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The grateful Un-dead? Philosophical and Social Implications of Mind-Uploading

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Abstract: The popular belief that our mind either depends on or (in stronger terms) is identical with brain functions and processes, along with the belief that advances in technological in virtual reality and computability will continue, has contributed to the contention that one-day (perhaps this century) it may be possible to transfer one's **mind** (or a simulated copy) into another body (physical or virtual). This is called mind-uploading or whole brain emulation. This paper serves as an **introduction** to the area and some of the major issues that arise from the notion of mind-uploading. The topic of mind/brain uploading is, at present, both a philosophical and scientific minefield. This paper ties together several thoughts on the topic in the popular, philosophical, and scientific literature, and brings up some related issues that might be worth exploring. A challenge is made that uploading a mind from a brain may have intrinsic limitations on what can be uploaded: whatever is uploaded may not be recognizably human, or will be a very limited version.

Keywords: mind uploading, brain emulation, mind transfer, virtual reality, robots, android, the mind-body problem, mind transfer, trans-human,

1.Introduction

What if (a big **if**) you actually could upload or transfer your mind into a computer network or a robot? That is, you would now have your mind in a different body or 'live in' a virtual reality (or virtual realities). Further, what if it promised a kind of immortality? Would you do it, if it was

possible?^{1 2} In the last decade, several philosophical and science magazines have considered ‘mind-uploading’ a topic of interest, including Scientific American, Discover, Popular Science, and Smithsonian magazine. Despite the technical and scientific criticisms expressed by skeptical scientists and philosophers, some very **influential** people also take the idea of mind-uploading very seriously. For example, Google’s Director of Engineering, Ray Kurzweil (Woollaston, 2013), contends that within 30 or so years we will be able to upload our entire brain into a computer. Similarly, the prominent neuroscientists David M. Eagleman (Smith, 2015) and Michael Graziano (Graziano, 2019) believe that within the next 50 years we will be able to download our particular brain-minds into computers. But others consider the whole idea of uploading your mind deserving of the respect your dog treats a lamppost. However, despite the uncertainty on whether the notion of mind-uploading is even possible, Caddy (2019) says, “It’s now become a valid topic of discussion among neuroscientists, futurists, philosophers, and even transhumanists.”

1. The Very Idea of Mind-Uploading

The notion of mind-transfer in its various general guises is not unfamiliar to many people. After all, most of us, even in the West³, have at least a passing awareness of the notion of reincarnation, which has a rich history in several Eastern Hindu, Jainist, and Sikh religious

¹ We will quickly gloss over many other questions here. Before we could download our mind into a machine or robot, the machine/robot would have to be of some minimal complexity of the right kind. Talk of downloading one’s mind into your grand daughter’s piggy-bank, a washing machine or an ant is just downright weird. (Although in the horror movie Christine (1983), a car of some kind was possessed (downloaded into?)) Also, would the target computer/robot need to have some human-like capabilities and simulated brain-like connections in the first place to replicate **human**-minded functions? Otherwise (at least on physicalist mind philosophies), our downloaded mind would be psychologically and physically ‘lost’ and unable to interact with the body of even a complex non-humanlike machine and experience some kind of locked-in syndrome? We can ask the question in the other direction---could we upload our minds into an entity far more complex and different than our own mind---such as an extraterrestrial mind that is more powerful and quite different than ours. Could such a body share different uploaded minds? Could such minds interact? Our brain-simulation in such a body would, one might suspect, not be capable of accessing either similar human senses with different extensions (e.g vision capable of perceiving in the ultraviolet domain) or different senses (e.g a sense capable of directly perceiving x-rays). The initial plausibility of such scenarios may depend on one’s metaphysical view of the mind. Perhaps those who advocate a non-physical immaterial soul view of the mind may have less problems here than those with materialistic leanings (the view that mind is physical). Integrating our physical minds into the body of some material entity (computer, robot, or car, or spider) bring up issues of compatibility which **may** be less problematic on immaterial mind views (depending on how flexible a non-material mind might be). After all, in some religious traditions and philosophies, the transmigration of souls into the bodies of different species is a distinct possibility.

² Would we be ‘alive’ if we uploaded our mind to a computer? Would the label matter? The **biological** notion of life includes essentials such as ‘reproduction, metabolism, and growth’, etc. Martine Rotlatt, CEO of a biotech company in California contends we would, she cites one definition of life as a self-replicating code that maintains itself against disorder [cited in T. Lewis (2013) The singularity is near: mind-uploading by 2045. Live Science, <https://www.livescience.com/37499-immortality-by-2045-conference.html>.] Further, many theists would consider God a paradigm example of a living being that doesn’t satisfy the biological constraints. Similarly, many Futurists and those in the artificial intelligence community would consider more advanced AI forms as ‘alive and intelligent’. Should we abandon talk altogether about the ‘alive-dead’ continuum when considering AI and mind-uploading?

³ Western philosophy (at least in Western universities) has, until recently, been dominated by the views of Western philosophers. The neglect of Eastern and aboriginal philosophies is being reconsidered. Baggini (2018) About time: why Western philosophy can only teach us so much. The Guardian, Sept 25. <https://www.theguardian.com/news/2018/sep/25/about-time-why-western-philosophy-can-only-teach-us-so-much>. See for example, C. Coseru, "Mind in Indian Buddhist Philosophy", *The Stanford Encyclopedia of Philosophy* (Spring 2017 Edition), Edward N. Zalta (ed.), URL = <<https://plato.stanford.edu/archives/spr2017/entries/mind-indian-buddhism/>>.

traditions.⁴ Reincarnation is associated with the idea that the soul of one body can transfer into the body of another person or animal. For example, the Hindu Upanishads contend the soul enters a new body at conception and does so continuously until the soul can reunite with the Divine. Belief in reincarnation is also found in Western thought, although in less familiar, and less articulated forms. Famously, Socrates (dialogues The Republic and Phaedo) considers the possibility that the way one lives their life on earth contributes to how their soul will be reborn after their death. Some criminals might become born again as wolves or politicians for example.⁵ For later Western philosophers, as well, talk of mind transfer has often been the staple of thought experiments regarding personal identity. For example, 18th-century philosopher John Locke (Locke 1690/2008) contends that consciousness over time plays a central role in personal identity, and brings up the possibility of the memories and mental abilities of a prince being transferred to the body of a cobbler. Locke contends the cobbler would now be considered the prince!⁶

Mind-transfer from one body into another body can also be found in Western religious and paranormal literature on possession. In such cases, an allegedly external mind (usually, at least in the West, described as a ‘demonic mind’) uninvitedly enters the body of a person. The topic has been popularized in movies such as *The Exorcist* (1973) and *The Possession of Hannah Grace* (2018). The idea is part of some religious traditions (e.g, Christianity) and associated with exorcisms and philosophical views of the mind as immaterial.⁷ While the idea of possession by another mind has popularity within some segments of the population, it is usually rejected in favor of naturalistic explanations (e.g mental illness) by most Western scientists and philosophers. Further, possession is considered a religious or paranormal phenomena, but other phenomena (sometimes given a paranormal association) such as multiple personalities is generally considered a natural, but relatively uncommon phenomenon.⁸ ‘Mind-uploading’ is a modern expression and usually distinguished from the phenomena mentioned above by resting

⁴ As well as among many cultures across the globe. See the entry in Wikipedia on reincarnation for a useful survey. <https://en.wikipedia.org/wiki/Reincarnation>

⁵ Plato’s speculations on the afterlife are provided in the last part of The Republic where he describes the Myth of ER, and in the dialogue Phaedo. Plato speculates that the kind of life you lead on earth (moral or immoral) contributes to the kind of life you will lead when reborn. In both dialogues Plato (using the voice of Socrates) avers the soul is immortal. The Myth of Er describes the afterlife legendary journey of a dead soldier named Er who returns to earth to tell people about how they lead their lives on earth with lead to the quality of their lives in the afterlife and subsequent re-births on earth. This myth is not referred to in the Phaedo, where Socrates outlines his arguments for the immortality of the soul. Plato’s views on politicians are generally negative unless they receive specific training in government (as with the philosopher-kings described in The Republic).

⁶ Locke’s views on the mind are not always clear-cut. See for example, W. Uzgalis (2018). An excellent outline of Locke’s views on the origin and of human knowledge can be found in M. Stuart (2013) Locke’s Metaphysics. Oxford University Press. Chapters 7 and 8 on identity and persons is relevant to much of people’s expectations on survival after uploading. Most people hold a Lockean view that much of our identity is tied to our memories.

