

# Age and ageing: What do they mean?

Joona Räsänen 

Department of Philosophy, Classics,  
History of Art and Ideas, University of  
Oslo, Postboks 1020 Blindern, Oslo, 0315,  
Norway

## Correspondence

Joona Räsänen, Department of Philosophy,  
Classics, History of Art and Ideas,  
University of Oslo, Postboks 1020 Blindern,  
Oslo 0315, Norway.  
Email: joona.rasanen@ifikk.uio.no

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## Abstract

This article provides a philosophical overview of different approaches to age and ageing. It is often assumed that our age is determined by the amount of time we have been alive. Here, I challenge this belief. I argue that there are at least three plausible, yet unsatisfactory, accounts to age and ageing: the chronological account, the biological account, and the experiential account. I show that all of them fall short of fully determining what it means to age. Addressing these problems, I suggest the Two-tier principle of age: whenever the three accounts of age contradict, combine the two accounts that differ the least, and reject the third. However, while this principle does solve some difficulties, it is itself vulnerable to problems; therefore I propose we should jettison it. I conclude that there are no accounts to ageing that are satisfactory; they all come with a bullet to bite.

## KEYWORDS

age, ageing, thought-experiments

## 1 | INTRODUCTION

It is commonly assumed that chronological time determines our age; that is, that a person's age is determined solely by how long he or she has existed. For instance, someone born in 1990 is 30 years old in 2020. While philosophers have been interested in the metaphysics of time for quite some time now (Godfrey-Smith, 1980; McTaggart, 1908; Norton, 2018), and bioethicists have asked whether ageing is bad for us (Hauskeller, 2011a, 2011b), a disease to be cured (Caplan, 1981; Murphy, 1986), or whether considerable life extension is preferable (Davis, 2018; Häyry, 2018; Rantanen, 2019), less ink has been spilled on questions regarding what it means to age or how one's age is determined.

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Here, I challenge the belief that chronology is what determines our age and that ageing simply means a number of days, months, or years have passed since our births.<sup>1</sup> What follows should not only be of interests to transhumanists aiming to achieve eternal youth and claiming we should try to stop our ageing process,<sup>2</sup> but also for bioethicists studying the ethics of new biotechnologies.<sup>3</sup>

This study is not mere philosophical arguments about biotechnologies that might never happen. I will systematically study our intuitive thinking on age and ageing. Some of the issues related to the concepts I am analysing are already present in e.g. health care rationing.<sup>4</sup>

The structure of the article is as follows. First, I propose a series of thought experiments illustrating how we, in fact, think (and how we should perhaps think) about our age and ageing. I raise three possible views on what matters when it comes to age and ageing: chronology, biology, and conscious experiences. I show that while all of them have some intuitive appeal, applying them consistently leads to results that might be too difficult to accept. I then try to solve these problems by forming an account called the two-tier principle of age, where any two corresponding ages are combined. I argue that the two-tier principle of age, while solving some of the problems raised, ultimately cannot be used successfully because it itself faces similar difficulties. I conclude by arguing that when it comes to the question of how we should understand age and ageing, there are no obviously right answers that everyone could accept.

## 2 | THOUGHT EXPERIMENTS ON AGE AND AGEING

In this section, I propose three possible accounts of age and ageing and show the problems they raise. To do so, I want the readers to consider several thought experiments and consult their intuitions behind the cases.

First, consider the following.

*Cryopreservation while alive:* In the near future, it has become possible to preserve living humans at ultra-low temperatures and wake them up after several decades. This technology both pauses their biological ageing process and keeps them unconscious throughout, effectively enabling people to subjectively 'travel' to the future. Alex, chronological age of 40, wants to be cryopreserved for 50 years and then woken up. Once 50 years have passed, Alex wakes up in the body of her 40-year-old self, with no recollection of the time she spent in cryopreservation.

How old is Alex when she is woken up? There are two plausible intuitions one might have.

