

Healthspan extension, completeness of life and justice

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Abstract

Recent progress in geroscience holds the promise of significantly slowing down or even reversing ageing and age-related diseases, and thus increasing our healthspans. In this paper, I offer a novel argument in favour of developing such technology and making it unconditionally available to everyone. In particular, I argue that justice requires that each person be provided with sufficient opportunities to have a 'complete life', that many people currently lack such opportunities, and that we would substantially improve the status quo by giving them access to anti-ageing technology.

KEYWORDS

ageing, complete life, geroscience, healthspan, justice, life extension

1 | INTRODUCTION

Recent progress in geroscience holds the promise of significantly slowing down—or even reversing—the process of ageing and the development of age-related diseases, such as cancer, heart disease and dementia. A number of interventions have been shown to have this effect in species ranging from yeast to nonhuman primates. These include pharmacological and genetic interventions that aim to prevent the shortening of telomeres, mimic the caloric restriction diet, increase the number and potency of our stem cells, modulate the genes and genetic pathways that regulate cellular ageing, or improve mitochondrial activity, among other things. Some of these research programmes have already entered or are about to enter human trials, and could become a part of medical practice within a decade or two.¹

Crucially, these interventions have the potential to extend not just our *lifespans* but also *healthspans*. That is, in addition to increasing the number of years that we are alive, they could also increase the

number of years we remain in the state of physical, cognitive, and reproductive health. In doing that, they would extend the prime of our lives while leaving the other two nominal stages—childhood and older age—intact. Alternatively, these interventions could increase our healthspans without extending our lifespans, by compressing morbidities and disabilities toward the end of life.²

Suppose that these visions of the future are warranted. In particular, assume that we could develop a technology that would allow people to add, in one of these ways, at least 20 healthy years to their life. (Of course, more might eventually become possible, but this number represents a reasonable starting point for ethical theorizing). Call this *healthspan extension*.

In this paper, I argue that, as a matter of justice, we have a duty to develop and widely distribute such technology. This is because justice requires that each person be provided with sufficient opportunities to have a 'complete life', many people currently lack such opportunities, and increasing people's healthspans would substantially improve the status quo in this respect. Along the way, I examine a range of issues intersecting longevity, social disadvantage, and welfare.

¹For overviews of recent developments in this field, see: Kennedy, B. K., Berger, S. L., Brunet, A., Campisi, J., Cuervo, A. M., Epel, E. S., Franceschi, C., Lithgow, G. J., Morimoto, R. I., Pessin, J. E., Rando, T. A., Richardson, A., Schadt, E. E., Wyss-Coray, T., & Sierra, F. (2014). Geroscience: Linking aging to chronic disease. *Cell*, 159(4), 709–713; Cohen, J. (2015). Death-defying experiments: Pushing the limits of life span in animals could someday help lengthen our own. *Science*, 350(6265), 1186–1187; Newman, J. C., Milman, S., Hashmi, S. K., Austad, S. N., Kirkland, J. L., Halter, J. B., & Barzilai, N. (2016). Strategies and challenges in clinical trials targeting human aging. *The Journals of Gerontology. Series A, Biological Sciences and Medical Sciences*, 71(11), 1424–1434; Partridge, L., Fuentelba, M., & Kennedy, B. K. (2020). The quest to slow ageing through drug discovery. *Nature Reviews Drug Discovery*, 19(8), 513–532.

²It is worth noting that compression of morbidity and disability naturally occurs among the longest-lived humans. See Andersen, S. L., Sebastiani, P., Dworkis, D. A., Feldman, L., & Perls, T. T. (2012). Health span approximates life span among many supercentenarians: Compression of morbidity at the approximate limit of life span. *The Journals of Gerontology. Series A, Biological Sciences and Medical Sciences*, 67(4), 395–405. Thus, we can perhaps expect anti-ageing technology to increase our healthspans both by extending our lifespans and by compressing morbidity and disability.

It is worth emphasizing that my central claim is not that we would *benefit* people by giving them access to healthspan extension technology (though that might be true as well). Instead, the claim is that providing access to this technology is something that we owe to people as a matter of justice. This distinction is important because duties of justice are generally understood to be more stringent than duties of beneficence. For example, we cannot escape these duties simply by citing a high cost of satisfying them and failing to satisfy these duties often amounts to wronging someone.

