Dying to live: transhumanism, cryonics, and euthanasia

Buben, A.J.; Cholbi, M.; Varelius, J.

Chapter 17
Dying to Live: Transhumanism, Cryonics, and Euthanasia

Adam Buben

Abstract It might seem counterintuitive to think transhumanists, who are typically characterized by extreme techno-optimism and hope for radical life-extension, would be interested in assisted dying. Because the technological enhancements they long for will probably not be available during their natural lifetimes, many transhumanists at least entertain the idea of having themselves cryonically preserved to buy some additional time for real-world technology to catch up to their dreams. However, since an ideal preservation would take place before serious cellular deterioration sets in, controlling the time and manner of death would be very attractive for transhumanist cryonicists. This chapter identifies some circumstances under which they might be justified in seeking assistance in dying (even though they would describe it as something more akin to hibernating). After providing a fundamental overview of both transhumanism and cryonics, and then making my case for what some scholars have called "cryothanasia" (i.e. assisted dying for the purpose of improved preservation quality), I proceed to consider some scenarios meant to test the limits of this justification. While things are admittedly murkier when considering the possibility of cryothanasia outside the context of imminent medical collapse, I can see no insurmountable criticisms of cryothanasia as a last resort in cases of (currently) terminal and irreparable neurodegeneration or other forms of progressive brain damage.

Keywords Alcor · Assisted dying · Cryonic wager · Reanimation · Suicide

17.1 Introduction

At first glance, it might seem that transhumanists would have little interest in receiving assistance in ending their lives. Such assistance is typically regarded as a last resort for relieving otherwise inescapable and intolerable suffering, so why would people characterized by tremendous optimism about what near-future technology might make possible—which includes hope for radical life-extension—focus their attention

A. Buben (✉)
Leiden University, Leiden, The Netherlands
e-mail: a.j.buben@luc.leidenuniv.nl

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on ways to end it all? This is not to suggest that transhumanists are unconcerned about suffering and all the ways it shows up in the world; in fact, concern about the misery ordinary humans have experienced throughout history is among the primary motivators for much of the transhumanist agenda. What sets them apart, however, is that most transhumanists think just-over-the-horizon technological developments will put a stop to much, if not all, of our misery without needing to *put us out of our misery*. Of course, problems arise when that horizon turns out to be a bit farther away than they had initially hoped and predicted, and it is in response to these problems that a connection between transhumanism and various forms of assistance in dying comes into view.

For those of us unlikely to survive long enough to see the promised technological wonders, transhumanists think there might be a way to buy some extra time: cryonic preservation. As in the case of the procurement of functional organs for transplant, however, the preservation process works best if it is begun before serious deterioration of the tissue takes place, and this fact makes controlling the time and manner of death very attractive for transhumanists interested in cryonics. Building on a fairly small body of relevant existing literature, this chapter argues that—at least under certain circumstances—these transhumanists might be justified in seeking assistance in dying (and perhaps even dying via the cryonics procedures themselves) in order to increase the quality of preservation. But before getting into this argument, it will be necessary to provide a fundamental overview of transhumanism, cryonics, and the relationship between them.

17.2 What Is Transhumanism?

Transhumanism can be difficult to characterize given the wide range of interests and individuals associated with it. As the term itself suggests, most of the scientists, philosophers, futurists, and science fiction enthusiasts who consider themselves transhumanists think humans can (and should be trying to) transcend their ordinary limitations through technological enhancements.[1] In the words of one commentator: "While definitions and strains of transhumanism vary, at the most basic level, transhumanism is an intellectual and cultural movement premised upon the idea that human beings can use science and technology to significantly enhance their capabilities and thereby overcome many of the limitations of human biology" (Huberman 2018: 50). While this basic description might be sufficient for many self-proclaimed transhumanists, plenty of others would add "…with the ultimate goal of transitioning into some kind of posthuman being." This posthuman being might very well constitute a

[1] Although transhumanists encourage technological enhancement, nearly all of them also advocate for individual freedom and autonomy when it comes to biomedical choices and enhancements, which makes it highly unlikely they would oppose assisted dying (see e.g. Manzocco 2019: 34–5; Sandberg 2013; Swan 2019: 726–7). On their general openness to choosing suicide, see, among many others, Jenny Huberman (2018: 57) and Tena Thau (2020: 641).

new, likely inorganic, species with abilities far beyond those we biological humans currently possess. As Roberto Manzocco (2019: 33) explains,

> A possible post-human being should…possess an intelligence superior to that of any human genius past or present, as well as being far more resistant than us to diseases and aging….a post-human being should also have direct control over their own desires and moods; the ability to avoid tiredness, boredom, unpleasant emotions and sensations; to adjust their sexual inclinations to their liking; to accentuate their hedonistic and aesthetic experiences; to experience brand-new states of consciousness inaccessible to…Homo sapiens.