⁷ A readable review of the topic of ‘demonic possession’ can be found at https://en.wikipedia.org/wiki/Demonic_possession

⁸ The expression ‘multiple personality’ is associated with different personalities within the same body. The topic of multiple personality (now called Dissociative Identity Disorder) is sometimes associated with possession as well (e.g . A. Crabtree (1997) Multiple man: Explorations in possession and multiple personality. Somerville House. Also, see Spiegel, 2019 for a useful overview of Dissociative Personality Disorder and its relationship to possession from a naturalistic perspective. D. Spiegel (2019) Dissociative personality disorder. Merck Manual (online). <https://www.merckmanuals.com/home/mental-health-disorders/dissociative-disorders/dissociative-identity-disorder>

on the state of contemporary and projected cognitive and neuropsychological scientific research and theory, and the transfer of a mind into another entity by technological means.

The notion of mind transfer has also been popular in science fiction novels and movies. For example, in McIntosh's (1970) novel Transmigration, every time the protagonist dies, his mind transmigrates to the nearest living human body (whatever its gender, age, or state of health). Recent movies are another popular source of mind-transfer themes. Films like 'Transcendence' (2014) and 'Chappie' (2015) involve mind-transfer. [Thank you for **not** bringing up older movies like 'The Shaggy Dog' (1959) and 'The Love Bug' (1968) etc].⁹

Given the prevalence of mind-transfer compatible background interests and beliefs across cultures, along with the notion's popularity in science-fiction novels, movies, and popular science magazines, the idea is worth a serious look along with the further exploration of some issues related to the idea.

Why upload your mind in the first place?

Even if mind-uploading were scientifically possible, **why** would anyone want to do it in the first place? Just because something is possible doesn't mean one should consider doing it.^{10 11} However, people might have a wide variety of reasons for considering it. Some possible reasons might be the following:

One reason that people might choose to upload their minds is that life on earth is difficult at times for all of us, and perhaps unbearable for many. Some might like to escape or avoid suffering. We don't have to go far to be reminded of this. Consider the pessimistic anthropomorphic view of nature by the nineteenth-century Italian poet and thinker Leopardi:

Not only individual people, but the whole human race was and always will be necessarily largely unhappy. Not only the human race but the whole animal world. Not only animals but all other living things in their own way. Not only individuals, but species, realms, planets and stars, solar systems, galaxies. Go into a garden of plants, grass, flowers. No matter how lovely it seems. **Even in the mildest season of the year. You will not be able to look anywhere and not find suffering [italics mine].** That whole family of vegetation is in a state of suffering, each in its own way to some degree. Here a rose is attacked by the sun, which has given it life; it withers, languishes, wilts. There a lily is sucked cruelly by a bee, in its most sensitive, most life-giving parts. Sweet honey is not produced by industrious, patient, good, virtuous bees without unspeakable torment for those most delicate fibers, without the pitiless massacre of flowerets. That tree is infested by an ant colony, that other one by caterpillars, flies, snails, mosquitoes; this one is injured in its

⁹ A useful description of sci-fi novels utilizing mind-uploading can be found in https://en.wikipedia.org/wiki/Mind_uploading_in_fiction

¹⁰ For example, it might be very expensive and time-consuming to implement mind uploading procedures, people might have strong moral objections to it, etc.

¹¹ Assuming being transferred into another body isn't forced on one (as where people are given no choice in what body or environment they are provided---if uploading is feasible, could future legal punishments involve miscreants being uploaded into an undesirable or largely unworkable body or unpleasant virtual environment?) This idea assumes an original mind is transferred into another body, not just a copy. Most of us, I suspect, would not consider punishing a virtual copy of Adolph Hitler very satisfying. Friedersdorf (2015) considers other possibilities such as "Perhaps the consciousness would be denied new information, or the ability to interact with others; or perhaps there would be some degree of torment inflicted." Friedersdorf's article points out that mind uploading would introduce all sorts of ethical issues that would not arise with our present limited lifespans.

bark and afflicted by the air or by the sun penetrating the wound; that other one has a damaged trunk, or roots; that other has many dry leaves; that other one has its flowers gnawed at, nibbled; that other one has its fruits pierced, eaten away. That plant is too warm, this one too cold; too much light, too much shade; too wet, too dry. One [plant] cannot grow or spread easily because there are obstacles and obstructions; another plant finds nowhere to lean, or has trouble and struggles to reach any support. In the whole garden you will not find a single plant in a state of perfect health. Here a branch is broken by the wind or by its own weight; there a gentle breeze is tearing a flower apart, and carries away a piece, a filament, a leaf, a living part of this or that plant, which has broken or been torn off. Meanwhile you torture the grass by stepping on it; you grind it down, crush it, squeeze out its life fluids, break it, kill it. A sensitive and gentle young maiden goes sweetly cutting and breaking off flower stems. A gardener expertly chops down trunks, breaking off sensitive limbs, with his nails, with his tools. Certainly these plants live on; some because their infirmities are not fatal, others because even with fatal diseases, plants, and animals as well, can manage to live on a little while longer. The spectacle of such abundance of life when you first go into this garden lifts your spirits, and that is why you think it is a joyful place. But in truth this life is wretched and unhappy, every garden is like a vast hospital (a place much more deplorable than a cemetery), and **if** these living things feel, or rather, were able to feel, surely not existing would be better for them than being alive. (**Zibaldon**)^{12 13}

It's difficult to imagine a more pessimistic perspective on the earthly human condition than Leopardi's, and if taken seriously, would provide a reason to consider uploading one's mind into cyberspace.¹⁴ Uploading might therefore be seen as greatly improving the quality of some people's lives, including those of terminally ill people? (See Pietrucha, 2017).

A second, overlapping reason might be that our own organic encapsulated minds are limited in a number of ways, and if we could transcend our biological body, perhaps we would side-step the present ills of human-kind. Without a physical body our biological **embodied** medical problems (cancer, heart disease, etc), including disease pandemics, would, presumably, no longer be a concern for those with a non-biological body in virtual reality or a robotic body.¹⁵

¹³ A pessimistic perspective no doubt, but consistent with the writings of a number of other thinkers such as Arthur Schopenhauer, David Benatar, and Emil Cioran. Its worth being reminded that far from all academics have such negative views of human nature. See S.B. Kaufman (2020) What humans could be. Scientific American Blog, April 13. <https://blogs.scientificamerican.com/beautiful-minds/what-humans-could-be/>

However, even if one believes an escape from this world can be found in uploading one's mind to another realm (perhaps a virtual realm), it is not clear that this alternative existence would necessarily be rosier. Further, human beings are not the only suffering creatures, as Leopardi points out. Other concerns arise: would we have responsibilities to animals? Leopardi does not consider non-human animal suffering in any depth, but the topic is widely discussed in the philosophical literature. A contemporary reading on animal suffering is O. Horta (2017) Animal suffering in nature: the case for intervention. Environmental Ethics, 39/3, 261-279. Apart from the brutality we show towards animals in slaughterhouses, the degrading effects of those working in them are also revealing. See T. Pachirat (2013) Every Twelve Seconds: Industrialized Slaughter and the Politics of Sight. Yale University Press.

¹⁴ Apocalyptic and millennial undercurrents are a staple of cultures across history. We have been there before. D. Kalder (2019) The End of the World is always nigh. UnHerd, Dec 31, <https://unherd.com/2019/12/the-end-of-the-world-is-always-nigh/> Of course, many-made and natural disasters could have unanticipated effects on the earth-bound hardware maintaining the viral web and possible occupants. One solution might be to have the supporting hardware somewhere in outer space (a space station?)

¹⁵ Indeed, there's evidence that over-thinking about what might befall us has negative effects on our endocrine and immune systems. B. E. Leonard & C. Song (2018) Stress and the immune system in the etiology of anxiety and depression. Pharmacology Biochemistry and Behavior, 54/1, 299-303.

Uploading might also be viewed by some as a way of escaping possible human-made catastrophes such as climate change, and dystopic scenarios such as nuclear war and the manufacture of various super-bugs (the poliovirus has already been synthesized).¹⁶ This reason might also be associated with a dystopian fear of the encroachment of technology in our lives (Paulson, 2018).