2 | JUSTICE AND COMPLETENESS OF A LIFE

The starting point of my argument is a broadly egalitarian conception of justice that holds that, at the minimum, justice requires that each person be provided with a fair share of opportunities.³ This formulation of the ideal of justice is, of course, incomplete. We need to specify what counts as a fair share and what are the opportunities in question.

Consider the first issue. There are three main positions here. On a (strictly) *egalitarian* view, fairness requires distributive equality.⁴ On a *prioritarian* view, fairness requires that we give priority to those who are worse off.⁵ On a *sufficientarian* view, fairness requires that everyone has enough, that is, that they clear a certain threshold.⁶

Much ink has been spilled over the relative merits of these three distributive principles, and I do not attempt to adjudicate between them here. The main claim of this paper—that justice requires that we develop and widely distribute healthspan extension—follows from any plausible distributive principle.

However, to make our discussion tractable, it is essential to adopt a particular view about what counts as a fair share. In particular, let us make the plausible assumption that *it is a matter of special significance that each person have sufficient opportunities*. This position is much weaker than sufficientarianism: it leaves open, for example, that equality matters above the sufficiency threshold, or that priority should be given to those below the threshold who are worse off. But, as we will see, it is enough to generate the conclusion that justice requires that we develop and widely distribute healthspan extension technology.

Turn now to the second question. Common examples of opportunities within the purview of distributive justice are things like political opportunities (e.g., to run for an office), educational

opportunities (e.g., to attend a university), and economic opportunities (e.g., to find meaningful employment), or opportunities for welfare in general. But equally important, or perhaps even more important, are people's opportunities to have a *complete life*—which we can define as a life that involves, in satisfactory quantity and quality, all fundamental ingredients of welfare.

Although my argument goes through on any plausible conception of welfare, for the sake of concreteness, let us assume *the objective list theory*.⁷ A major attraction of this view is that it recognizes a whole array of basic prudential goods, such as personal achievements, loving relationships, social contributions, social recognition, pleasure or satisfaction with one's life, and possibly others. Accordingly, a complete life is conceptualized as a life that involves all of these fundamental ingredients of welfare in satisfactory quality and quantity.⁸

With these preliminary considerations in place, the first premise of my argument takes the following shape: justice requires that each person be provided with sufficient opportunities to have a complete life. The next section explains the extent to which our society falls short of this ideal.

3 | LOPSIDED LIVES

Certain goods are of special importance to our opportunities in general and to the opportunity to have a complete life in particular. Freedom is one obvious example: a person who cannot act freely will not be able to engage in loving relationships or personal projects that could culminate in achievements, or at least their opportunities to attain these and other prudential goods will be very diminished.

Health has this profile as well. As Norman Daniels has emphasized, health is a precondition for attaining what we, as a matter of justice, should be able to attain.⁹ To take an extreme example, a person who is not capable of moving on their own or who lacks the ability to make and carry out plans will find it extremely difficult to attain certain basic prudential goods, such as achievements, relationships, or social contributions. But even less severe conditions—such as chronic pain, depression, or impaired mobility—can present serious challenges in this respect.

What is often overlooked, however, is that not just *the state of health* is important. An adequate *healthspan*—the number of years that we are in physical, cognitive, and reproductive health—is crucial as well. After all, maintaining projects that culminate in achievements or social recognition requires a considerable amount of time and so

³For prominent views along these lines, see Arneson, R. (1989). Equality and equal opportunity for welfare. *Philosophical Studies*, 56(1), 77–93; Cohen, G. A. (1989). On the currency of egalitarian justice. *Ethics*, 99(4), 906–944.

⁴See Temkin, L. (1993). *Inequality*. Oxford University Press; Temkin, L. (2003). Equality, priority, or what? *Economics and Philosophy*, 19(1), 61–88.

⁵For influential statements of this view, see Sen, A. (1973). *On economic inequality*. Oxford University Press; Parfit, D. (1997). Equality and priority. *Ratio*, 10(3), 202–221.