Some transhumanists even go so far as to posit, and long for, the eventual immersion of all posthuman minds into a universal artificial consciousness that will expand into the cosmos and reorganize it into a more perfect form (cf. Geraci 2008: 149–52; Graham 2002: 72–3).

For the purposes of this discussion, we can probably focus on the more down-to-earth desires and ideas associated with transhumanism, setting aside the somewhat extreme (and less commonly held) notions about the emergence of posthuman species and "Apocalyptic AI." On this more relatable level, what is it that transhumanists hope to achieve, and what technologies would be necessary to make such achievements possible? When they speak of "the radical enhancement of human being," what they seek is "the enhancement of all its psycho-physical capacities and functions in the way that specifically presupposes the application of non-traditional means, those of biomedicine (neuroscience, genetics, pharmacology) and those of technology (molecular nanotechnology, informational technology, artificial intelligence, robotics)" (Agatonović 2018: 430). More specifically, some common transhumanist goals include increased intelligence, physical strength and endurance, and longevity. In the latter case, the hope is that developments in cellular medicine, cyborgization, and mind-mapping/-uploading will lead to much longer lives and eventually to overcoming necessary mortality.[2]

More than a few transhumanists think it will not be long before medical interventions can "cure aging" and eradicate various deadly diseases that now seem almost inevitable—e.g. the numerous forms of cancer and neurodegeneration.[3] Geraci (2011: 143) states that "purely biological solutions…include neuro-pharmacology, to…enhance mental abilities, stem cell research, to regenerate limbs and organs, and genetic engineering, for therapeutic and enhancement purposes." There are quite a few serious problems to solve along each of these lines of research, but the biggest hurdle to clear when it comes to slowing, stopping, or reversing aging is basic cell

[2] The most optimistic speculations (see e.g. Kurzweil 2005: 358, 486) even suggest advancing to the point of being able to "hop" to other universes in order to avoid the inevitable destruction of this one. Reaffirming my commitment to down-to-earth ideas, I will not pursue this notion any further here.

[3] In the meantime, most transhumanists happily recommend following the latest research on the benefits of exercise and a healthy diet, while some make more controversial lifestyle choices, such as adopting a regimen of "caloric restriction." This practice finds limited support in laboratory experiments showing that the lives of mice can be radically extended (roughly doubled) by drastically cutting caloric intake (by about 50%) without sacrificing certain "fundamental nutrients"; similar effects have not yet been demonstrated in humans (Manzocco 2019: 92–3).

degeneration. The hopeful call attention to existing species—e.g. *Turritopsis dohrnii*, a.k.a. "the immortal jellyfish"—that are better at maintaining cellular robustness (and might provide clues to unlocking our own potential), to experiments that have succeeded in rejuvenating laboratory worms and mice (suggesting that analogous human therapies might be right around the corner), and to speculation about sophisticated nanotechnology that could repair cell damage on a molecular level (see e.g. Dvorsky 2013; Jabr 2021; Manzocco 2019: ch. 5; Piore 2021; Rich 2012).[4]

However, even if these biomedical dreams come true, and death is no longer necessary, humans will still be susceptible to accidents so long as they depend on these fragile organic bodies. This problem could be partially addressed by cyborgization (i.e. the gradual replacing of biological organs and tissues with mechanical components) or by transplanting brains into more durable robotic bodies (see e.g. Hughes 2004; Kurzweil 2005: 309–10; Manzocco 2019: 28–9). Unfortunately, these strategies would only spare us from relatively small-scale dangers; we would still be at risk from larger calamities and cataclysms. Enter "mind-uploading," which would end human reliance on bodily form through the detailed mapping/recording of neural membranes, synapses, and their functions, and the transferring of this information onto a computer processing platform (see e.g. Goldstein 2012; Huberman 2018; Koene 2013; Manzocco 2019: ch. 7.3). One of the purported benefits of purely digital existence is almost total invulnerability (especially if one is constantly "backed up" and saved in various locations around the world/galaxy/universe), but the suggestion that the subjective experience of selfhood could survive the uploading process after being reduced to mere patterns of information raises some difficult questions about the nature of personal identity (cf. Harle 2002; Hughes 2013; Zimmerman 2013: 100–1).[5] Setting aside these questions for now, uploading is one more speculative longevity-enhancing technology eagerly awaited by many transhumanists. But what about those on "short clocks" due to age or illness who cannot wait for medicine, robotics, and neuroscience to advance at their current pace? It is cryonics companies that give these people the purported chance to buy some time while all that troublesome R&D plays out.