Thirdly, mind-uploading might appeal to many if seen from the perspective of promising a much longer life or a relatively endless one.¹⁷ The journalist Stokel-Walker (2019) reports that many super-rich desire additional time in their lives to spend all their money.¹⁸

A fourth reason (likely overlapping the second and third reasons) might be fear of death.^{19 20} Mind-uploading might be seen as postponing death.²¹ Philosophers have long reflected on death and how we might deal with it (Lyden, 2009, Luper, 2019).²²

¹⁶ For the alarmists among us, see https://en.wikipedia.org/wiki/Biological_warfare. There are other ways human beings can deal with such destructive scenarios, as by bunkers or underground silo living. More on this in S. Jeffries (2020) *Underground skyscrapers and off-grid bunkers: inside the world of preppers*. The Guardian, March. <https://www.theguardian.com/books/2020/mar/27/underground-skyscrapers-and-off-grid-bunkers-inside-the-world-of-preppe>

¹⁷ Not everyone considers a much longer or an immortal life to be something worth acquiring. P. Sagar (2018) *On going on and on*. Aeon magazine, <https://aeon.co/essays/theres-a-big-problem-with-immortality-it-goes-on-and-on>
R. I. Smith (2017) *Is a long life really worth it?* The Atlantic, <https://www.theatlantic.com/notes/2017/03/is-a-long-life-really-worth-it/518658/> and M. Graham (2018) *Would a longer life span make us happier? : a philosopher's take*. The Conversation, <https://www.theconversation.com/would-a-longer-lifespan-make-us-happier-a-philosophers-take-99619> These articles provide a useful discussion on the topic, but their discussions assume a longer life will be in our present-day biological bodies.

¹⁸ It's an odd world we live in, to say the least, where some people have so much money they do not know what to do with it, co-exist on the same planet with millions of people who lack proper food and drinking water, or exist in lives of despair. We don't have to look far, even in prosperous North America to see serious problems on how human beings mistreat each other. One might start with N.S. Riley's audio (2017) *The New Trail of Tears*. (Tantor Audio) on the past and present-day American policies on American Indians. Canadians have no reason to feel superior either. J. Daschuk (2019) *Clearing the Plains*. University of Regina Press. See also, E.T. Richardson ET (2020). *Pandemicity, COVID-19 and the limits of public health 'science'*. BMJ Global Health, :5:e002571. doi:10.1136/bmjgh-2020-002571

¹⁹ Attempts to postpone or eliminate death have been present since the beginning of time. Several recent books describe the fascinating history of such attempts. A. Bernstein (2020) *The Future of Immortality: Remaking Life and Death in Contemporary Russia*. Princeton University Press. M. Shermer (2018) *Heavens on Earth: The Scientific Search for the Afterlife, Immortality, and Utopia*. Henry Holt and Co. and J. Gray (2011) *The Immortalization Commission: Science and the Strange Quest to Cheat Death*. Allen Lane

²⁰ The topic of death brings up the issue of the **meaning of life**. A global or cosmic meaning is usually tied to religious views regarding immortality where the next life (after death) is considered more important than our lives on earth. This view has been challenged by Swedish-American academic Martin Hagglund, who argues that death is necessary for meaning in our lives and the religious notion of immortality robs our lives of meaning. The things we do in life have meaning only because our time on earth is limited. M. Hagglund ((2019) *This Life: Secular Faith and Spiritual Freedom*. Anchor Books. This book will be of interest to counsellor and therapists.

²¹ There are other things people fear (apart from disease, crime, and clowns), especially, as they achieve old age. One is dementia. L. C. Harper (2020) *On Vanishing: Mortality Dementia & What It Means to Disappear*. Catapult books. Given the brain deterioration with dementia and other forms of mental deterioration, it is not clear mind uploading would help in such cases (without a way of prior-rejuvenating the brain).

²² People deal with death in a variety of different ways. However, for many, the *abstract* philosophical beliefs we express on death, and the beliefs we express when directly confronting our deaths can be quite different. Consider the views of American philosopher Herbert Fingarette for example: 'A 97-year old philosopher ponders life and death: what is the point?' The Atlantic, <https://www.theatlantic.com/video/index/604840/being-97/>

Fifth, some might desire mind-uploading for environmental and/or ethical reasons. For example, some consider reducing our physical numbers to be good for us and the planet. With increasing numbers of people on the planet, we have increasing problems providing food, water, garbage removal, living space, and dealing with increasing pollution (e.g Reinhardt, 2019).²³ Similarly, some may consider mind-uploading a way that many serious human sociological and psychological biases, along with ineliminable aspects of our nature may be bypassed.^{24 25} If we could transcend our physical bodies, it would make sense that theoretically, problematic organic urges along with built-in human biases might go by the wayside as well.²⁶

A sixth reason might be that some individuals who already spend much of their time ‘living’ or participating in virtual realities might consider the possibility of spending **all their time** in such virtual environments.²⁷

Thomson and Bodington (2014) argue that one should prefer death to living forever.

²³ Some people have refused to have children for a number of reasons, including concerns regarding overpopulation. See A. Fleming (2018) Would you give up having children to save the planet? Meet the couples who have. The Guardian, June. <https://www.theguardian.com/world/2018/jun/20/give-up-having-children-couples-save-planet-climate-crisis>. Also R.O. Kwon (2020) More women like me are choosing to be child free: is this the age of opting out. The Guardian (UK), July, <https://www.theguardian.com/lifeandstyle/2020/jul/06/more-women-like-me-are-choosing-to-be-childfree-is-this-the-age-of-opting-out>.

²⁴ Perhaps a less successful mind uploading would be desired (or one tweaked before uploading)? If our minds are exactly copied as many advocates assume, both our human and individual flaws might accompany the uploading. It isn’t clear that the outcome would be much of an improvement in many ways than life before uploading.

²⁵ Things get murky here. Much might depend on whether aspects of our human identity and individual identity are retained after uploading. If, as many contend, mind uploading preserves most of our biological identities, the same problems may be expressed, but in different ways in a virtual reality. Much of how one evaluates this will to some extent depend on our views on human nature. While a kind of Hobbesian view seems dominant in Western society, and the contrary view that humans are innately good seems naïve, the latter can’t be dismissed and a case for the kindly human view can be found in Bregman’s Humankind: A Hopeful History (2020) Little, Brown and Co. and R. Wrangham (2019) The Goodness Paradox: The Strange Relationship Between Virtue and Violence in Human Evolution, Pantheon Books.

²⁶ An interesting consideration, since issues of harassment arise in a number of present-day virtual reality environments. For example, Sweeney claims over one-third of women report online harassment or bullying. M. S. Sweeney (2014) What the law can (and can’t) do about online harassment. The Atlantic, <https://www.theatlantic.com/technology/archive/2014/11/what-the-law-can-and-cant-do-about-online-harassment/382638/> However, these harassments take place in virtual environments where avatar participants are **stand-ins for physical/biological human beings or bots made to act in particular human-like ways by biological human beings** and the virtual avatars being harassed are controlled by biological human beings. If the harassment was done to non-human bots, would we feel the same? This is an ongoing part of the debate on violence and sexuality in videogames and debates concerning our treatment of robots (think of sex-bots and the TV series Westworld). Perhaps harassment would not be a problem in a virtual environment where you have uploaded your mind entirely, or if your mind still exists in some robotic body on earth, **and** emotions as we know them are not available. However, for a different view, see J. Danaher (2017) ‘Virtual sexual assault: a classificatory scheme’ Philosophical Disquisitions, March, <https://philosophicaldisquisitions.blogspot.com/2017/03/virtual-sexual-assault-classificatory.html>

²⁷ This is an engaging reason since it is the basis of Nozick’s ‘experience machine’ thought experiment described in his book (1974) Anarchy, State and Utopia, Basic Books (pp. 42-45). If we were offered the opportunity to plug into a special machine that could simulate all the pleasurable experiences we would desire, would we plug in and eschew the real world? Nozick thinks we would not, but others disagree. I suspect that the answer one gives would depend on the condition of one’s life at the time and one’s interests. Nozick focuses on pleasure but people have other values that may override pleasure. For example, plugging in may provide a more exciting life, even if not always more enjoyable. However, read Hindriks and Douven (2018) ‘Nozick’s experience machine: an empirical study’ Philosophical Psychology, 31, 2. <https://www.tandfonline.com/doi/full/10.1080/09515089.2017.1406600>. In their variations on Nozick’s idea, the authors found support for Nozick’s intuitions. It would be interesting to repeat their study with individuals across a wide social spectrum. A

Seventh, mind-uploading might be considered a way of becoming ‘somebody else’ or something else. Woody Allen once said, no doubt with tongue in cheek, “My one regret in life is that I am not someone else.” After all, why our **particular mind**, with all its psychological quirks, baggage, limitations, and problems? (Nozick, 1989, 27) This, as it stands, is a bit ambiguous. It could mean desiring an ‘improved human you’, or becoming someone else, or something else entirely. So, why not upload a re-wired (enhanced, according to your own lights) mind--- a much-improved version of yourself without the chronic flatulence and perhaps possessing better social skills? Over the last century, our conception of ourselves has undergone some modification (at least to many philosophers and many cognitive scientists). If our minds are largely opaque even to ourselves this would likely remain in any uploading (or would it?)²⁸

Eighth, mind-uploading might allow one to have new experiences. Males might be uploaded in a virtual female body and have virtual experiences of pregnancy.²⁹ Uploaded minds (assuming they don’t fade or change unpredictably over time) might be useful on long trips to other planets or solar systems (Prisco, 2012; Strout, 2014; More, 2014; Smith, 2015; Schneider, 2019, p.146).³⁰

Of course, these reasons are not all mutually exclusive, a person may pursue mind-uploading for several of the above reasons, or even all, or other ones not mentioned³¹, with varying degrees of conviction.