⁶See Frankfurt, H. (1987). Equality as a moral ideal. *Ethics*, 98(1), 21–43; Crisp, R. (2003). Equality, priority, and compassion. *Ethics*, 113(4), 745–746; Casal, P. (2007). Why sufficiency is not enough. *Ethics*, 117(2), 296–326; Timmer, D. (2022). Justice, thresholds, and the three claims of sufficientarianism. *Journal of Political Philosophy*, 30(3), 298–323.

⁷This label is due to Parfit, D. (1984). *Reasons and persons*. Oxford University Press. For a recent overview of the philosophical literature on welfare, see also Lin, E. (2022). Well-being, part 2: Theories of well-being. *Philosophy Compass*, 17(2), 1–23.

⁸It is worth noting that 'complete life' is a higher standard than 'life worth living'. Moreover, on the objective list theory, it is possible for a life to have very high welfare but not be complete. This is so, for example, when a life is rich in pleasures but largely deprived of achievements and relationships.

⁹See Daniels, N. (1985). *Just health care*. Cambridge University Press; Daniels, N. (2001). Justice, health, and healthcare. *The American Journal of Bioethics*, 1(2), 2–16; Daniels, N. (2007). *Just health: Meeting health needs fairly*. Cambridge University Press.

does finding a romantic partner and maintaining a valuable relationship. Consequently, people with short healthspans will often lack sufficient opportunities to have a complete life.

This observation has an influential precedent in the bioethics literature. According to John Harris, there is some length of life (say, 70 or 80 years) that is *normally* sufficient for a complete life, and this age serves as a threshold that we can use to allocate scarce healthcare resources. On this view, we should save a 20-year-old rather than an 80-year-old because the former person has not yet received their fair share of opportunities, or 'playtime'—at least when other things are equal.¹⁰ This is known as *the Fair Innings View*.¹¹

The Fair Innings View can serve as a useful heuristic for allocating limited healthcare resources, but it clearly oversimplifies the relationship between healthspan and opportunities. There are many people for whom even a normal healthspan does not present sufficient opportunities to have a complete life. This is particularly true of people who face various forms of social disadvantage, such as poverty, discrimination, disability, and exclusion. Each of these conditions makes it more difficult for a person to achieve things, form loving relationships, receive recognition, make social contributions, and experience pleasure in satisfactory quantity and quality. As a result, many people's lives are, at best, *lopsided*: rich in one type of prudential good, but largely deprived of others.¹² To appreciate this situation, consider the key prudential goods constitutive of a complete life one by one.

Start with *achievements*. An achievement is a product of a personal project or some other sustained, goal-oriented effort.¹³ Such efforts can be undertaken within an educational context, as a part of one's job, or in one's disposable time. However, many people lack sufficient opportunities to have significant achievements in these settings. To begin with, in many countries, higher education is unaffordable, has a high alternative cost, or otherwise presents various barriers to entry for the disadvantaged parts of the population. Similar considerations apply to labour markets. For example, an Amazon warehouse employee whose primary task is to reach for an item in one container and place it in another has few meaningful opportunities for accomplishments, and occupations that are more rewarding in this respect are scarce. Finally, cultivating personal projects—be it running a marathon or learning an instrument—often requires significant amounts of time, attention, energy, or wealth, and those in socially disadvantaged positions often cannot afford that.¹⁴

Turn now to *relationships*. Many people's opportunities to form and maintain romantic and parent–child relationships are significantly

restricted by virtue of the fact that women's reproductive capabilities—understood in terms of fertility, offspring health, offspring retention, and maternal health—decline rapidly in their thirties.¹⁵ This is so in at least two ways. For one thing, many people are forced to choose between parenthood and other important facets of life, such as pursuing a professional career or a major personal project, because of the difficulty involved in balancing these roles.¹⁶ This is especially true of people who cannot afford childcare or count on the support of their relatives. And even those who have the necessary financial means and a support network might have to give up parenthood, for example, because pregnancy and childbirth make it impossible for them to compete in sports at the highest level. For another, since the desire to have children is almost universal, many people find themselves under considerable pressure to find a romantic partner relatively early in their life, before their reproductive health deteriorates. As a result, they can rush into things and settle for less than what is best for them.