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<sup>1</sup>However, I am not the first to claim that chronological age is a problematic concept when it is used to define human ageing. Baars (2007) argues that chronological age cannot by itself give any precise reference to (a phase of) ageing processes. It is also argued (in Räsänen, 2019a, 2019b), that the distinction between chronological and biological age warrants legal age change in some context. However, the view presented here is more fundamental and deeper than presented in Räsänen (2019a) or in Baars (2007).

<sup>2</sup>For instance, Bostrom (2005) sees biological ageing as a process that we are morally obligated to stop and Moen (2015) argues it is rational to cryopreserve oneself because of the small chances of lengthening one's life significantly. For a summary of scientific developments that give hope to eliminate biological ageing, see de Grey and Rae (2007).

<sup>3</sup>For an extensive study on the ethics of cryonics see Minerva (2018).

<sup>4</sup>To give one example, in responding to COVID-19 pandemic, Swedish ethics platform for priority setting in healthcare is giving guidelines on how to prioritize among intensive care patients and how to ration other parts of the healthcare system to free up resources for use where they are needed the most. The work leader professor Lars Sandman said that in Sweden they should take biological—not chronological—age to account, so one of the main thrusts of their guidelines is how to interpret biological age in dire situations (Weinberg, 2020). For a broader discussion on age-based rationing in healthcare, see Jecker (2013). See Lippert-Rasmussen and Petersen (2020) and Räsänen (2020) for discussion on age change in the context of healthcare.

Alex is 90 years old.

Alex is 40 years old.

If you have the intuition that Alex is 90 years old, your intuition might be explained by the claim that it is only chronological time that matters when it comes to age. Put another way: only the amount of time one has been alive matters for how old one is. So, your intuition and the explanation behind *Cryopreservation while alive* could be as follows:

*Intuition:* Alex is 90 years old.

*Explanation:* Alex was 40 years old when she was cryopreserved. Because another 50 years have passed, during which Alex was alive, she must now be 90 years old.

Here, the *Intuition* and the *Explanation* form the following view:

*Chronological account:* the amount of time one has been alive determines how old one is.

Chronology seems a plausible candidate to determine age because in ordinary life, our (legal) age is determined solely by how long we have been alive. However, I find the intuition and the explanation behind *Chronological account* unreliable. To understand why, consider the next case.

*Cryopreservation while dead:* In the near future, it has become possible to medically kill humans, cryopreserve their bodies, and reanimate them later. This technology enables people to subjectively 'travel' into the future. Bianca, chronological age of 40, wants to be killed and woken up in 50 years. She steps into a machine that kills her and then freezes her body. When 50 years have passed, Bianca is reanimated in the body of her 40-year-old self.<sup>5</sup>

How old is Bianca when she is reanimated after being dead for 50 years?

If chronology—the amount of time one has been alive—determines one's age, then Bianca must be 40 years old, because she did not exist while she was dead and non-existing people do not age chronologically.

So, in *Cryopreservation while dead*, Bianca is chronologically 40 years old upon reanimation. However, in *Cryopreservation while alive*, Alex is chronologically 90 years old when she wakes up, because she was alive and existed during the period of her cryopreservation. But is the mere difference in their chronology relevant? Many rights and duties depend on how old one is. So if Alex is 90 but Bianca is 40 years old then Alex should be entitled, for example, to retirement benefits more than Bianca. But that does not seem correct. So if you believe, as I suspect, that Alex and Bianca should be treated similarly when it comes to age related rights and duties, the easiest explanation for this is that Alex and Bianca are the same age.

Now, if you believe Alex and Bianca are the same age, you should either reject the intuition behind *Cryopreservation while alive* or the intuition behind *Cryopreservation while dead*. I think it is more plausible to reject the intuition that Alex, who was alive, has aged, than to reject the intuition that Bianca, who was dead, has not aged. So, if you initially believed that Alex in *Cryopreservation while alive* is 90, you should now revise your belief and reject the view that chronology determines our age.

<sup>5</sup>One might object here and claim that if the person can be revived he is not dead in the first place. Cryopreservation while dead is thus impossible case. Therefore, either Bianca cannot be brought back alive, or Bianca is not dead during the time of being attached to the machine. I find this implausible because it implies that we cannot know whether someone is dead until far in the future—or perhaps never.