What exactly is mind-uploading?

The phrase ‘mind-uploading’ requires some elaboration. The notion, as popularly used, is based on scientific and technological advances that could conceivably allow us to either transfer or copy a mind to another medium such as a robot or the internet. More precisely,

A [mind] upload is a creature that has its thoughts and sensations transferred from a physiological basis in the brain to a computational basis in computer hardware.
(Corabi & Schneider, 2012, p. 26).

detailed philosophical re-examination of Nozick’s thought experiment can be found in Mark Silcox, ed. (2017) Experience Machines: The Philosophy of Virtual Worlds. Rowman & Littlefield.

²⁸ How transparent are our own minds to ourselves? How much access do we have in regards to our own thoughts, prejudices and beliefs? Can we be wrong about our own minds? While a number of philosophers in the past believed we have direct (transparent) access to our minds (as with introspection) this belief is no longer widely held. See Lycan, William, "Representational Theories of Consciousness", *The Stanford Encyclopedia of Philosophy* (Fall 2019 Edition), Edward N. Zalta (ed.), URL = <<https://plato.stanford.edu/archives/fall2019/entries/consciousness-representational/>>. See also, E. Schwitzgebel (2011) Perplexities of Consciousness. MIT Press. Schwitzgebel contends we know much less about our inner consciousness than we think we do. Would mind-transfer result in a mind with the same limitations of our biologically embodied minds or could we ‘program in’ (before or after) greater access to the unconscious depths of our minds? (And why would we want that?) See Swinburne (2019) for a contemporary adherent of the contrary view that under a number of circumstances, first person intuitions are still authoritative.

²⁹ Virtual pregnancy occurs in one of the short fiction stories in Weinstein’s collection Children of the New World (2016). Memories and experiences are implanted and people have virtual sex and virtual children. However, in the story, people are still human beings but living through implanted memories.

³⁰ The micro-gravity found on space trips may have negative effects on the biological body and brain, providing a reason to explore the use of non-human astronauts. Larry A. Kramer *et al.* (2020) Intracranial Effects of Microgravity: A Prospective Longitudinal MRI Study. *Radiology*, published online April 14; doi: 10.1148/radiol.2020191413

³¹ See Anissimov (undated) for other reasons. <https://lifeboat.com/ex/benefits.of.mind.uploading>

While your original mind is transferred in reincarnation and thought experiments like Locke's example of consciousness being transferred from one person to another, mind-uploading may not involve direct mind transfer but rather a simulated copy.

When we talk of **mind**, in this context, we usually mean human minds and associated human consciousness--- emotions, feelings, thought processes, and decision-making capabilities. A mind is associated with subjective mentality. One we can extend, by analogy our notion of 'mind' to other biological creatures somewhat like ourselves^{32 33 34} **Mind-uploading** would, ideally, involve being able to transfer or copy this consciousness and other essential attributes of individual minds (personality, emotions, feelings, etc) to another body, perhaps a different biological one or one made largely of other substrates (e.g a robot, a virtual body).

A successful mind-transfer would presumably involve an identical or very close transfer of these mind constituents/functions.³⁵ A less successful mind-transfer would presumably involve an incomplete transfer in some specified ways, for example, perhaps a successful transfer of cognitive abilities but not affective states. There are other possibilities where we might not know what to say. What if the mind-transfer somehow gave us completely new senses (e.g an X-ray detecting sense)³⁶ but, at the same time, some less effective original human

³² Most of us, I suspect, would have little difficulty in crediting many animals with **minds** and consciousness (at least apes and other mammals, e.g dolphins). The difficulty soon becomes rather intractable when we consider ants, snails and bacteria. Consider snails, Schwitzgebel points out,

Garden snails are fascinatingly bizarre. Their brains are mostly clumps of ganglia in a ring around their esophagus, and they've got these huge neurons that resemble our neurons in some ways and differ in other ways; and they have far more neurons in their tentacles than in their brains; and despite their limited central nervous system, they have these fascinatingly complicated mating dances. Nifty theories of consciousness come crashing down around your toes when you try to apply them in a principled way to the case of the garden snail.

(cited in J. Horton (2020) On Crazyism, Jerkitude, Garden Snails and Other Philosophical Puzzles Scientific American, July 6, <https://www.scientificamerican.com/article/on-crazyism-jerkitude-garden-snails-and-other-philosophical-puzzles/>).

³³ I haven't come across any academic references to uploading **robot** minds. However, in the sci-fi movie Chappie (2015) consciousnesses are transferred into robots and a robot (Chappie's) consciousness is transferred into another being. It is unclear whether a robot mind could be conscious in the first place. But see Horton (2018) for the possibility of conscious robots with human simulated uploaded minds. But then again, there might be reason for uploading a mind that lacks consciousness (see Schneider, 2019, Chapter 3).

³⁴ Would the mind remain a '**human** mind' after transfer into a non-human body? Would it even remain a **mind**? Regarding the second question, if we consider a mind to be the preserve only of **biological** organisms, then 'No'. But if we allow minds to exist in non-biological substrates, then 'Yes'. I suspect, for most of us, our intuitions support the latter view. After all, most religions do not deny the existence of immaterial (non-physical) minds (e.g gods, angels, demons, etc) and many would not deny the possibility of artificially created minds (as in advanced robots or artificial intelligences). However, given that human minds are the way they are by closely interacting with human biological **bodies**, it seems plausible that interacting with a non-human biological body or a non-biological body would result in a non-human mind.

³⁵ Here we confront the philosophical issue of **personal identity** over time: what makes you the same person you were when you were in elementary school? Is it your memories and character that makes you **you** or having the same body over time, or something else? The issue is a complex one and a useful outline of competing theories can be found in Olson, Eric T., "Personal Identity", The Stanford Encyclopedia of Philosophy (Fall 2019 Edition), Edward N. Zalta (ed.), URL = <<https://plato.stanford.edu/archives/fall2019/entries/identity-personal/>>, or C. Korfmacher 'Personal Identity' Internet Encyclopedia of Philosophy, <https://www.iep.utm.edu/person-i/>

³⁶ L. Maguire (2019) 'Hacking the brain' Philosophy Talk, <https://www.philosophytalk.org/blog/hacking-brain>

biological senses?³⁷ Given our differing human interests, values, and concerns, people may disagree to some extent on what might be considered a successful mind-upload.

The main assumption underlying talk of (scientific) present-day mind-uploading is: **the mind is the functions and processes of the brain.**³⁸ It is worth mentioning that mind-uploading is also called ‘Whole **Brain** Emulation’ for obvious reasons. Unless I am seriously mistaken everything rests on this assumption. While the procedures underlying mind-uploading are usually described in terms of scanning the brain and transferring or copying all the neural connections onto another template, sometimes the process is described in terms of the transfer of information or algorithms, etc.

How might mind-uploading work?

Keith Wiley (2014) in his book A Taxonomy and metaphysics of mind-uploading describes several hypothetical procedures for mind uploading.³⁹ The different scenarios include gradual replacement procedures, scan-and-duplicate procedures, and brain division procedures along with variations within each category (pp.31-61, 147-162).⁴⁰

One might ask to have one’s brain hacked genetically to have new abilities/senses before the uploading takes place. However, given that one’s uploaded mind would somehow exist in the virtual stratosphere, hacking could take place after uploading, assuming one is still somewhat human and has human-like desires. Who would do the hacking?