Next, consider *social contributions*. Some opportunities for making significant social contributions can arise within the regular context of employment: for example, a microbiologist might develop a new vaccine for a common disease or a firefighter might prevent a fire in one building from spreading across the neighbourhood. Alternatively, one might seek out such opportunities in one's disposable time by volunteering, donating a portion of their income to support effective charities, or being an active member of their local community. As in the case of achievements and relationships, not everyone is in a good position to do that. Careers that allow people to make meaningful social contributions are scarce and may require higher education or specialized training. And the contributions made outside of one's employment often require a substantial investment of time, attention, energy, or wealth that many people simply cannot afford.

Further, turn to *social recognition*. It is often mediated by other basic prudential goods: achievements, relationships, and social contributions. For example, our society might appreciate the achievement of an athlete who was the first to scale a high peak, the dedication of a local community leader, or the supportiveness of a family member. However, this 'second-order' nature of social recognition means that people who are deprived of sufficient opportunities to attain these other goods will also lack sufficient opportunities to receive social recognition. To make matters worse, people who face forms of social disadvantage are sometimes forced by their circumstances to take jobs or engage in activities that not only do not give them a chance to receive social recognition but can even undermine it (e.g., criminal activity and perhaps sex work).

¹⁰For example, when the 20-year-old and the 80-year-old can be expected to live for as many years and enjoy equally high quality of life.

¹¹Harris, J. (1985). *The value of life: An introduction to medical ethics*. Routledge.

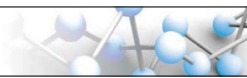
¹²This label is due to Pummer, T. (2017). Lopsided lives. In M. Timmons (Ed.), *Oxford studies in normative ethics* (Vol. 7, pp. 275–297). Oxford: Oxford University Press.

¹³For a recent book-length treatment of the nature of achievements, see Bradford, G. (2015). *Achievement*. Oxford University Press.

¹⁴For an illuminating discussion of how the changing nature of employment exacerbates the impact of social disadvantage on people's lives, see Boushey, H. (2016). *Finding time: The economics of work-life conflict*. Harvard University Press.

¹⁵Between 2017 and 2019, only 3.5% of all births in the United States were from women past the age of 40 years. See Martin, J. A., Hamilton, B. E., Osterman, M. J. K., & Driscoll, A. K. (2021). Births: Final data for 2019. *National Health Statistics Report*, 70(2), 1–51.

¹⁶Indeed, increases in women's educational enrolment and labour force participation are understood to be key factors contributing to the decline in fertility rates and the postponement of childbearing. See Mills, M. Rindfuss, R. R., McDonald, P., & Te Velde, E. (2011). Why do people postpone parenthood? Reasons and social policy incentives. *Human Reproduction Update*, 17(6), 848–860.



Finally, consider *pleasure* (or satisfaction with one's life). Our pleasant experiences tend to have a derivative character, much like social recognition. This is so in the sense that our achievements, relationships, social contributions, and even social recognition are all important sources of pleasure in our lives. Thus, inadequate opportunities to attain the former goods will often result in insufficient opportunities to find pleasure as well. The other important cradle of pleasant experiences are things we do in our disposable time: travelling, reading, exercising, watching plays and sports events, or cooking. Unfortunately, immersive participation in these activities often requires significant amounts of time or money, so those who are disadvantaged will often lack genuine opportunities to engage in pleasurable pursuits on a daily basis.

Taken together, these considerations point to the following conclusion. As is well known, forms of social disadvantage—such as poverty, discrimination, disability, and exclusion—undermine our opportunities to attain each of the basic prudential goods. However, against the backdrop of the present-day healthspan, these forms of disadvantage have an even more profound effect. They make the basic prudential goods *exclusionary*, in the sense that many people are forced to choose which of them to pursue. This is a key reason why many people currently lack sufficient opportunities to have a complete life.

Of course, there is room for reasonable disagreement about where exactly the threshold for sufficiency lies, and thus how many people are below this threshold. But for now, let us put this issue aside and consider whether the status quo would be substantially improved by giving people access to technology that would increase their healthspans by at least 20 years. The next section argues that it would, in at least four ways.