[4] Some of the standard objections to transhumanist enthusiasm for radical longevity have to do with overpopulation, strain on limited resources, and unequal access to new technologies (see e.g. Glannon 2002: 347; McNamee and Edwards 2006: 514–5; Noonan 2016: 40–1). The standard response to these concerns usually falls along the lines of: "a civilization with technology advanced enough to exacerbate these problems by extending lives will probably be able to solve or mitigate them (e.g. by colonizing uninhabited planets)." A more thoughtful response (see Cutas 2008; cf. Moen 2015: 680) is to argue that the living do not have some moral duty to die so that others (especially others who do not yet exist) can be accommodated. I might not be justified in doing absolutely anything to survive, but others' rights to reproduction and at least some resources might just be eclipsed by my right to avoid death, when possible, even if it is not possible for everyone.

[5] Of course, for those interested in the emergence of posthumans and a universal artificial consciousness, the potential loss of personal identity might not be much of a problem (and personal identity is a fraught philosophical concept anyway, as James Hughes and others (e.g. Swan 2019: 710–3) are careful to point out), but this is a somewhat different line of inquiry from the one currently under consideration.

17.3 A Miracle on Ice?

Transhumanist goals and strategies certainly receive their share of criticism, even mockery, and this is especially true when it comes to cryonics[6]—the practice of preserving human (and sometimes other animal) bodies or body parts at extremely low temperatures in the hope of having them reanimated or resurrected at some point in the future. In order to understand which critiques (or jokes) are well-placed and fair, it will be helpful to clarify what exactly cryonic preservation entails. Fortunately, there is widespread agreement on the details, and the handful of (mostly US-based) cryonics companies seem to provide roughly the same services (although some of them outsource certain elements of the process—e.g. preparation and transportation of the body—to other companies). To begin with, the prospective patient (or designated surrogate) must decide whether to pursue full-body preservation or instead opt for neuropreservation (i.e. preservation of only the head/brain); the latter costs less than half as much but creates obvious additional complications for reanimation (cf. Manzocco 2019: 114). Without one's original body, one would have to hope that future technology will sort out issues such as head/brain transplants in addition to reanimation and other more straightforward biomedical interventions aimed at preventing/reversing degeneration (at least in heads/brains). Of course, the development of uploading technology would render a lot of these other advances unnecessary, but this possibility comes with its own problems, as mentioned above, and it seems to be a less desirable option for many people hoping to come out on the other side of cryonic preservation someday (see Swan 2019: 708).

So, let us suppose I am interested in full-body preservation; how would I pay for it? A common misconception is that cryonics is only for the rich. It is certainly true that preservation is not cheap, but that does not mean it is inaccessible to all but the fabulously wealthy. Full-body preservation at Alcor (in Scottsdale, Arizona), the most prominent cryonics company, costs $200,000 with everything included (but there is a much cheaper option in Russia, and prices in between these extremes elsewhere in the US). That is not an insignificant amount of money, but there are some mitigating factors to consider. For example, money otherwise spent on cremation or burial could instead go toward the costs of this alternative approach to handling one's remains. More significantly, cryonic preservation can be paid for through a special life-insurance policy (with one's chosen cryonics provider as the beneficiary) that might only cost a few dollars per day, depending on one's age and health history.

[6] Not every cryonicist is a transhumanist, or vice versa, but there is a lot of overlap in that Venn diagram. In one notable example, Max More, one of the most influential transhumanists, spent a decade as president and CEO of Alcor, the largest cryonics company. In the small non-overlapping parts of the diagram, one might find people who choose cryonic preservation simply hoping to reach an ordinary human lifespan prevented by the early onset of an extraordinary (and currently incurable) illness; such people would not necessarily be seeking any sort of transhumanist enhancement. See, for instance, the 2019 documentary, *Hope Frozen*, which details one family's decision to have their three-year-old daughter's body preserved after she succumbed to brain cancer.

This kind of financial planning might not be available to absolutely everyone, but it certainly makes cryonics a viable option for most members of the middle-class (cf. Manzocco 2019: 119; Moen 2015: 678–80; Shaw 2009: 516).