³⁷ This may not be that far out, after all, bangs on the head have resulted in new extraordinary interests or skills. See Piore (2013) and Treffert (2018). Piore provides examples of people who acquired special abilities after brain damage, while Treffert describes sudden cases of such abilities. These instances are indeed remarkable, and are usually associated, in the popular media with autistic individuals, perhaps because of films such as **Rainman** (1988). However, many instances are with non-autistic individuals. A remarkable example of such an extraordinary ability is described at <https://www.appliedbehavioranalysisedu.org/what-is-an-autistic-savant/>

On a mild fall day in 2009, an Englishman named Stephen Wiltshire climbed into a helicopter in New York City and was quickly whisked from the ground. For a brief 20 minutes as the chopper arced through the crisp blue sky dotted with puffy white clouds, Wiltshire gazed out the window, taking in the breadth and scope of the metropolis of 8.3 million people going about their business below. After landing, Wiltshire was taken to the Pratt Institute in Brooklyn. On a 19-foot long swatch of white paper, using a series of fine-tipped black pens, he began to draw. Seven days later, a complete, building-by-building rendition of that aerial view, correct in every detail, was sprawled across the paper. Three hundred and five square miles of some of the most dense urban construction in the world had flown into Wiltshire’s brain in those twenty minutes in the air and flown back out through his hands onto the paper—just as it had looked that day. (see also, <https://www.stephenwiltshire.co.uk/new-york-skyline-panorama#:~:text=In%20a%20helicopter%20above%20the%20city%20on%20Friday%2C,a%20gallery%20at%20the%20Pratt%20Institute%20in%20Brooklyn>).

When the mechanisms of such abilities are understood, it might be possible to provide such abilities to those desiring them. One possibility of how this might be achieved is through future developments in stem cell research. A useful book on the present state of the field is J. Price (2020) Brain repair: a realists guide to stem cell therapy. MIT press. Today’s therapies are tomorrows enhancements.

³⁸ Or the mind is dependent on the brain. We have to be careful here, while with human beings our minds are presently tied to our brain functions (and all the other minds we know of), most advocates of mind-uploading would add that our brain functions can be copied to another substrate. If one holds that a mind is *only found in biological systems*, this would rule out mind-uploading into a robot or virtual reality *a priori*, but such a strong view is not held by most philosophers and psychologists in academia (it would also not rule out uploading a mind into another biological body with the right connections, but I have not seen this seriously discussed anywhere).

³⁹ See also Keith Wiley (2014) A brief introduction to mind-uploading. <https://www.youtube.com/watch?v=au14xD3n1SM>

⁴⁰ Wiley’s book not only provides a wide variety of potential mind-uploading procedures (part one) but also encompasses a discussion of relevant philosophical theories of mind, along with a metaphysical background (part 2 of the book).

Danaher (2013, also Wiley, 2014, pp. 35-57) points out that there are two general ways by which this mind transfer could theoretically be accomplished---either simultaneously or by slow replacement:

Copy-and-Transfer: Your mind/brain is copied and then transferred to some technological substrate, e.g. your brain is scanned and monitored over a period of time, and then a digital replica/emulation is created in a supercomputer. This may also involve the destruction of the original copy.

Gradual Replacement: The various parts of your mind/brain are gradually replaced by functionally equivalent, technological analogues, e.g. your frontal lobe and its biological neurons are replaced by a neuro-prosthesis with silicon neurons.

Both Danaher (2013) and Wiley (2014) consider the gradual replacement view less plausible than the copy and transfer theory.

There is also some debate over whether mind-uploading might be more plausible after you are dead or while still living. The tech company, Nectome (<https://Nectome.com>) in the United States upholds the former. They contend that after you are dead, your brain can be indefinitely embalmed and soon uploaded into a virtual reality. The uploaded version of you will be a simulated copy of your mind. Much of your personality will be retained since it is encoded in the brain.

What is expected of Mind-Uploading?

Let us briefly consider what many advocates **expect** from uploading their minds. The assumption held by most advocates is that mind-uploading would preserve your memories, personality, thoughts, and emotions. That is, preserving personal identity is paramount. I suspect most of us would lose interest in the topic if we were told that we would likely end up resembling Jekyll and Hyde upon being uploaded, or make us look like Swamp Thing without the muscles.

A perusal of the popular and scientific literature shows that, at this time, the most commonly held views are similar to those expressed by American neuroscientist Ken Hayworth in Smithsonian magazine (Adler, 2015). Adler says,

[Hayworth] wishes to upload his mind—his memories, skills and personality—to a computer that can be programmed to emulate the processes of his brain, making him, or a simulacrum, effectively immortal (as long as someone keeps the power on). It envisions a future of “substrate-independent minds,” in which human and machine consciousness will merge, transcending biological limits of time, space and memory.

Along the same lines, Anissimov (undated) says,

Mind uploading would involve simulating a human brain in a computer in enough detail that the “simulation” becomes, for all practical purposes, a perfect copy and experiences consciousness, just like protein-based human minds....all the features of human consciousness that we know and love — including all our memories, personality, and sexual quirks — would be preserved through the transition. By simultaneously disassembling the protein brain as the computer brain is constructed, only one implementation of the person in question would exist at any one time, eliminating any unnecessary confusion. Still, even if two direct copies are made, the universe won’t care — you would have simply created two identical individuals with the same memories....an upload of you with all your memories and personality intact is no different from you than the person you are today

is different than the person you were yesterday when you went to sleep, or the person you were 10⁻³⁰ seconds ago...

Alternatively, Corabi and Schneider (2012) suggest some may think of uploading (downloading) their minds into a robot or android:

Imagine life as an [android] upload. From a scheduling perspective, things are quite convenient: on Monday at 6 PM, you could have an early dinner in Rome; by 7:30 PM, you could be sipping wine nestled in the hills of the Napa Valley; you need only rent a suitable android in each locale. Airports are a thing of the past for you. Bodily harm matters little – you just pay a fee to the rental company when your android is injured or destroyed. Formerly averse to risk, you find yourself skydiving for the first time in your life. You climb Everest (p. 26).

Strout (2014) goes beyond the typical claims and contends that not only will uploading allow us to change our appearance but also travel at the speed of light and explore the solar system. We will retain our humanity and all our positive and negative emotions.

When we talk of the mind in mind-uploading most of the popular literature presupposes that personal identity will be preserved (the underlying assumption being that all that is essential to one's identity is found in the brain): that is, it will be **me** that will have a longer life and perhaps be immortal.⁴¹ It will be **me** that will be no longer shackled to the physical limitations of my biological body and I will continue in the virtual sphere (or in the physical sphere in a new body) in some way analogous to a disembodied existence postulated in many religions, except in a scientifically and technological way. Others contend only a copy of you will be uploaded.⁴² Graziano (2019) imagines that successful mind-uploading will not upload your mind but a simulated copy that preserves

the person's mind and memories, emotions and personalityIn effect, a new and equally valid version of that person would now exist, in a potentially immortal, digital form... the simulated you wakes up in a virtual apartment and feels like the same old you. It has a continuity of experience. It remembers walking into the clinic, swiping a credit card, signing a waiver, lying on the table. It feels

⁴¹ The topic of personal identity is a complex one. A useful overview of contemporary theories on this topic can be found in J. Johansson (2019) '20th century theories of personal identity' in A. Kind (ED). Philosophy of Mind in the Twentieth and Twenty-first Centuries, Routledge. Pp. 126-147. Our thinking about personal identity has been mainly focused on human identity over time, and even here there is no consensus among philosophers. Once we turn to animals such as earthworms and amoebas things break down. As Loftson (2001) points out, "The fact is, ...we are lucky that such things as fission [as with amoebas who can divide] have not happened to us. That they have not is indeed a necessary condition of each of our personal identities over time. As a matter of fact, from moment to moment, throughout our lives, we only manage to continue to be ourselves by virtue of such luck' (p. 194). P. Loftson (2001) Reality: fundamental topics in metaphysics. University of Toronto Press. However, given the possibilities of weird alien life, and advances in computer technologies, this luck may change.