4 | THE PROMISE OF HEALTHSPAN EXTENSION

Healthspan extension technology has the potential to transform many aspects of our society and daily life, ranging from political and economic arrangements to the nature of work and personal relationships. The ensuing discussion focuses on four effects that are particularly plausible and would have the biggest positive impact on people's opportunities to have a complete life. Needless to say, each of these mechanisms is to be understood in *ceteris paribus* terms; we are examining one variable at a time, while holding others constant. This is a natural starting point for an analysis of any complex social phenomenon.

First and foremost, healthspan extension would substantially improve people's opportunities to have a complete life simply by virtue of giving them more time to attain the relevant goods. We can call this *the Temporal Empowerment Effect*.

There are in fact two distinct aspects of temporal empowerment. In the first instance, healthspan extension would enhance people's ability to attain multiple prudential goods *sequentially*, one after the other.

One reason for this has to do with reproductive health. If people had the option of having children in their forties and fifties without incurring significant health risks and financial costs, they would be in a better position to take on endeavours that culminate in significant achievements and social contributions. This is because they would no longer be forced to choose between, or try to balance, demanding careers or personal projects and starting a family. Similar considerations apply to relationships. If the 'deadline' for having children were to be extended by 20 or more years, many people would be better placed to find a true match.

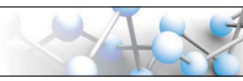
There would be analogous benefits by virtue of the extended window of physical and cognitive health. If people were equally able to succeed in demanding careers, educational settings, and strenuous personal projects later in life, they could pursue them one after the other, or after they had already raised children. As a result, they would not be compelled to try to attain all of these goods at the same time, which is something that many people, especially those facing social disadvantage are unable to do.

That said, there is another—perhaps less obvious—aspect of temporal empowerment. Healthspan extension would also enhance people's ability to pursue multiple goods of life *simultaneously*. The main factor here is that extending the prime of their lives holds the promise of reducing the temporal burden of employment. As things stand, relatively long periods of childhood and older age—both of their own and of their dependents—force people to squeeze out as much income as possible from their productive years. This is especially true of those who suffer from forms of social disadvantage or live in a country without an adequate social security system.

If people's healthspan were to increase substantially, and with it the number of years they could spend in employment, they could afford to spend fewer hours on any given day and in any given year working, as well as preparing for and recovering from work.¹⁷ This is because, even if the absolute length of childhood and older age (the nominal stages of life when they are more dependent on others or our past selves) would not change, their relative length would shrink. Consequently, people would have more time—and in some cases, finally enough time—for personal projects, socially beneficial pursuits, and pleasurable activities.

Second, healthspan extension would likely enhance people's ability to overcome socio-economic disadvantage, and thereby access a wider range of opportunities. We can call this *the Upward Mobility Effect*. To illustrate this, consider higher education and specialized training. Both are prime contexts for achievements and are often necessary to access especially rewarding careers and opportunities for making significant contributions to the society. Unfortunately, in many places, these forms of tuition are expensive, have a prohibitively high opportunity cost, or otherwise exclude various parts of the population. Healthspan extension has the potential to reduce these barriers to entry. For example, people who do not have the means to enrol in their preferred education programme, or move

¹⁷For an insightful discussion of the problem of the increasing temporal colonization of work, see Danaher, J. (2019). *Automation and Utopia*. Harvard University Press.



to a location where it is offered, would now have more time to first build up necessary wealth, as well as security that comes with work experience. Moreover, the prospect of a longer healthspan would make the decision to pursue educational opportunities later in life less risky, as the number of years during which one could reap their benefits would increase. Crucially, these kinds of benefits would likely be passed down the chain of generations. After all, improving a single person's opportunities to attain the goods constitutive of a complete life would often also improve the opportunities of their offspring. In that way, healthspan extension could have a lasting impact on upward mobility.

Third, what goes for social disadvantage also applies to bad luck and bad decisions. If people's healthspans were longer, many of their misfortunes and mistakes would, in one way, weigh less heavily on their lives. A traffic accident resulting in an injury requiring years of rehabilitation would no longer put an end to a promising cycling career. A decade wasted in an abusive relationship would not jeopardize one's dream of starting a family. And choosing not to apply to graduate school after college would not prevent one from embarking on a long and successful academic career later in life. We can call this *the Safety Net Effect*.

