind: it would be the ultimate victory in our battle against nature.

After thousands of years debating and dreaming about the topic of immortality, humanity is closer than ever to actually achieving it. Enormous steps in increasing longevity have already been made, and each new invention, new piece of technology or new medicine can count on widespread support. Achieving technological immortality is around the corner, and therefore it is time to discuss its implications. As I argued in this thesis, it is not all bread and butter. There are problematic elements and certain issues that need to be addressed by politics in order for immortality to be feasible and desirable. But can these issues be solved at all? Is technological immortality indeed something that we should desire? Or have we gone too far in our aim to 'beat nature'?

In this thesis I defended the main claim that technological immortality could have undesirable implications for society and our political lives. Based on four different arguments, set out in four respective chapters, I conclude that we, as a society, are not ready for immortality and its implications. Perhaps we could be ready in the future, perhaps we shall never be ready. Regardless, if immortality were to be implemented before we have found adequate solutions to the problems raised in this thesis, it shall have a negative and undesirable impact on society. It could cause civil unrest, as discussed in the first chapter. It could make our lives less meaningful and less happy, as discussed in the second chapter. It could have a severe impact on our wellbeing and our economy, as discussed in the third and fourth chapters.

I defined the term desirable as 'something we should aim or strive for', and 'something that is in accordance with values that a society holds dear'. In the first chapter I argued that technological immortality has many opponents. Implementing something that is so controversial, is in conflict with societal values, possibly leading to protests and perhaps even riots, which is generally not something that a society 'should hope or strive for'. Furthermore, many proponents of immortality find the concept initially appealing, but their appeal is often based on irrational grounds. While, as I discussed in the other chapters, the opponents of technological immortality could base their position on more rational, solid grounds. Proponents of technological immortality mistakenly believe that death is something evil, or that life is something intrinsically good. I argued with the help of philosophers including Nagel and Schopenhauer that both propositions are irrational. I argued that it is not mere organic survival the proponents want: they do not simply wish to live longer, they wish to live a longer, happier and meaningful

life. But immortality cannot guarantee this. On the contrary, as I argued in the second chapter: technological immortality shall make life devoid of meaning and it shall likely make us less happy. Immortality yields a loss of value. Furthermore, it shall distort our perception of time, leading to boredom, a loss of motivation for action and a need for serious revisions of our justice systems. All these consequences shall either decrease our happiness or conflict with societal values.

Furthermore, as I argued in the third chapter, technological immortality could pose serious threats to our wellbeing. Without cures for all other diseases, we could find ourselves stuck with a painful disease for eternity. By increasing our lifespans, we are also increasing our chances of experiencing rare and painful events, like being struck with lightning. Furthermore, without ageing as a natural cause of death, we shall all die in agony. Our deaths are likely to be painful, the new number one cause of death shall likely be suicide. Since death becomes even more of a loaded and dreadful event in an immortal setting, chances are we shall find ourselves in a continuous, anxious state of worrying about death.

In the fourth chapter I discussed the implications of technological immortality on the economy. Removing ageing as our natural cause of death shall cause a rapid population growth. This distorts the supply and demand balance and could lead to the very undesirable situation of overpopulation. Measures to prevent overpopulation are imaginable, but it could be argued that they shall yield other undesirable implications. Furthermore, it is not even certain that technological immortality shall be first implemented by *societies.* It shall likely be privatized in the first stage, leading to a situation in which the technology to become immortal is only available to the rich. This shall widen the poverty gap. Lastly, technological immortality shall lead to an ageing population. As a result, retirement systems needs to be heavily revised. For economic concerns, the concept of retirement shall likely be abolished. Furthermore, our working lives shall not only be longer, but also will include less opportunities for developments and advancement. An immortal society shall lack enough young people with their fresh, creative ideas and therefore our intellectual development is likely to stagnate.

It must be acknowledged that some of these issues could possibly be solved. Solutions are thinkable, but they have not been found yet. Therefore, my conclusion, based on these arguments, is that without adequate solutions to the problems addressed in this thesis, technological immortality shall have an undesirable impact on society.

Bibliography

Adler, F. 2018. '*Life and Destiny'.* New Delhi: Sagwan Press. (Original work published in 1913).

Aristotle. 2009. '*Nichomachean Ethics'*. Oxford: Oxford University Press. (Original work published around 340 BC.).

Bacon, F. 2011. '*Valerius Terminus'.* Calgary: Theophania Publ. (Original work published in 1603).