⁴² Even if our human individuality (personality, emotional and cognitive makeup) survived intact, and we had bodies in virtual reality, why do they have to be virtual **human**-like bodies? Why not a virtual Paddington the Bear body, the Family Guy, or a favorite Soprano character, a virtual dinosaur body etc? Perhaps bodily changes could be for as long, or short a time as we wish: Daenerys Targaryen during weekdays and Captain America on the weekend? Could we choose any body we wanted, as long as it had the right connections, or would there be structural or legal limitations (who or what would enforce them and how?)----after all, we can't (legally) all have the same license plate on our cars as others in the same locality. How would we deal with a plethora of Aristotle look-alikes? It is likely that serious constraints, of some kind, would limit the forms we could take even if a large number of virtual choice worlds were possible. Looking like the Family Guy in a Call-of-Duty like-world would probably not be a good fit. The virtual world, ideally, would also need to be one where our experiences are not pre-determined by computer algorithms. This brings up the question of motivation (desires, interests and needs) and free-will.

as though it was anaesthetised and then woke up again somewhere else. It has your memories, your personality, your thought patterns and emotional quirks. ...

Further, Graziano, with tongue in cheek, imagines that we (living in our biological body back on earth) may be able to interact with our digital (simulated) copy⁴³:

You find yourself equipped with a complementary simulated smartphone, and you call the number that used to be yours – the phone you had with you, just a few hours ago in your experience, when you walked into the clinic....Now the biological you answers the phone. “Yo,” says the sim you. “It’s me. I mean, it’s you. What’s up?”...You would not believe what it’s like in here! It’s a fantastic place. Remember Kevin, the guy who died of cancer last week? He’s here too! He’s fine, and he still has the same job. He Skypes with his old yoga studio three times a week, to teach his fitness class. But his girlfriend in the real world has left him for someone who’s not dead yet. Still, lots of new people to date here.^{44 45 46}

Further, Anissimov (undated) suggests, while,

Some lucky people are innately really happy. Some people have chronic depression. With [mind] uploading we will be able to ...reprogram [our] brains to raise [our] happiness set points....

That is, mind-loading will likely enable us to pre-enhance ourselves in positive ways.

However, if people are uploaded with the same personalities and personal flaws into android bodies or the web, should we expect the web world to be much different than before? Nelson (2018) tells us,

⁴³ If mind-uploading results in a simulated copy of your mind, questions arise about what the procedure does to your original body (assuming mind uploading does not take place after you are dead). If we continue to exist intact as before while our simulated copy can live an independent life (as Graziano suggests), would this reduce interest in getting mind-uploading done in the first place? Given the two existences are somewhat parallel, how would happenings in the virtual world affect our notions of knowledge and belief? Consider two statements taken from Graziano (2019): “If you hold your breath, you don’t get dizzy, because there is no such thing as oxygen in this virtual world” and “Remember Kevin, the guy who died of cancer last week He’s here too. He’s fine”. We may be used to reading similar statements in fictional novels, but how would we deal with them if minds could be successfully uploaded into virtual worlds?

⁴⁴ Assuming our personal minds are uploaded, how would we feel about living in an artificially created virtual reality? The possibility has been explored in various ways in films. In *The Matrix* (1999) movie, the character Cypher, after spending time in the real world, which is pretty trashed, asks to be put back in the virtual world of the Matrix where he can live a better life. In this instance, the Matrix world seems better than the real world. In *The Truman Show* (1998) a person grows up in a manufactured fake world. At the end of the show he finds his way to the real world. It ends on a positive note, as in fairy tale marriages. It would be of interest to fast forward a decade. Given our human penchant to boredom and the need for variety, it is difficult to predict how we would respond, especially when people have different needs and desires (what if some desire to live in a violent virtual world?). Satisfying them all seems impossible. It might also be worthwhile to ask what would motivate the programmers interested enough to keep the virtual reality going (for centuries?) and not end up with a repetitive *Groundhog Day* (1993) scenario (if they are human).

⁴⁵ While we would not physically age while living in an uploaded state, would we mentally age? Presumably, we would not remain psychologically and mentally the same forever? Would there be a common path that uploaded minds follow developmentally?

⁴⁶ One has to be careful what they wish for. If our uploadings replicate our personality, and emotional states and quirks, apart from physical downsides being eliminated, could difficulties with others, personal biases, and personality issues and philosophical issues (What’s it all about?) take central stage? Aren’t such concerns and personality flaws also part of who we are as individuals? Who would design the virtual reality (assuming it is a virtual reality we are uploaded to) and who would have control over it? Would knowing you are ‘living’ in a virtual reality have an effect on how you understand your uploaded life?

[Futurist Ian] Pearson warns that electronic immortality might not be everything it's cracked up to be. For one, android bodies aren't likely to be provided for free. Bodies might become like apartments — spaces that you rent. If you can't pay up, you might end up floating aimlessly in the cloud. Even more dire, space on the cloud might not be free either. So, what happens if you can't pay for your own cloud space and/or your android body? It might become the property of whoever owns the electronic storage space: Google, Apple, Facebook, etc Things can really become dystopian at this point. Pearson imagines scenarios where corporations replicate people's minds and puts them to use as slave androids. Or perhaps your mind is particularly adept at a particular task, and companies extract the elements or ideas within your mind that are useful, and discard the rest. Your fragmented self might go on existing in some form, though it's hardly the sort of ... utopia you probably imagined. In other words, you might escape mortality, but you won't escape the injustices and soullessness that come with existence in a commodified, stratified society.

Given the precedents provided from human history, Pearson's prognostications seem more likely than the utopian scenarios of most mind uploading advocates.

Many of the popular views of mind-loading have likely been partly influenced by novels and movies.⁴⁷ For example, in the popular film *Transcendence* (2014) the main character, a scientist, successfully uploads his mind/consciousness to the internet where he retains his individuality and gains in knowledge and powers. The mind upload survives his dying body.

It all seems so straightforward. However, many questions arise, if mind-uploading turns out to be successful, could our uploaded minds be hacked and fake memories easily implanted on the web? Given that uploaded minds would be 'living' in a manufactured simulated world, and uploaded minds would be virtual, would they be more susceptible to manipulation than biological minds, it is not clear that uploading would be as utopian as many advocates suggest. As Schneider says,

[p]rograms on my smartphone are probably tracking my location, listening to my voice, recording the content of my web searchesI think I've turned these features off, but the companies building these apps make the process so opaque that I can't be sure. If AI companies cannot even respect our privacy now, think of the potential for abuse if your innermost thoughts are encoded on microchips, perhaps even being accessible somewhere on the internet (2019, p. 6).

Schneider is talking about the world in 2019 and that shortly we may somewhat meld with AI through implants in our bodies, however, the concerns could be magnified in a world where virtual minds live in virtual worlds.

Even if individual identities were just partially individualistic after uploading⁴⁸, would individuality soon go by the wayside (if most of your memories were merged with others or

⁴⁷ Those with an interest in science fiction tend to have more positive attitudes toward mind-uploading, while traditional religious belief tended to be associated with more negative attitudes (M. Laakasuo, M. Drosinou, M. Koverola, A. Kunnari, J. Halonen, N. Lehtonen, & J. Palomäki (2018) What makes people approve or condemn mind upload technology? Untangling the effects of sexual disgust, purity and science fiction familiarity. *Palgrave Communications*, 4 (1) DOI: [10.1057/s41599-018-0124-6](https://doi.org/10.1057/s41599-018-0124-6). The issue of mind-uploading and religion is not a simple one. Istvan (2015) Mind uploading will replace the need for religion *Church and State*, churchandstate.org.uk/2018/02/mind-uploading-will-replace-the-need-for-religion/ For a Christian view on mind uploading see Anonymous (2018) Sci-fi Christianity: mind uploading and mind-body dualism, *Faith, Fiction and Fatherhood*, May 21. The author favors a dualistic approach to the mind-body problem and contends this would not be an impediment to uploading but might even require it. <https://faithfictionfatherhood.com/2018/05/21/sci-fi-theology-part-ii-mind-uploading-and-mind-body-dualism/> Steinhart (2011) 'Uploading and religion. *Camels with Hammers*, <https://www.patheos.com/blogs/camelswithhammers/2011/06/uploading-and-religion-criticism-of-stross/> contends mind uploading is consistent with Christianity which would encourage it.

⁴⁸ Perhaps partially successful uploads would still have value for some, as Corabi and Schneider (2012) point out,

implanted, would talk of individual minds become unmanageable).⁴⁹ Would it even make sense to talk about separate boundaries among uploaded minds?

Before we engage with the cogency of claims of mind-uploading, let us consider some other issues that are usually brushed under the carpet.

To where would we be uploading our minds?