If Alex is not 90 after the cryopreservation, could she be 40? Suppose you had this intuition in the first place after *Cryopreservation while alive*. Your intuition might be explained by the claim that it is only conscious experience that matters; that is, one's age is determined by how long one has lived her life. So, your intuition and the reasoning behind the *Cryopreservation while alive* could be the following:

*Intuition:* Alex is 40.

*Explanation:* Alex was 40 years old when she was cryopreserved. Although she was technically alive during the 50 years of her cryopreservation, she was fully unconscious the whole time, so she did not have any experiences amounting to a lived life during that time. Because conscious experiences matter, Alex must now be 40 years old.

Here, the *Intuition* and *Explanation* form the following view:

*Experiential account:* The amount of time one has been conscious and lived her life determines how old one is.

Consciousness seems a plausible candidate for determining our age, because living a human life essentially boils down to having experiences. While *Experiential account* seem to solve the bare-difference argument presented above, by treating Alex and Bianca as equally old because neither of them lived their lives during the 50 years, I find the intuition and the explanation behind it to be unreliable as well. To understand why, consider the next case.

*Coma:* Charlie is 20 years old when she is in a serious car accident that causes her to fall into a coma. She is unconscious, but kept on life support in a hospital because of a slight chance of waking up. Finally, after 30 years in a coma, Charlie wakes up in the body of a 50-year-old-woman, yet with no recollection of conscious experience after her accident as a 20-year-old.

How old is Charlie after she wakes up from the coma? I believe you agree here that there is only one plausible answer, which is the following:

*Intuition:* Charlie is 50.

*Explanation:* Charlie was 20 years old when she fell into a coma. Because 30 years have passed during which Charlie was alive and her body aged normally, although she was unconscious, she must now be 50 years old.

So far, we have considered two possible intuitions and their explanations behind *Cryopreservation while alive* and saw that they were unreliable. These were *Chronological account* and *Experiential account*. But there is a third possibility.

If your initial intuition was that Alex is 40 years old, it might be explained by the claim that it is biology that matters. So, your intuition and the reasoning behind *Cryopreservation while alive* could be the following:

*Intuition:* Alex is 40.

*Explanation:* Alex was 40 years old when she was cryopreserved. Although 50 years have passed, Alex did not age biologically. Because it matters how fit and healthy one's body is in a physiological or biological sense, Alex must now be 40 years old.

Here, the *Intuition* and the *Explanation* form the following view:

*Biological account:* One's biological fitness and health determines how old one is.<sup>6</sup>

Biology is a plausible way to determine our age, because our intuitions about growing old seem to relate mostly to the gradual deterioration of our organism and its functional characteristics. But is the intuition and explanation behind *Biological account* reliable? Consider the following case.

*Anti-ageing pill:* Scientists have discovered a 'cure' for biological ageing. When a person takes the anti-ageing pill, it stops her biological ageing process. Diane, chronological age of 40, takes the pill. After 50 years, Diane's body is still physiologically indistinguishable from that of an average 40-year-old woman.

How old is Diane 50 years after taking the pill? If you accept *Biological account*, you should think that Diane is 40, because although she has lived through 90 years of conscious experience, her body is that of a 40-year-old woman.

But I believe few would think that Diane is 40. It seems that all possible answers to the question of Alex's age in *Cryopreservation while alive* turned out to be unreliable because the principles behind the intuitions lead us to conclusions that are too difficult to accept.

So, we therefore are forced to conclude that if Diane is not 40 years old in *Anti-ageing Pill*, she must instead be 90.

*Intuition:* Diane is 90 years old.

But what might explain the intuition here? At this point, I want to propose a hypothesis. Consider the following principle.

*The Two-Tier Principle of Age (TTPA):* Whenever the accounts from chronology, consciousness, and biology contradict one another on the question of someone's age, we should seek guidance from whichever two accounts differ the least from one another, and reject whichever account remains.