Bauman, Z. 1992. '*Mortality, Immortality and Other Life Strategies'*. Cambridge: Polity Press.

Bengtsson, T. 2010. 'Population Ageing - A Threat to the Welfare State?'. *The Case of Sweden (Demographic Research Monographs).* Berlin: Springer.

Bentham, J. .1829–1830. '*Euvres de Jérémie Bentham*: *Introduction to the Principles of Morals and Legislation*'. Brussel: Hauman.

Chandana, R.C. 2005. '*Geography of Population'*. New Delhi: Kalyani Publishers.

Coles L.S. 2004. 'Demography of human supercentenarians'. *Journal of Anti-Ageing Medicine 59.* Los Angeles: University of California.

Coughlin, J. F. 2017. '*The Longevity Economy: Unlocking the World's Fastest-Growing, Most Misunderstood Market'.* New York: Public Affairs.

Deudney, D. & Ikenberry, G. J. 2009. '*The End of The Cold War after 20 Years*'. London: MacMillan Publishers.

Edelman, S. 2018. 'Identity, Immortality, Happiness: Pick two'. *Journal of Evolution and Technology, Vol. 28.* Retrieved from https://jetpress.org/v28.1/edelman.pdf

Ehrlich, P. R. 1990*. 'The population explosion'.* London: Hutchinson.

Eng, W., Coles, M.E., Heimberg, R.G. & Safren, S.A. 2005. 'Domains of life satisfaction in social anxiety disorder'. *Journal of Anxiety Disorders (19).* Retrieved from https://www.ncbi.nlm.nih.gov/pubmed/15533701.

Epicurus. 2016. '*Letter to Menoeceus'.* Scotts Valley: CreateSpace Independent Publishing Platform. (Original work published between 341-270 BC.).

Gorman, R. 2014. 'Membrane that can keep your heart pumping forever and possibly prevent heart attacks'*. Daily Mail.* Retrieved from https://www.dailymail.co.uk/news/article-2571917/Membrane-heart-pumping-forever-possibly-prevent-heart-attacks.html

Haigh, R. & Bagaric, M. 2002. 'Immortality and Sentencing Law'. *Journal of Philosophy, Science and Law.* Retrieved from http://jpsl.org/archives/immortality-and-sentencing-law/

Harris, J. 2004. 'Immortal ethics'. *Ann NY Acad Sci 1019.* Retrieved from https://www.ncbi.nlm.nih.gov/pubmed/15247080

Husserl, E. 1931. '*Cartesian Meditations: An Introduction to Phenomenology*'. Berlin: Springer.

Iczkovits, Y. 2012. '*Wittgenstein's Ethical Thought'*. Basingstoke: Palgrave Macmillan.

Jobs, S. 2005. '*Stanford Commencement Address'* [Video]. Retrieved from: https://www.youtube.com/watch?v=UF8uR6Z6KLc

Kagan, S. 2017. '*Immortality: Death'.* New Haven: Yale University Press.

Kass, L. R. 2001. 'L'Chaim and its limits: why not immortality?'. *First Things 113.* Retrieved from https://faculty.utrgv.edu/jose.martinez/General/GenBioCloning.pdf

Katz-Balmes, M. 2016. '*How Overpopulation Leads To Habitat Loss and Mass Extinction'.* [Webpage]. Retrieved from http://fubini.swarthmore.edu/~ENVS2/max/essay4.html

Knaus, J.P. 1981. 'The problem of overpopulation in Asia'*. Ther Ggw 120(6).* Retrieved from https://www.ncbi.nlm.nih.gov/pubmed/7281040

Kurzweil, R. 2000. '*The age of spiritual machines when computers exceed human intelligence'.* London: Pinguin.

Kurzweil, R. 2015. '*The Singularity Is Near'*. London: Penguin Putnam Inc.

Kymlicka, W. 2002. '*Contemporary Political Philosophy'*. Oxford: Oxford University Press.

Lucke, J. & Hall, W. 2005. 'Who wants to live forever?'*. EMBO Reports 6.2.* Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1299249/

Magalhães, J. P. D. 2017. '*Immortality and Society'.* [Online article]. Retrieved from: http://www.senescence.info/immortal_society.html

McMichael, A. J., Mckee, M., Shkolnikov, V., Valkonen, T. 2004. 'Mortality trends and setbacks: global convergence or divergence?'*. Public Health Journal, Volume 363.* Retrieved from https://www.ncbi.nlm.nih.gov/pubmed/15064037.