Once the necessary arrangements have been made, the next step—dying—is easy enough in the abstract, but the specific circumstances surrounding it are massively important and get right to the core issue of this chapter. Ideally, a preservation team is waiting nearby at the moment death is declared (it also helps if you can die in a hospital near your chosen cryonics facility). Their job is to begin cooling the body immediately while maintaining respiration and blood flow artificially to slow the onset of cell degeneration. They also inject anti-coagulants to prevent blood-clots and replace much of the body's fluids with a kind of antifreeze solution. The goal is to limit the formation of destructive ice crystals as they gradually lower the body's temperature even further. Instead of freezing, the body vitrifies, reaching a glass-like state in which there is little molecular activity and cell deterioration is brought to a virtual standstill. The final step in the process involves transferring the body to the chosen cryonics facility and submerging it upside down in regularly replenished liquid nitrogen at −196 °C. There is no electricity required, but if the liquid nitrogen refills are neglected, the container housing the body will begin to thaw starting at the top, which is why the all-important head/brain is at the bottom (cf. Manzocco 2019: 118; Minerva and Sandberg 2017: 527; Moen 2015: 677; Shaw 2009: 515; Swan 2019: 701–2).

Provided the cryonics company stays in business and keeps the liquid nitrogen flowing, the preserved have all the time in the world to wait for technology to advance far enough to be able to fix what was ailing them prior to preservation and make reanimation possible. But how likely is it that this will ever happen? Honestly, not very, and this extreme unlikelihood is probably the main source of the criticism and mockery cryonicists face. In response, they offer what David Shaw (2009: 520–1) calls the "Cryonic Wager," which is similar in structure to Pascal's more famous version. Among the available postmortem options—various forms of burial and cremation vs. cryonic preservation—the latter seems to provide the best chance of living again (and possibly a lot longer if some of transhumanism's other technological dreams are also realized). In fact, assuming there will be no divine intervention, dissolution into one's constituent elements provides no chance whatsoever of returning to life in the world (in the relevant sense), so even the very limited possibility of cryonic preservation paying off triumphs in comparison. Of course, it does come at a premium, which has to be weighed against one's other financial responsibilities, but people make questionable purchases that are not "potentially life-saving" all the time and we generally think they are free to spend (at least some of) their money as they wish (Moen 2015: 680).

But is it really accurate to say that being resurrected, young and healthy, from a vitrified state is any less of a fantasy than the sort of resurrection Pascal believed in? The reason the Cryonic Wager has some rational pull is that no one can definitively rule out the possibility of advancing science and technology eventually being able to

solve all the pertinent problems (cf. Minerva and Sandberg 2017: 531–2).[7] If truth be told, many of the required technologies already exist in some rudimentary form, which suggests to some that successful reanimation might not be such a far-fetched idea. I have already mentioned biomedical research in genetic engineering, the therapeutic use of stem cells, etc., and there are several examples of proto-cyborgization to be found in the medical devices we currently implant in human bodies. When it comes to cryonics specifically, "mainstream cryobiology" has "routinely cryopreserved, thawed and recovered," the "sperm, eggs and tissues" of humans (Moen 2015: 678). There have also been experiments that have succeeded in reanimating nearly frozen rats and pigs whose brain activity had come to a halt, and there have even been examples of this kind of thing in cases where humans drowned in very cold water. More recently, hospitals have begun using some of the same cooling techniques employed in cryonic preservation to buy extra time for trauma surgeons to repair serious damage in patients (cf. Moen 2015: 677; Swan 2019: 702).

However promising the different lines of research might be, there are obviously still many battles to be fought on each front. For example, in the case of cryonics, even an ideal preservation will result in some micro-fracturing of the tissues and organs that will need to be repaired before a successful reanimation can take place.[8] Once again, sophisticated nanotechnology seems to be the "magic bullet" that most transhumanists predict will solve some of these very difficult lingering problems (cf. Manzocco 2019: 118, 122, 127; Moen 2015: 678). Whether this technology is ever developed remains to be seen, but the most important takeaway from this overview of cryonics, for my purposes, is that successful repair, rejuvenation, and reanimation is made easier (and thus, more feasible) when the preserved body is as undamaged as possible. This is the observation that finally brings the conversation around to transhumanist interest in assisted dying.[9]

[7] However, even if the technology becomes available, some have pointed out that there might still be social or political obstacles to the reanimation of preserved bodies. For example, future societies might not see any good reason to devote resources to reanimating and caring for the people of a bygone era that could be better spent on the people of their own (cf. Moen 2015: 678; Shaw 2009: 517). On the other hand, Thau (2020: 643–4) considers the disturbing possibility that future societies *would* be motivated to reanimate the preserved people of the past, but only to use or abuse them.

[8] Since this damage can occur in the brain, it is also a problem for the proponents of future uploading technology. It is hard enough to map accurately and understand one's neural structures without having to contend with structural damage as well.