How might we test this hypothesis? We can see whether TTPA gives the same answers as our intuitions when faced with different thought experiments. First, TTPA seems to explain our intuition in *Anti-ageing pill*. Since we do not (intuitively) think Diane is any younger after taking the anti-ageing pill, something like TTPA is needed to explain why believe so. But, let us first test TTPA on some more thought experiments. Consider the following.

*Ageing Pill:* Scientists have created a pill that causes the person taking it to instantly age 50 years biologically. Elizabeth, chronological age of 40, wants to become biologically old (just to see how it feels) and takes the pill. Her body instantly transforms into that of an average 90-year-old woman; she now has wrinkled skin, grey hair, loss of eyesight, cardiovascular problems, stiff joints, and loss of body fat and muscle.

How old is Elizabeth after taking the pill? I doubt you think she is 90. There is an obvious intuition.

*Intuition:* Elizabeth is 40.

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<sup>6</sup>Several approaches to quantify biological age (senescence, as it is sometimes called) have been used, including the use of biomarkers in the form of serum analytes, epigenetic markers or frailty index. See Jazwinski and Kim (2019).

What might explain this intuition? Let us consider our hypothesis: when chronology, consciousness, and biology contradict one another, we should seek guidance from whichever two correspond.

Elizabeth is chronologically and experientially 40, yet biologically 90. According to the TTPA, we should seek guidance from the two that correspond—in this case, chronology and consciousness. Thus, Elizabeth must be 40.

The TTPA works well with the intuition behind the *Ageing Pill* and explains why we think (intuitively) that Elizabeth still is 40 after taking the pill: she is chronologically 40 and has had 40 years of conscious experiences.

But just because TTPA can explain the intuition behind the *Ageing Pill* does not mean we should endorse TTPA. Can TTPA explain our intuitions in other cases? Consider the following case.

*Computer Upload:* It has become possible to transfer a person's brain into a computer, enabling one to have decades' worth of conscious experiences in a millisecond. Francine, chronological age of 40, is curious about this new technology, so she uploads herself into the computer. In an instant, she subjectively lives out five decades of a full, rich human life. Everything—from the mundane pleasures of reading and listening to music, to the sublime joys of falling in love and going on adventures in distant lands, to the hardships of heartbreak and losing a loved one—is instantly rendered in full sensory and emotional fidelity. After a millisecond, she is detached from the computer, yet she has subjectively lived her life for 50 years.

How old is Francine after the computer upload? While the case is quite far-fetched, I think the obvious intuition is that Francine still is 40—not 90. Francine is chronologically and biologically 40, but she has 90 years of conscious experience. According to the TTPA, we should seek guidance from the two ages that correspond together, that is, chronology and biology. They say Elizabeth is 40.

The TTPA works well with the intuition behind *Computer Upload* and explains why we think (correctly) that Francine still is 40 after computer upload: because she is chronologically and biologically 40.

But even TTPA's ability to explain the intuition behind *Ageing Pill* and *Computer Upload* might still not be enough to endorse it fully. Can TTPA explain our intuitions in other cases as well? Consider yet another case.

*Computer Upload with Cost:* It has become possible to transfer a person's brain into a computer, enabling one to have decades' worth of conscious experiences in a millisecond. However, this technology has a drawback. For every year's worth of conscious experiences received this way, the person also ages biologically by one year. Gina, chronological age of 40, is curious about this new technology. Informed about the cost, she consents to have 50 years' worth of conscious experience. In an instant, she subjectively lives out five decades of a full, rich human life. Everything—from the mundane pleasures of reading and listening to music, to the sublime joys of falling in love and going on adventures in distant lands, to the hardships of heartbreak and losing a loved one—is instantly rendered in full sensory and emotional fidelity. After a millisecond, she is detached from the computer, yet she has subjectively lived her life for 50 years. Moreover, her body is now that of a 90-year old woman; she has wrinkled skin, grey hair, poor eyesight, cardiovascular problems, stiff joints, and loss of body fat and muscle.