Mishra, V. 2002. 'Population and Environmental Challenges in Asia'. *Asia-Pacific Population & Policy, No. 63.* Retrieved from https://www.eastwestcenter.org/publications/population-and-environmental-challenges-asia.

Nagel, T. 1979. '*Death: Mortal Questions'*. New York: Cambridge University Press.

Nietzsche, F. 2005. '*Also Sprach Zarathustra: part 2'*. Cologne: Anaconda Verlag. (Original work published in 1883).

Nietzsche, F. 1969. 'Der Antichrist nr. 43'. *Nietzsche Werke, vol. 6/3.* Berlin: De Gruyter. (Original work published in 1895).

Nietzsche, F. 2006. '*The Gay Science'.* Mineola: Dover Publications Inc. (Original work published in 1882).

Nietzsche F. 2014. '*Twilight of the Idols'.* Scotts Valley: Createspace Independent Publishing Platform. (Original work published in 1889).

Nozick, R. 1974. '*Anarchy, state, and utopia'*. New York: Basic Books.

Nussbaum, M. 1994. '*The Therapy of Desire'*. Princeton: Princeton University Press.

Ottu, I.F.A. 2019. 'Death Anxiety From Quality of Life and Emotional Impact of Event'. *OMEGA Journal of Death and Dying. Volume 78 (4)*. Retrieved from: https://journals.sagepub.com/doi/abs/10.1177/0030222817701466

Partridge, B., Lucke, J., Barlett, H., Hall, W. 2009. 'Ethical, Social, and Personal Implications of Extended Human Lifespan Identified by Members of the Public'. *Rejuvenation Research. Volume 12 (5).* Retrieved from https://www.ncbi.nlm.nih.gov/pubmed/19929257

Pearson, I. 1998. '*The Atlas of the Future'*. London: Routledge.

Planck, M. 1968. '*Scientific Autobiography and Other Papers by Max Planck'.* Westport: Greenwood Press Publishers. (Original work published in 1949) .

Plato. 2009. '*Phaedo'*. Oxford: Oxford University Press. (Original work published in 399 BC.).

Polanyi, K. 2001. '*The Great Transformation'*. Boston: Beacon Press. (Original work published in 1944).

Rawls, J. 1971. '*A Theory of Justice'*. Cambridge Mass.: Harvard University Press.

Sartre, J. P. 2003. '*Being and Nothingness'.* Oxford Shire: Taylor & Francis Ltd. (Original work published in 1943).

Scheffler, S. 2016. '*Death and the Afterlife'*. Oxford: Oxford University Press Inc. (Original work published in 2013).

Scheffler, S. 1982. '*Natural Rights, Equality, and the Minimal State'.* Oxford: Basil Blackwell.

Schopenhauer, A. 1966. '*The World as Will and Representation, Vol 1'.* Mineola: Dover Publications Inc. (Original work published in 1819).

Shelton, J.D. 2014. 'Taking Exception. Reduced mortality leads to population growth: an inconvenient truth'. *Global Health Sci Pract (2).* Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4168619/

Sherman, D.W. 2010. 'A Comparison of Death Anxiety and Quality of Life of Patients With Advanced Cancer or AIDS and Their Family Caregivers Elsevier Journal of the Association of Nurses'. *AIDS Care Volume 21 (2).* Retrieved from https://www.ncbi.nlm.nih.gov/pubmed/20006525

Smuts, A. 2011. 'Immortality and Significance'. *Philosophy and Literature 35(1).* Retrieved from https://philpapers.org/rec/SMUIAS

Stock, G.B. 2004. 'The pitfalls of planning for demographic change'. *Ann NY Acad Sci 1019*. Retrieved from https://www.ncbi.nlm.nih.gov/pubmed/15247083

Vaupel, JW., Baudisch A., Dolling MA., Roach D., Gampe J. 2004. 'The case for negative senescence'. *Theoretical Population Biology (65).* Retrieved from https://www.ncbi.nlm.nih.gov/pubmed/15136009

Velleman, D. 1991. 'Well-being and time'. *Pacific Philosophical Quarterly 72 (1).* Retrieved from https://philpapers.org/rec/VELWAT

Williams, B. 2009. '*Problems of the Self: Philosophical Papers 1956-1972'.* New York: Cambridge University Press. (Original work published in 1973).

World Health Organization. 2018. '*Suicide'.* [webpage]. Retrieved from https://www.who.int/news-room/fact-sheets/detail/suicide