[9] Just to be clear, I do not mean to discount the various social, political, or economic practicalities I have mentioned along the way that would surely have some bearing on the likelihood of successful repair, rejuvenation, and reanimation; all of these issues are taken into consideration when coming to the conclusion that cryonic preservation is extremely unlikely to work out. (I have said less about aesthetic and psychological uncertainties related to how a reanimated individual might adapt to the future world, but I doubt these kinds of worries will essentially alter the Cryonic Wager math, especially if suicide remains a possibility under unsatisfactory conditions (cf. Thau 2020: 641, 643).) However, my focus is on the medical, physiological, and technological practicalities because those have the most direct relevance to the issue of assisted dying in the cryonics context.

17.4 Cryothanasia

What I suggested above is that the longer a dead body sits before the preservation process is begun, the worse the damage will be at the cellular level. The worse the damage is, the more sophisticated the repair techniques will need to be. This point is of particular concern when it comes to brain damage, given the singular importance of the brain in most accounts of personal continuity. If the damage is severe enough, we might reasonably say the person is gone, and no repair techniques will be sufficient to bring the person back into being.[10] In an extreme, but illustrative, example, it seems accurate to claim that the brain of a cremated person is damaged beyond repair (again, barring divine intervention, or that of some AI with knowledge and capabilities well beyond human comprehension). But we do not need to reach this catastrophic level of damage to come to similarly pessimistic conclusions about the chances of successful restoration. In fact, it is not even necessary for a brain to be dead before we start worrying about the onset of irreparable damage.

Consider the situation of otherwise healthy people with degenerative brain conditions. For someone struggling with progressive dementia due to Alzheimer's disease, the more time passes, the less there is of this person to preserve or restore. In the case of (mathematician and noted cryonics advocate) Thomas K. Donaldson, the problem was an expanding brain tumor, rather than Alzheimer's, but he was thinking about the same "clock is ticking" problem when he asked the California courts (in the early 1990s) to allow him access to pre-mortem cryonic preservation. Donaldson's doctors argued that if he were to wait "until his natural death to be suspended, future reanimation will be futile because the tumor will have destroyed his brain" (Pommer 1993: 590). The lawsuit was ultimately unsuccessful because the courts in question "found that recognizing a right to pre-mortem cryonic suspension was tantamount to sanctioning assisted suicide," which is "a legislative matter rather than a judicial one" (Pommer 1993: 600, 603).[11] Whether or not the legal reasoning that resulted in this decision was sound, it is imperative to acknowledge that cryonicists would not necessarily describe the situation in these terms. Donaldson himself states, "I would not see myself as committing suicide, nor would the people who froze me see me as committing suicide. They'd see me as going through a draconian treatment that was my only chance to stay alive, however slim that chance might be"

[10] Many transhumanists/cryonicists speak of "information-theoretic death," in which the personality-generating memories and other information encoded in one's neural structures are irreparably lost due to damage/deterioration so severe that no technology would be able to recover it (cf. Manzocco 2019: 116–7; Minerva and Sandberg 2017: 527; Moen 2015: 677–8; Shaw 2009: 518–9). According to this understanding of death, a cryonics patient with a well-preserved brain need not be considered entirely dead, even though most people (relying on our current legal and medical definitions of death) would not consider such a person alive either. To borrow a quote from *The Princess Bride*'s Miracle Max, the cryonically preserved might turn out to be "only mostly dead." For further discussion of this strange situation, see Hershenov (2003: 91–4).

[11] Despite this legal setback, things apparently worked out ok for Donaldson in the end (see Minerva and Sandberg 2017: 526), but his good fortune does little to diminish the force of the hypothetical situation his case represents.

(Pommer 1993: 601n98). This different way of describing things suggests that, even where the language of assisted dying remains useful, requesting it for the purposes of better cryonic preservation could, and maybe should, be distinguished from ordinary requests aimed at preventing otherwise inescapable and intolerable suffering. At the risk of momentarily sounding a bit theological or soteriological, dying to (hopefully) live again seems importantly different from dying just to avoid the pain of being alive any longer.

Ole Martin Moen (2015: 680) and Shaw (2009: 519) both offer brief arguments supporting this distinction, but it is the more recent work of Minerva and Sandberg (2017: 529–30) that really digs into the ethical issues surrounding these two motivations for assisted dying. They coin the term "cryothanasia" to refer to the kind of pre-mortem cryonic preservation Donaldson sought, and they claim that the standard arguments against euthanasia (broadly construed here, it seems, to include various sorts of assisted dying), which might not be all that compelling to begin with, simply do not apply to cryothanasia. The strongest of these arguments have to do with ethical prohibitions (both within society in general and within the medical profession specifically) on the taking of human lives, regardless of the reasons for wanting to take them.[12] However, since it remains to be seen if cryonic preservation will pay off, it is unclear if cryothanasia qualifies as taking a life or merely pausing a life.