Fourth, healthspan extension would improve people's opportunities to have a complete life because, in the process of living a longer life, they would likely gain a better understanding of themselves and what is worth doing. We can refer to this as *the Wisdom of Age Effect*.

There are two main issues here. The first is that when we are young, we are still learning about our capabilities and the world around us. In particular, we are yet to fully appreciate what possible engagements the world can offer us, how much effort they require, what we are good at, what brings us joy, and how much we can fit in a day, a year, or a lifetime. It is only as we grow older and gain more experience that we develop this kind of insight. If people's healthspans were longer, they would have more time both to gather this information and to put it to use. This would put them in a better position to take advantage of their talents and unique circumstances to achieve things, find meaningful relationships, and make lasting contributions.

The second issue has to do with the order in which we tend to pursue things. While the objective list theory identifies social contribution as one of the fundamental prudential goods, not everyone recognizes its importance from the outset. For many people, achievements, relationships, and pleasure take priority. It is only after they have attained these other goods that they turn to endeavours aimed at contributing to the wider society. We see that most clearly in the case of some billionaires who, having spent the first 50 or 60 years of their life chasing profits and status, eventually turned to philanthropic efforts. But this trajectory is not exclusive to the rich. Many people seek out ways to contribute to the wider society only after they 'made it' in other domains of life. Insofar as healthspan extension would help them do the latter, it would also enhance their opportunities to make a social contribution.

The discussion of these four effects—the Temporal Empowerment Effect, the Upward Mobility Effect, the Safety Net Effect, and

the Wisdom of Age Effect—has focused on achievements, relationships, and social contribution. But it should be easy to see that their influence extends to the other two basic goods of life mentioned earlier: social recognition and pleasure. Because these goods have a largely derivative character (what we are appreciated for and what we take pleasure in are often our achievements, relationships, and social contributions), healthspan extension would also improve people's opportunities to attain them.

Before concluding this section, it is important to acknowledge that any technological revolution brings with it a host of unintended and unforeseeable consequences. So, it is entirely possible that healthspan extension could also diminish people's opportunities to have a complete life in certain ways. Still, the four effects described above seem strong enough to warrant the conclusion that healthspan extension *would*, and not just *could*, substantially improve the status quo.

If that is right, we have all the necessary pieces to complete the overarching argument of this paper. Justice requires that people be provided with sufficient opportunities to have a complete life (Section 2), many people currently lack such opportunities (Section 3), and healthspan extension would substantially improve the status quo (Section 4), so justice requires that, if possible, we develop healthspan extension technology and make it widely available. The remainder of the paper addresses three objections to this argument and some practical considerations.

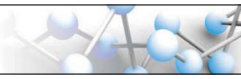
5 | THREE OBJECTIONS

The first objection targets the idea that those who fail to have a complete life are typically in this position because they lack sufficient opportunities to attain the core prudential goods in sufficient quantity and quality. Instead, the thought goes, they fail to have a complete life because they waste time. Thus, extending people's healthspans by 20 or more years would make no meaningful difference to their opportunities. In the literature, this kind of concern, which we can call *the Wastefulness Objection*, goes back all the way to Seneca, who wrote:

It is not that we have a short time to live, but that we waste a lot of it. Life is long enough, and a sufficiently generous amount has been given to us for the highest achievements, if it were all well-invested.¹⁸

What should we make of this concern? To begin with, I think that those who share Seneca's sentiment overstate how much of our lives is actually wasted. We certainly spend a significant portion of our

¹⁸Seneca. (2005). *On the shortness of life*. (C. D. N. Costa, Trans. & Ed., p. 1). Penguin Books. For this objection, see also Jonas, H. (1985). *The imperative of responsibility: In search of an ethics for the technological age*. Chicago University Press; Kass, L. R. (2004). L'Chaim and its limits: Why not immortality? In S. G. Post & R. H. Binstock (Eds.), *The fountain of youth: Cultural, scientific, and ethical perspectives on a biomedical goal* (pp. 304–320). Oxford University Press.



lives idle. But idleness serves an important role. Most strikingly, an athlete can train only so many hours each day because it is essential to give the body time to recover. Likewise, a novelist can write only so many words on a given occasion before their prose becomes insufferable. And the same goes for many other kinds of engagements. If we are to make the most of our physical, creative, social, and rational capacities, we simply cannot spend every waking hour in active pursuit of the core goods of life.