How old is Gina after the computer upload? This is the most far-fetched thought experiment so far, and I think the most obvious intuition is that Gina is now 90 years old, rather than 40. But if you are not sure, imagine yourself in the place of Gina. Imagine that you experience 50 years' worth of subjective life while your biological age increases by 50 years. Would you not then *be* 50 years older?<sup>7</sup>

<sup>7</sup>If you think, as I do, that imagining yourself in the place of Gina makes the intuition that the machine ages the person attached to it, stronger, it might be because only when you imagine it happening to yourself, you can give sufficient weight to the bodily and mental experiences. See also Shoemaker (1994) on the shift from third-person to first-person in thought experiments.

I assume now that you believe you would be 50 years older if you had 50 years of conscious experience while simultaneously aging 50 years biologically. If you believe so, you should also believe that Gina is 90 years old after her brief upload to the computer.

The TTPA works well with the intuition behind *Computer Upload with Cost* and explains why we think (correctly) that Gina is 90 after computer upload: because she is biologically 90 and has had a total of 90 years of conscious experience.

So far I have presented seven thought experiments where chronology, biology, and consciousness differed. I thus covered all possible cases where one of them differed while the two remain the same. I showed that chronology, biology or consciousness alone could not explain how old someone is. I proposed a principle called *Two-Tier Principle of Age* and showed that it explained our intuitions behind the seven thought experiments. Next, I will show why I still think we should reject the Two-Tier Principle of Age.

### 3 | REJECTING THE TWO-TIER PRINCIPLE OF AGE

Consider the following case.

*Anti-ageing pill with a side effect:* Helen, chronological age of 30, takes the anti-ageing pill that stops her biological ageing process. However, the pill has a side effect: it causes Helen to fall into a coma 30 years after taking the pill. The coma lasts for 30 years. When Helen wakes up from the coma, how old is she?

There are three possible intuitions, but TTPA cannot explain any of them because chronology, biology, and consciousness all differ from each other.

The plausible answers, to the question of how old Helen is, are:

Helen is 90 (because she has been alive for 90 years).

Helen is 60 (because she has experienced 60 years of conscious life).

Helen is 30 (because her body is that of a 30-year-old woman).

Here the TTPA offers no help, and I think that is a good enough reason to jettison the principle. We simply cannot use a principle that cannot give us any answers in cases where biology, consciousness, and chronology all differs from each other significantly.<sup>8</sup>

So, how to continue here? I think *Anti-ageing pill with a side effect* is too far-fetched for our intuitions from that case to serve as evidence about how we should think about age in other cases. Indeed, it might be difficult to form any reliable intuitions about this case in the first place. If you claim to have an intuition about how old Helen is, you are likely to apply your intuitions from earlier thought experiments, rather than forming genuine new intuitions about this case. Thus, *Anti-ageing pill with a side effect* itself does not seem to prove or explain anything.

I believe we simply have to choose between *Chronological account*, *Experiential account*, or *Biological account*. Thus, it is ultimately about choosing which bullet one is willing to bite. Let us consider which of the three principles is the easiest to accept.

<sup>8</sup>Consider for instance another version of the cryopreservation case, wherein the person ages biologically at a rate of only 10% of normal speed. TTPA cannot explain her age in these kind of cases.

## 4 | WHICH VIEW ON AGE TO CHOOSE?

When I tried to show that chronological age does not matter, I presented two analogous cases where the difference between the cases was only in one detail. In the first case, Alex was cryopreserved while she was still alive. Her body was kept alive and unconscious in a machine that stopped her biological ageing. In the other, Bianca was killed and her body cryopreserved at the moment of death, before being reanimated into that same body.

When Alex woke up and Bianca was reanimated, neither of them had aged biologically and neither had any conscious experiences; the bare difference was that Alex had been technically alive while Bianca had been technically dead. I argued that it is very difficult to believe that Alex is older than Bianca.

Now, one might object here that I have misunderstood chronological age. My assumption regarding chronological age was as follows:

*Chronological account*: the amount of time one has been alive determines how old one is.