While the sympathetic-uploading literature focuses on persons being uploaded, there is much less talk regarding **what and where** the uploading destination would be. The uploaded destinations, when given, are usually limited to expressions such as ‘the web’, ‘the cloud’, ‘digital space’, ‘cyberspace’, ‘a computer’, ‘a simulated reality’, ‘a robot or android’ and so on. Understandably, until mind-uploading is attempted, we don’t know whether it is even possible, or whether unanticipated problems that will arise can be worked out. Details are therefore lacking since to answer this question we have to already assume mind uploading is possible and also that we will survive either intact or as a copy, for some unknown time period.⁵⁰

Assuming something of our individuality survives mind uploading, what comes next? The ‘where’ question is probably not separable from the ‘what’ question. Understandably few speculate on what ‘life’ would be like after in any detail after uploading. The American futurist and economist Robin Hanson is an exception, and acknowledging the speculative nature of his suggestions, he is willing to envisage a possible future, where artificial uploaded minds will

....live and work in virtual reality....you will feel no hunger, no cold, no heat, no pain. There’s no need to eat or to take medicine, although you can if you like....look out your office window and you will see sunlit spires towering over tree-lined boulevards (Wescott, 2016).⁵¹

Even if someone in the future was neither you nor a continuation of you, that future person might preserve aspects of you that might make bringing about the existence of such a person of tremendous import to you. For instance, what if you were told that you were about to die, but for that a reasonable sum of money you could form a biological clone of yourself right now that would have copies all of the most important positive memories from your life, as well as a number of the character traits that you most highly value in yourself. Many people, when placed in the situation, would happily pay the fee for this clone. Why? One reason might be that the existence of such a person would comfort your friends and family. But it is pretty clear that this is not the only consideration that may push you in a “yes” direction anyway. It is reasonable to conjecture that part of what may be driving you to pay for the clone is a desire for your distinctive experiences and characteristics to be preserved in the future for their own sake, even if not by you or a continuation of you. In a similar vein, then, we can ask of uploads whether they preserve enough of what is valuable about ourselves (or at least enough of what we consider valuable) so that, even if they are not identical to us or continuations of us, there will still be much from our standpoint that commends us to upload. (p. 28)

⁴⁹ Virtual pregnancy occurs in one of the short fiction stories in Weinstein’s collection Children of the New World (2016). Memories and experiences are implanted and people have virtual sex and virtual children. However, in the story, people are still human beings but living through implanted memories.

⁵⁰ Mind-uploading would lose some of its attractiveness if the uploaded mind (however successful) slowly faded away over a short period of time, or was susceptible to outside interference and could quickly be radically changed into something else.

⁵¹ Hanson is one of the very few who have given a detailed speculative account of what it might be like in the future. R. Hanson (2018) The Age of Em (Oxford University Press). Hanson covers economics, organization, and sociological considerations in a virtual reality of uploaded minds. A lot of topics are included in this expansive effort.

On Hanson's detailed speculative views, EM's, that is, uploaded human simulated minds housed in robotic bodies, will continue to work at jobs in a virtually constructed reality.

Most surmise the digital world to which we will upload ourselves to be virtual worlds similar to our present-day world in many ways. Given the state of our knowledge and our difficulty of considering unknowns without recourse to analogies, this is understandable. Graziano (2019) speculates a simulated copy of yourself (retaining your personality) waking up in a simulated version of cities on earth:

You step out of your [simulated] apartment into the sunlight of a perfect day and find a virtual version of New York City. Sounds, smells, sights, people, the feel of the sidewalk underfoot, everything is present – with less garbage though, and the rats are entirely sanitary and put in for local colour. You chat up strangers in a way you would never do in the real New York, where you'd be worried that an impatient pedestrian might punch you in the teeth. Here, you can't be injured because your virtual body can't break. You stop at a cafe and sip a latte. It doesn't taste right. It doesn't feel like anything is going into your stomach. And nothing is, because it isn't real food and you don't have a stomach. It's all a simulation. The visual detail on the table is imperfect. There's no grittiness to the rust. Your fingers don't have fingerprints – they're smooth, to save memory on fine detail. Breathing doesn't feel the same. If you hold your breath, you don't get dizzy, because there is no such thing as oxygen in this virtual world.

It seems more likely (to me at least) that those uploaded (even if they retain, for some time human characteristics), would be more interested in new virtual realities that are quite different from those on earth, and uploads would consequently diverge from human beings in terms of values and development.

What about those left-behind?

Even if mind-uploading became readily available, many might choose **not** to have their mind uploaded to virtual reality or to other bodies (physical or virtual). Some would likely choose to remain behind in their earthly physical body, for differing reasons (e.g religious, anti-technology, personal, political, etc). Sex and gender may even be a contributing factor as to whether or not one initially decides to upload one's mind ---*perhaps* more men than women would opt to be uploaded.⁵²

One might also consider the possible attitudes and duties of those left behind regarding those uploaded or vice versa (assuming attitudes are attributable in some way to those uploaded). The common **expectation**, I suspect, is that concerns will go both ways. In the film Transcendence (2014) the 'hero' of the movie successfully uploads his consciousness to the internet and grows in power as he starts to take over the web and designs a Utopia. His interest remains focused on improving the human world (according to his ideals). Our earth-bound attitudes to the uploaded will likely depend on what exactly is uploaded and what they or it is capable of. A concern is that the designers of the virtual reality could manipulate and channel responses to those uploaded, in the same way designers manipulate possible responses in video games [see Silcox (2018) for more on this topic].

⁵² Why might this be important? It might, if as most advocates contend, that personality would be uploaded with brain emulation. There is evidence that male and females have somewhat different personalities. S. B. Kaufman (2019) Taking sex differences seriously. Scientific American Blog, Dec 12. <https://blogs.scientificamerican.com/beautiful-minds/taking-sex-differences-in-personality-seriously/> This might result in unbalances in the virtual world or those refusing uploading or those not being allowed to upload.

The attitude of the uploaded towards the ‘left-behinds’ may depend on several things----- their power and ability to put into practice their ideas to those on earth or those in virtual reality (assuming they have ‘interests’ and these involve what is going on the earth). If they lack emotions (or have non-human emotions), they may be indifferent to us, or malign (from our human perspective). It would seem necessary for any moral obligations, either way, to be grounded in directed duties toward moral equals which are required when talking about right and wrong, and it does not seem straightforward when uploaded minds do not share humanity as we know it with us (especially as time passes).

Stepping back: Is mind-brain uploading even possible?

But are we not getting ahead of ourselves? Don’t we need to have the hippo before we consider how to cook it? Is mind-uploading even philosophically or scientifically likely in the first place? After all, we don’t want to waste energy and capital on something that isn’t possible, or if possible, has potentially serious shortcomings. At the same time, we don’t want to rule out the possibility, in advance of serious examination.⁵³ Unfortunately, a perusal of the present-day philosophical and scientific literature shows little consensus on this complex question of the plausibility of mind-uploading. How we answer might be somewhat tied to our view of the relationship of mind to body, and faith in continuing large strides in technological advances.

Is the mind/brain computable?

While much of the **popular** literature focuses on the brain and whether such a complicated organ is capable of being simulated, on the other hand, much of the **academic** literature is debated on whether the brain is like a computer or not (is the mind/brain computable?). A computational (or informational) view of the mind holds that our mental processes such as reasoning and perception are algorithms, or mathematical-like series of steps that accomplish goals, such as solving particular problems. Common ways that convey such a view are through expressions such as ‘the mind/brain is a computer’ and ‘the mind is a software program’ (if so, would it need ‘refreshing’ over-time or anti-virus additions periodically?) or talk of ‘backing up your brain on a computer’. A popular advocate of such an approach to the mind is held by the Israeli historian Yuval Noah Harari. In his best-seller Homo Deus: A Brief History of the Future (2017), Harari contends that all life and its processes and behaviors are ultimately algorithmic.⁵⁴ If the processes and behaviors of our bodies are algorithms and can be theoretically duplicated by electronic algorithms then mind/brain uploading in some sense would seem theoretically possible and perhaps plausible given the right advances in science. If indeed, this view is the most plausible view of the mind/brain, then the case for popular mind/brain uploading would be strengthened. However, not everyone is convinced the mind is computational.⁵⁵

⁵³ Further, even if we eventually find out that mind-uploading is not feasible, or limited in what is uploadable, we may learn a lot of useful information along the way. For example, we have learned much about aging and the human body as well as all sorts of practical implications from our interest in space exploration, even if we haven’t been to Mars yet. See <https://www.asc-csa.gc.ca/eng/about/everyday-benefits-of-space-exploration/default.asp> Further, Schneider (2019) suggests “mind uploading could facilitate the development of brain therapies and enhancements that could benefit human or nonhuman animals, because uploading part or all of a brain could help generate a working emulation of a biological brain we could learn from” (p. 147)

⁵⁴ Also, Y. N. Harari (2018) 21 Lessons for the 21st century. Penguin Random House Canada. Chapter 3 ‘Liberty’, especially pages 47-50.