Moreover, while it is true that some people fall short of having a complete life because they waste opportunities presented to them, this does not apply to everyone. For reasons listed earlier, it seems impossible to deny that, by virtue of social disadvantage, many people are deprived of the relevant opportunities.

Finally, suppose that some people would, in fact, waste the entirety of their additional healthspans. (This seems unlikely if they are afforded only a few decades rather than a full-blown immortality, but it is worth considering nonetheless).¹⁹ That would not be a major strike against my argument either. The conception of justice employed in this argument has as its currency not 'outcomes' but rather 'opportunities'. That is, we are primarily concerned with giving everyone sufficient opportunity to have a complete life, and not with everyone actually having a complete life. So, extending people's healthspan would improve the status quo with respect to justice even if many people ended up wasting their additional time.

The second objection concerns the notion of the complete life. One might worry that healthspan extension would not improve people's opportunities to have a complete life because what counts as a complete life is not fixed but rather relative to one's healthspan. That is, compared with a person with a normal healthspan, a person with an extended healthspan would need to have correspondingly greater achievements, relationships, social contributions, social recognition, and pleasure in order to count as having a complete life. And, the objection goes, extending a person's healthspan would afford them at most a proportional increase in their opportunities. So, if that person lacked sufficient opportunities to have a complete life in the absence of healthspan extension, they would not have them in its presence as well. We can call this *the Shifting Goalposts Objection*.

Both premises of this objection are dubious. First, on reflection, the idea that what counts as a complete life is indexed to one's healthspan is not tenable. We can see that most clearly when we consider lives with healthspans that are shorter than normal. It is a great tragedy when a person has very few achievements, relationships, social contributions, and so forth, even when they get to live for only 10 or 20 years, rather than eighty. Indeed, this very line of thought plays an important role in motivating the popular Fair Innings View about the allocation of healthcare resources mentioned earlier.²⁰

Second, there is some reason to believe that a substantial enough increase of a person's healthspan would afford them a greater than proportional increase in their opportunities to have a complete life. The key idea here is that certain opportunities have cumulative effects on our life. For example, having access to higher education and specialized training gives us greater opportunities for accomplishments and appreciation not only in the educational context but also further down the road in one's professional and personal life. Likewise, if the arguments of the previous section are sound, we should expect healthspan extension to have a positive impact on social mobility further down the chain of generations. Thus, even if it were true that what counts as a complete life is relative to one's healthspan, healthspan extension could still significantly improve people's opportunities to have a complete life.

The third objection takes a different direction. It seems that the present-day, limited healthspan is not *in itself* an impediment to having a complete life. Instead, it merely amplifies the force of other social problems, such as poverty, discrimination, disability, and exclusion. After all, it is plausible that at least some people with the present-day healthspan who do not face social disadvantage have sufficient opportunities to have a complete life. For this reason, the objection goes, it is a mistake to focus our efforts on extending human healthspan rather than on ameliorating these more fundamental problems.

Moreover, the objector might add, the availability and widespread use of healthspan extension technology could make it more difficult to address these societal problems. This is because this technology would make the severity of social disadvantage harder to appreciate and, as a result, our society would be less motivated to combat them. In this respect, healthspan extension technology could be likened to a painkiller that can make it seem that a disease that is causing the pain is less important to treat than it actually is. We can refer to this as *the Real Issue Objection*.