Perhaps one could make a case that cryonics is so unlikely to work out that, for all practical purposes, cryothanasia amounts to taking a life. Setting aside the conjecture required to make such a case, it would still be necessary to explain how cryothanasia differs from other potentially deadly but widely accepted medical choices—for example, undergoing experimental treatments that many jurisdictions already allow as last resorts. As Minerva and Sandberg (2017: 531–2) see things,

> what is relevant in the context of people affected by terminal diseases, and for whom no other treatment is available, is that the probability is still greater than 0. From a moral perspective, the use of experimental treatment for some patients is indeed justified on the basis that it is the only alternative to their dying within a short time, so it is in their best interest to use a potentially unsafe treatment in order to have a chance to survive.

[12] On the weaker end of the spectrum are arguments based on religious belief, or on arbitrary and contingent views about what is "natural" or "dignified." Minerva and Sandberg do an admirable job of briefly responding to religious arguments on their own terms and showing that support for cryothanasia need not conflict with certain, mostly Judeo-Christian, religious beliefs. While I am unsure that dreams of life-extension via cryonic preservation would be as compatible with other religious traditions, especially certain versions of Buddhism (see Buben 2019), the main problem with religious arguments is that they often depend on additional, highly dubious, metaphysical and epistemological claims about the existence of divinities and knowledge of their will. Something similar could be said about the questionable assumptions made by those who attempt to define what is natural or dignified for human beings. This is a tried, if not true, strategy employed by the conservative-minded in response to new technological developments throughout history. In most cases, their concerns are gradually ignored as the new developments are normalized and deemed compatible with the ever-shifting socio-cultural understanding of what is appropriate for humans.

If a probability greater than zero is all it takes to justify other last resorts, then why could the same not be said of cryothanasia? The point of this mostly rhetorical question can be made even stronger through further consideration of the Cryonic Wager.

As previously explained, the only thing at stake in post-mortem cryonic preservation is money—a not insignificant, but also not impossibly large, amount of money. Things are a little more complicated when it comes to cryothanasia because, in addition to the costs of preservation, it is also necessary to put some actual life on the line. Granted, the quality of the remaining days of the terminal cancer or Alzheimer's patient might not be so great, but it is possible, and perhaps likely, that someone opting for cryothanasia would end up sacrificing a little of the good stuff as well—e.g. extra time with loved ones, or one more scoop of ice cream (cf. Minerva and Sandberg 2017: 531–2; Shaw 2009: 519). Now, Pascal's Wager suggests that where the potential benefits of making a finite sacrifice are infinite—"an infinite life of infinite happiness," in Pascal's (2005: 213) words—it really does not matter how likely getting those benefits is; so long as there is even a remote possibility, making the sacrifice is sensible. Given that the potential (though unlikely to materialize) benefits of cryonic preservation for the transhumanist include indefinite life-extension, one might argue that the merely finite sacrifice/wager of time and money involved in cryothanasia is similarly sensible (cf. Minerva and Sandberg 2017: 533n29). Although the analogy with Pascal's Wager is imperfect, the potential benefit of indefinite life-extension means that cryothanasia would compare quite favorably, even if there is a substantial divergence in probability of success, to other experimental last resorts that might only buy someone a few more years.

And there is still more to be said in defense of cryothanasia. On the topic of money, I can think of another mitigating factor to take into account. Both Minerva and Sandberg (2017: 532) and Moen (2015: 680) mention that cryothanasia would come with certain economic benefits, but what they do not get into explicitly is how these benefits impact the Cryonic Wager. The end of life is typically quite expensive, given the costs of medicine, ambulance rides, hospice care, stays in intensive care units, etc. In the Cryonic Wager, as originally formulated, the costs of post-mortem cryonic preservation would be incurred in addition to standard end of life expenses. In the case of cryothanasia, however, these costs would simply replace the expense of weeks or months of hospice care or ICU stays. Combined with the savings that come from avoiding burial or cremation, cryothanasia might easily pay for itself in many instances. One could certainly imagine insurance providers wanting to give cryothanasia some serious consideration once these economic issues are factored into the equation. Support from insurance companies might not be all that reassuring to most people, but the economic pros of cryothanasia do seem to mitigate (even if only slightly) the cons associated with sacrificing a few (mostly and/or increasingly miserable) weeks or months in the hope of gaining indefinite life-extension. Since economic concerns were an important element of the original Cryonic Wager, it seems significant that these concerns can be more or less neutralized in cases of cryothanasia.