But one could claim that the amount of time one has been alive is not what chronological age is. One might instead adopt the following slightly revised assumption:

*Chronological account<sub>2</sub>*: the amount of time it has passed since one was born determines how old one is.<sup>9</sup>

If the latter understanding of chronological age is correct (rather than the former), then dead people do age, contrary to what I have assumed. And if dead people age chronologically, then Bianca is as old as Alex is (both would be 90)—contrary to what I assumed, namely that neither of them have aged. One could then say that it is this latter understanding of chronological age that matters in determining one's age.

However, I do not think my initial assumption on chronological age is mistaken. The reason for this is that if we use the other understanding of chronological age, then it leads to views that are obviously wrong. For instance, consider the following claim:

My great-great-grandfather, born in 1870, is 150 years old.

The above claim seems to be false. Instead, the following claim seems to be true:

My great-great-grandfather, born in 1870, would be 150 years old if he had never died.

If the latter claim is true and the former claim is false, then the revised view of chronological age cannot be true. If, on the other hand, the revised view for chronology is true, then the following sentences are also true: 'Julius Caesar is 2120 years old' or, 'Tutankhamun is 3,300 years old'. However, it is very difficult to believe that these statements are true. For them to be true, we should accept the counter-intuitive claim that someone (or something) that does not exist (anymore)—like my great-great-grandfather, or Julius Caesar, or Tutankhamun—could age. Further, what if we could magically reanimate Tutankhamun? Would he then be 3,300 years old? I doubt you think so. Tutankhamun would be as old as he was when he died, which was 19 years old.

If you think Tutankhamun would be 3,300 years old when he is brought back to life, you must be basing your view on how old Tutankhamun's body would be if he were somehow reanimated into a living body with a biological age equivalent to the age of his mummified remains. In such a scenario, he might well be 3,300 years old. But this merely shows that it is indeed biology that matters—not chronology—when we think of how old Tutankhamun would be if he were brought back to life today.

<sup>9</sup>This is endorsed for example by Baars (2007, p. 3).

One might also suggest that one does age while dead, provided one is brought back to life later.<sup>10</sup> But this would mean that the decision to reanimate Tutankhamun determines how old he is. I find it difficult to believe that the mere act of reviving Tutankhamun would cause him to age more than 3,000 years.

There is yet a further problem with the revised chronology view. Suppose you would invent the time machine. Suppose further that you would travel back in time to 100 years before you were born. Now, in this case, you would be *negative* 100 years old. But surely this is not true. Surely, you are as old as you were at the time you entered the time machine and travelled back in time.

I believe I have now given enough reasons to believe that my initial understanding of chronological age is indeed true. If my initial understanding of chronological age is true, then Alex and Bianca have different chronological ages. But when we consider how old they are, chronological age is not the answer, unless one is willing to bite the bullet that Bianca should be treated very differently than Alex because they are different ages.

Those not yet convinced that *Chronological account* is untenable should consider the following case.

*Cryopreservation of a child:* In the near future, it has become possible to cryopreserve living humans and wake them up after several decades. This technology stops their biological ageing process and keeps them unconscious, effectively enabling people to subjectively travel into the future. Alex, chronological age of 8, wants to be cryopreserved and woken up in 50 years. The machine keeps her unconscious during the whole time and stops her biological ageing (but technically keeps her alive). When 50 years have passed, Alex is woken up and her body is that of an 8-year-old girl.

It would be absurd to think that Alex, now cryopreserved at the age of 8, would be ready to vote, drive, drink alcohol, and consent to sex or marriage after the procedure. Thus, it would be absurd to think that she would be older than eight years old after spending 50 years in the cryopreservation machine.

I do not think we should bite this bullet (although I admit that someone *might* be willing to do so). Therefore, I do not think chronological age matters when we ask how old someone is. But perhaps *Experiential account* offers an easier bullet to bite.

To demonstrate why consciousness does not matter in determining one's age, I earlier proposed a scenario wherein someone falls into a coma for several decades, and then asked whether you thought she had not aged. I assumed that the initial intuition would be that she had indeed aged, despite the fact that she had been unconscious and she had not 'lived' her life. But could it be possible to accept this view?