This objection raises an important concern. There is no denying that poverty, discrimination, disability, and exclusion are important issues that need to be addressed head-on and we should not lose sight of them in the pursuit of technological advancement. However, the Real Issue Objection does not carry the day. For one thing, it is far from clear that a definitive solution to these problems can be found and implemented in the foreseeable future. In the meantime, we should settle for the second-best option, which is to alleviate the effects that social disadvantage has on people's opportunities to have a complete life. The four effects identified in the previous section—Temporal Empowerment, Upward Mobility, Safety New, and Wisdom of Age—suggest that healthspan extension has the potential to do just that.²¹

Moreover, the second part of the Real Issue Objection unjustifiably instrumentalizes people's misfortune. While it may be true that our society would be more motivated to address poverty, discrimination, and exclusion if these problems had more severe

¹⁹For an influential discussion of the effect that immortality could have on our motivation and ability to pursue certain goods of life, see Chapter 6 in Williams, B. (1973). *Problems of the Self*. Cambridge University Press.

²⁰Of course, it could be that morality is asymmetric in this respect and only increases—and not decreases—of healthspan change the requirements for a complete life. But the burden of showing that this is the case lies with the objector.

²¹Of course, that is not to say that we should divert all funding away from fighting poverty, discrimination, and exclusion, and into healthspan extension research. There are many possible ways of improving people's opportunities to have a complete life and to determine which one we should pursue, we should assess their relative effectiveness. My aim in this paper is to show that healthspan extension merits a place on the list and serious consideration.

impacts on our lives, it is unacceptable to let people suffer avoidable consequences just so that they can serve as a reminder of the existence of the underlying problems. In that respect, it would be like refusing to treat cancer patients using the imperfect forms of treatment available nowadays so that our society would accelerate the efforts to find a genuine cure.

6 | UNCONDITIONAL ACCESS

Finally, let us examine a practical matter. On the plausible assumption that its cost would be non-negligible, should healthspan extension be available to everyone or just to those who currently lack sufficient opportunities to have a complete life?

It might seem that the presented argument can only support the latter option. After all, the weak sufficientarian principle of distributive justice assumed earlier seems to generate no reason to provide people who already have sufficient opportunities to have a complete life with means of improving these opportunities even further.

However, that is not quite right. Even on this minimal conception, reasons of justice support making healthspan extension available to everyone and unconditionally. To see that, consider the steps that would be required to offer healthspan extension on a means-tested basis and the effects that this regime would have on the society.

To begin with, there would have to be a system for assessing whether a particular person already has sufficient opportunities to have a complete life. That is already difficult at the theoretical level: ethical theory can rarely provide precise guidance in these matters. And it sounds almost impossible at the practical level, considering how much information about an individual would have to be collected and analysed.

Moreover, even if it were possible to efficiently collect and process such data, a means-tested system would likely be less effective at alleviating the problem at hand. This is because it would divide the society between those who need help and those who can manage on their own, and thereby stigmatize the recipients of healthspan extension. Moreover, the intrusive nature of means-testing would disincentivize people from applying for healthspan extension. In light of these issues, we should expect healthspan extension to reach fewer people under a means-tested scheme compared to an unconditional scheme.

In this latter respect, the argument for unconditional healthspan extension is similar to a common argument for the Universal Basic Income. As proponents of this idea often emphasize, there is nothing humiliating or intrusive about receiving a basic income granted to all members of the society, and thus UBI is likely to be more effective at

alleviating poverty than unemployment benefits and other means-tested income support programmes.²²

7 | CONCLUDING REMARKS

In this paper, I have argued that we have a justice-based reason to develop healthspan extension technology and make it unconditionally available to everyone. This is because justice requires that each person be provided with sufficient opportunities to have a complete life—which involves achievements relationships, social contributions, social recognition, and pleasure in satisfactory quantity and quality—and healthspan extension would substantially improve the status quo in this respect.

In closing, let me emphasize that this discussion alone does not imply that we ought to, *all things considered*, develop healthspan extension technology and make it unconditionally available to everyone. While important, considerations of justice having to do with opportunities to have a complete life are just one element of a broader moral landscape. There are other normative considerations that we also need to take into account.²³ But that must be left for another occasion.

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CONFLICT OF INTEREST

The author declares no conflict of interest.

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²²See, for example, Van Parijs, P., & Vanderborght, Y. (2017). *Basic income: A radical proposal for a free society and a sane economy*. Harvard University Press.

²³For a comprehensive overview and discussion of objections to life extension technology found in the literature, see Davis, J. (2018). *The new Methuselahs: The ethics of life extension*. MIT Press.