17.5 Going Too Far?

These supportive comments about how cryothanasia fares in connection with the Cryonic Wager are not the end of the conversation, however, as they leave room for other worries about the circumstances under which cryothanasia is compelling. Even if it is justifiable to sacrifice *some* finite amount of time in pursuit of indefinite life-extension, we might still wonder *how much* time it is justifiable to sacrifice. For example, would it be justifiable for a healthy 43-year-old to sacrifice a likely 40 more years of life (given current demographic information about life-expectancy)? After all, though we tend not to put it in the same category as cancer, aging is currently a terminal condition and 40 years is not so different from four months in comparison with the life that awaits if transhumanists get what they want out of cryonics (cf. Minerva and Sandberg 2017: 532). The obvious reply here, especially considering the probability of success based on where technology currently stands, is that cryothanasia makes the most sense as a last resort, when waiting any longer would cause serious irreparable damage. As long as one is healthy, Minerva and Sandberg (2017: 533n29) explain, "staying alive has a high likelihood of being a safer way of getting to the future than undergoing cryonics." If, on the other hand, one's health is failing and technology has not yet advanced to the point of being able to push the end of life off further into the future without the use of cryonics, then I can see little reason why cryothanasia should not be a live option (so to speak) in cases where natural death would come too late for a good preservation.

Although I accept that health and probability of successful preservation and reanimation are key factors in determining when cryothanasia makes the most sense, I would like to consider a couple of scenarios that complicate matters a little. The first scenario gets back to the reservation I mentioned earlier about neuropreservation. Having only a head/brain preserved means that additional and/or more sophisticated technologies will be required to restore an individual to something like the kind of life enjoyed prior to preservation. Alternatively, if a preserved individual already has a body, that is one thing no one needs to worry about before thawing this individual out. This shorter to-do list makes it easier to bring a person back, which in turn makes it more likely that it will happen sooner. Could something similar be said about aging and rejuvenation technologies?

If it turns out that merely arresting the aging process will be much easier in the future than rejuvenating someone who has already reached an advanced age, then not having reached an advanced age prior to cryonic preservation will come with certain benefits that could lead to an earlier and more desirable reanimation. Just like the extra technologies associated with regrowing bodies or transplanting brains in the neuropreservation scenario, rejuvenation technologies might constitute an additional hurdle to clear before an aged person could be fruitfully reanimated.[13] So, thinking about the healthy 43-year-old, it might actually make some sense to consider cryothanasia before the aging-related damage can get any worse. This scenario is not among the

[13] For a transhumanist preserved at age 90, the goal is not to be reanimated only to go on living someday in the body of an ordinary 90-year-old.

more frequent worries of transhumanists because it is commonly assumed that any technology (by which they primarily mean molecular nanotechnology) sophisticated enough to reanimate a preserved body will also be able to reverse the effects of aging, but this is not necessarily true. If these technologies come apart, then youth might also be a key factor, alongside health and probability of success, in determining when cryothanasia makes the most sense.

Another troubling scenario arises in connection with basic human fragility. Most of our activities involve taking physical risks that, if things go poorly, could render cryonic preservation and resurrection difficult or even impossible. This seems like an uncontroversial claim given the variety of destructive accidents that might befall us from moment to moment. Knowing how susceptible we are to accidents, even when we are not engaging in particularly risky behavior, I wonder if there is a case to be made for having ourselves preserved before we become victims and lose our chance to have our lives prolonged by future technology. It might turn out that this technology will render our activities less risky than they are at present, and so it might be smart to put at least some of these activities off until it does. What I am suggesting here is a more thoughtful and risk-averse YOLO ("You Only Live Once") mentality than what is usually intended by this expression in contemporary popular culture.[14] In fact, if we take certain precautions with cryonic preservation in mind, perhaps we will, in some sense, end up living more than once.

Consider the following example: at the height of the Islamic State turmoil, I went on a road-trip through rural Turkey with my cousin, let us call him "Phil Kierney," an Alcor bracelet-wearing cryonicist.[15] Now, I do not mean to exaggerate our adventurousness (or our stupidity), but along the way we did wander alone through a complex set of narrow caverns, face the business end of a farmer's rifle during some unintentional trespassing (for which we apologized profusely), and manage to get our rental car stuck in the mud at night in the middle of nowhere.[16] We also discussed what would happen to his plans for cryonic preservation if he were to fall victim to our questionable decision-making during the trip. Scottsdale is a long way from Turkey, and my options for lowering his body temperature while maintaining circulation would have been fairly limited and hard to manage in such a remote setting. Suffice it to say, Phil's body would have been in pretty bad shape by the time it was delivered to the professionals (if it was delivered at all). For the sake

[14] I highly recommend The Lonely Island's song "YOLO" for a humorous rebuttal of the standard "don't sweat the future; live in the present" interpretation of the expression.