If you think we should accept that comatose patients have not aged because they have lived their life less than others, then you might have to accept some other, even more radical conclusions as true, too.

Consider two people born at the same day, Ida and Jane, who live their lives in an almost identical way except in terms of sleep. Ida sleeps on average 6 hr per night, while Jane sleeps 9 hr per night. Ida would then be conscious approximately 1,100 hr more than Jane in a given year. That means that roughly every 8 years, Ida will have lived a full year longer than Jane in terms of conscious, subjective experience. Despite this, I doubt that anyone would think Ida is older than Jane. If one is not willing to accept that Ida is older than Jane, we should finally reject the experiential account when it comes to age and ageing.

When we considered whether biology determines our age, I asked you to imagine a case where Diane takes the anti-ageing pill that stops her biological ageing process. I assumed that there still is an intuition that she is 50 years older 50 years after taking the pill. If biology is what matters, we should reject this. But perhaps it is not as difficult to accept that the anti-ageing pill actually stops you from ageing. However, if one wants to endorse the biological account, one might have to accept other, even more difficult conclusions, too.

Consider the following.

<sup>10</sup>I thank an anonymous referee for this suggestion.

*Grand Master*: Grand Master has lived for thousands of years; no one knows exactly how many. Biologically, he does not age. His body is that of a 50-year-old man and has been so for thousands of years. He remembers what has happened during those years at least as vividly as a normal 50-year-old remembers his own twenties. Grand Master knows dozens of languages and hundreds of skills, from archery to differential calculus, because he has had thousands of years to practice them. He has had multiple lovers, wives, children, and friends who have all died years ago. He has experienced many times more of anything than anyone else.

If *Biological account* is true, then Grand Master really is 50, but it is tempting to say that he is thousands of years old. Suppose further that the grandmaster suddenly falls ill and needs a lifesaving organ transplant. Suppose further that there is another patient, aged 60, who needs the same organ. If Grand Master is younger than the other patient, then Grand Master should get the organ, since justice requires, in general, prioritizing the lives of younger people. But surely we should take into account the fact that the grandmaster, while biologically younger, had actually existed and lived his life for thousands of years. So, justice actually requires that the organ go to the biologically older patient—something we would miss if we view biology as the sole factor determining age. This is another reason to be sceptical that biology determines how old we are.<sup>11</sup>

## 5 | SOME CONCLUDING REMARKS

In this paper, I challenged the belief that chronology determines our age. I used philosophical thought experiments to show that it is not always obvious how we should think about someone's age.<sup>12</sup>

I proposed three plausible but ultimately unsatisfactory accounts to ageing. I tried to solve the problems by applying any two corresponding views together and this way tried to determine someone's age. Yet, even this two-tier account to age is vulnerable to persuasive counter-examples, so I claimed that the matter eventually boils down a choice of which bullet one is willing to bite.

I did not choose my side on the issue here, but I hope I have defined and clarified the plausible philosophical positions one could take on age and ageing.<sup>13</sup> My considerations suggest that it is far from obvious which side we should take and which bullet we should bite in a given scenario. It is not obvious how we should think about our age and ageing because our concept of age seems poorly adapted to unusual scenarios where our biology, chronology, and consciousness diverge. If my analysis is right, I have managed to show—as far as arguments from thought experiments go—, that the question of how to determine one's age has yet to be answered in a satisfactory way.

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## ORCID

Joona Räsänen  <https://orcid.org/0000-0002-7383-6138>

<sup>11</sup>Lippert-Rasmussen and Petersen (2020) use similar reasoning against age change in the healthcare context.

<sup>12</sup>It is possible to create more cases where, for instance, a person ages very slowly biologically while being cryopreserved or where a coma patient is not entirely unconscious but constantly feels minimal pleasure. This sort of cases complicates the analysis further, and for simplicity I have not dealt with such cases in this paper.

<sup>13</sup>This is what some philosophers think is true philosophical bioethics. See Häyry (2015).

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