[15] As an Alcor member, one wears a "stainless steel bracelet…which reports the phone numbers to call in case of an emergency and the protocols to follow by whoever finds the body of this person" (Manzocco 2019: 117–8).

[16] Although we were far from any particularly dangerous areas near the Syrian border (we were trying to find the ancient ruins of Oenoanda, which housed some extensive Epicurean inscriptions, when we got lost and then stuck), Phil was convinced that IS insurgents were lurking out there in the darkness ready to take us hostage. Fortunately, a lovely local family in a small car stumbled upon us first and helped pull us out of the muck.

of a quality preservation and his hopes for future reanimation, would he not have been better off staying close to home (which just happens to be a few miles away from Alcor) and out of harm's way?

This is not to suggest that Phil should never experience the joys of road-tripping through the Turkish countryside, but maybe experiencing these joys could wait until, for example, developments in cyborgization provide him with a more durable body or easily replaceable component parts. And if such developments are more than a few decades away, then perhaps he would be better off having himself cryonically preserved before pursuing certain travel opportunities. Furthermore, because analogous claims can be made about virtually all human activities—from riding a bike on a busy street to teaching in person at a university in a Republican-leaning state during a pandemic to sleeping at home in a poorly maintained Florida condominium complex—preventative cryothanasia before some catastrophic accident or another can get us might have a certain macabre appeal. Given the countless ways one could suffer irreparable damage before the preservation process can be initiated, there are at least some reasons to want to initiate it while one is still relatively young and healthy. As I said above about youth and health, durability might be another key factor in determining when cryothanasia makes the most sense.

To be clear, I do not actually think it would be a very good idea for a relatively young and healthy person to give up decades of life now in the hope of preserving youth or avoiding danger later. I am simply not confident enough in advancing technology to make *that* wager at this point. When aging, disease, or injury have drastically reduced both the quantity and the quality of my life, such that I no longer need to gamble very much, then my level of confidence in a successful outcome of cryonic preservation will not be as important, and I will be more open to the potential benefits of cryothanasia. However, remarkable leaps forward in technological capability and scientific understanding might change my tune a bit. I could imagine seriously considering cryothanasia in the kinds of scenarios I just discussed if it suddenly looked a lot more likely (even if not yet entirely certain) that the technology of transhumanist dreams will become reality. So, my lingering resistance to these scenarios appears to be a merely contingent matter.

17.6 Conclusion

Transhumanists interested in cryonics have some compelling reasons to seek out assistance in dying, and they also have good reasons to describe the situation using other terms. "Cryothanasia" is a more appropriate way to describe the rather odd situation of choosing an earlier death, or what they hope is just a kind of pre-mortem hibernation, in order to improve their chances of living again, and possibly a lot longer, one day. Whether or not things ultimately work out for them, I have not encountered any insurmountable objections to cryothanasia as a last resort in cases of (currently) terminal and irreparable neurodegeneration or other forms of progressive brain damage. Things are admittedly murkier when considering the possibility

of cryothanasia outside the context of imminent medical breakdown. One of the most crucial issues in these more complicated cases is the likelihood of realizing the technologies necessary for successful repair, rejuvenation, and reanimation. Although an argument can be made for cryothanasia at nearly any point in life, given the potentially indefinite benefits of even a vanishingly small chance of a positive outcome, I would not recommend wagering the "bird in the hand" until its song is less sweet. What is "in the bush" may well be quite enticing, but you could end up with both prizes (i.e. a full natural lifespan and, should sophisticated enough technology ever be developed, an indefinitely extended lifespan after reanimation from a cryonically preserved state) if you can hold out a while longer before placing your bet.[17] Leaning entirely into this combination of metaphors, for now I would advise paying more attention to the hedges than the bushes.[18]

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[17] This idea is a bit like trying to cheat Pascal's Wager by concluding the life of an unbeliever with a deathbed conversion, albeit without having to worry about facing divine wrath for attempting to pull a fast one on the Almighty.

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Adam Buben is a University Lecturer (Universitair Docent 1) in philosophy at Leiden University in the Netherlands. His primary areas of research are nineteenth and twentieth century continental philosophy, and the philosophy of death across various traditions. He is the author of two books: *Existentialism and the Desirability of Immortality* (Routledge, 2022) and *Meaning and Mortality in Kierkegaard and Heidegger* (Northwestern University Press, 2016). His work has appeared in journals such as *European Journal of Philosophy, International Journal for Philosophy of Religion*, and *Journal of the American Philosophical Association.* He is currently the series co-editor for Lexington Books' *New Kierkegaard Research.*