⁵⁵ The debate over whether the mind is computable is a complex and abstract one, and outside the scope of an introduction. For those interested, the following would be a good start:

Cobb (2020) contends the brain-mind metaphor is, at best, only partially useful and that the brain does not function as a computer in many ways. For example, the brain is an active organ and does not engage in neural coding in a passive way as do computers, and that many of the neural systems are emergent and not explainable in terms of components, as computers are.⁵⁶

Gabriel (2018) takes a different tack and argues that we cannot reduce human beings to any parts such as the brain. Human beings are entire bodies connected to our environments and culture in complex ways.⁵⁷

Tallis (2018) adds,

What I would wish to be preserved in any life extension would be my experiences, memories, thoughts, emotions, my imagination, my aesthetic sense, my empathy, my habit of laughing at my own jokes, and so on. In what sense are they all merely 'information'? In order to be hoovered up through a computational scanner, they are presumably translated into a very large number of 0s and 1s. How they would these be translated back into experiences, thoughts, etc. is (to put it generously) not at all clear. As if this were not difficulty enough, individual items are profoundly interconnected. My memory of a past event links me with a past world which could hardly be reduced to and unpacked from the 0s and 1s supposedly corresponding to the discrete neural activity that is thought to be the memory's original biological substrate.... The reduction of the self I wish to immortalize to information is a necessary step to making me replicable in the sort of way we've been considering. But the very fact that the information is replicable shows that it does not correspond to the unique, singular, irreplaceable, unreplicable me. Information is information because it is intelligible, and it is intelligible because it is general. So that which makes something information prevents it from reaching down to unique personal identity. Whatever the scan extracts will be impersonal. Against this it might be objected that what is unique about me is not a particular bit of information, but a unique combination of items of information. But this won't work: there is an unbridgeable gap between (first-person) experiences and impersonal information. My experience of sitting writing this piece in a taverna on the island of Samos cannot be replicated, even though *the fact that* I wrote this in a taverna on Samos can be replicated indefinitely. Experiences are ultimately incommunicable (and certainly not in any language composed of 0s and 1s), whereas communicable facts are ownerless, and belong to the community of minds. There is a more profound objection. Information transmission or sharing is a *manifestation* of human consciousness. So trying to build higher-level first-person consciousness out of bits of information is like trying to build the foundations of an unbuilt house out of its upper storeys. This would be self-evident were it not for the slipperiness of the term 'information' in philosophical discourse. Normally we understand that information involves at least one conscious being: the informed recipient of the information. The fact that information can be 'stored' for later interpretation misleads some into thinking that it can exist without consciousness, and hence could

Rescorla, Michael, "The Computational Theory of Mind", *The Stanford Encyclopedia of Philosophy* (Spring 2020 Edition), Edward N. Zalta (ed.), URL = <<https://plato.stanford.edu/archives/spr2020/entries/computational-mind/>>. Criticisms part seven of the paper.

Grim, Patrick and Singer, Daniel, "Computational Philosophy", *The Stanford Encyclopedia of Philosophy* (Spring 2020 Edition), Edward N. Zalta (ed.), URL = <<https://plato.stanford.edu/archives/spr2020/entries/computational-philosophy/>>.

⁵⁶ See M. Cobb (2020) [The Idea of the Brain](#). Basic books. See also the review of Cobb by S. Casper (2020) Neuroscience needs some new ideas. [Nature](#), 580, pp. 23-24, and another review in [American Scientist](#), June 12, 2020. <https://www.americanscientist.org/blog/science-culture/making-sense-of-the-brain> .

⁵⁷ M. Gabriel (2017) [I Am Not a Brain: Philosophy of Mind for the 21st Century](#). (translated by Christopher Turner). Polity Press. See also, <https://iai.tv/articles/why-the-mind-is-not-the-brain-auid-1139>

be the material out of which consciousness is constructed. But to separate information from consciousness in this way quickly leads to lunacy.

While a debate over whether or not the mind is computable is important, there are other objections to consider.

Common objections to mind uploading

This leads to some more common and popular objections to mind uploading. We can start with some scientific concerns expressed in Smithsonian magazine:

A 3-D map of all the cells and synapses in a nervous system is called a “connectome,” and so far researchers have produced exactly one, for a roundworm called *Caenorhabditis elegans*, with 302 neurons and about 7,000 connections among them. A human brain, according to one reasonable estimate, has about 86 billion neurons and 100 trillion synapses. And then there’s the electrochemical activity on top of that....[To] scan an entire human brain at the scale [some advocates] thinks is necessary—effectively slicing it into virtual cubes ten nanometers on a side—would require, with today’s technology, “a million electron microscopes running in parallel for ten years.” (Adler, 2015)

This objection refers to the complexity of the brain and questions our ability to adequately upload an entire brain.⁵⁸

Tallis (2018) contends the whole idea of mind uploading is problematically analogous to being caught between a dog and a fire hydrant from the start and is worth quoting:

There are many obvious problems. The first is that there would be nothing to stop the boffins producing hundreds of copies of me at any given moment. Secondly, a mind without its body would seem to lack an agenda. It would certainly be fundamentally different from the original embodied mind. Thirdly, this bodiless mind would also be *worldless*, because being-in-the-world is being in a shared world: the personal is interpersonal. In short, continuing personal existence on a non-biological substrate would be solitary and empty unless my world – whose scope is vast and ill-defined – were scanned and packaged along with me.

We also don’t know how our complex uploaded simulated brain would respond to a new substrate. The 18th-century philosopher David Hume in his ‘On the immortality of the soul’ (1755/1998) told us, “Judging by the usual analogy of nature, no form can continue when transferred to a condition of life very different from the original one, in which it was placed. Trees perish in the water, fishes in the air, animals in the earth. Even so small a difference as that of climate is often fatal”. Even organ transfers within our species from one body to another are sometimes unsuccessful. On a simple level, for example, blood transfusions and organ transplants don’t even work straightforwardly within our species. This suggests that the expression ‘making the right connections’ with a new substrate is overly simple. There may be many ways even correct connections with a different substrate may not work out.

⁵⁸ There is still much we don’t know about the brain, despite the large strides in neuroscience. See, M. Cobb (2020) The idea of the brain. Basic Books. Cobb provides a readable survey of how the brain operates, along with the various metaphors that have provided direction for research over the recent centuries. The brain-as-computer is only the latest in a line of metaphors and is likely another oversimplification of how the brain evolved and works alongside our organic bodies. The book also indicates, despite the popularity of neuroscience explanations in psychology that there is much we don’t know about processes such as memory and vision.

One of the most popular objections to mind-uploading is whether what was uploaded would only be a copy/replica of you and not the original you at all, even if everything went as expected. The issue of ‘who’ or ‘what’ would be uploaded ties in with questions about the self. What is the self and how does it arise? Is the self something unitary or not? Here we confront philosophical issues regarding personhood and the self. Here we can quote the resolute Tallis (2018) again:

So, already many problems; but they are nothing compared with the contradictions in the very idea of ‘uploading’ me, which relies on identifying my personal identity with the ‘information’ stored in my brain.And an instantaneous snapshot taken by a brain scan would also not capture how I am *extended in time*. Tallis at time *t* is steeped in Tallis’s past and is pregnant with the future he anticipates and tries to control. Trying to capture that temporal depth by prolonging the snapshot would only result in a blur as different activation states of the brain are superimposed. What’s more, it’s also not at all clear what has to be copied. For some writers, for instance, the information that should be captured by the scanner is not neural activity but the unique micro *structure* of my brain. Effectively, what must therefore be extracted would be a recipe for reconstructing a non-biological equivalent of my neural circuitry. This raises many problems, not least because there is no guarantee that even the same circuitry, reconstituted on, for example, silicon, would behave like the wetware of the brain. Moreover, living brain tissue is not reducible to merely its wires and connections. There can be no clear distinction between the information supposedly carried by or stored in the brain, the microscopic structure of the brain, and the juices that support that structure. They all have a hand in the ‘information’ that goes into making me *me*. The question then arises as to how much of that wetware – the brain’s living tissue – should be replicated.

Many would balk at the procedure if they take the copy objection seriously. After all, a replica whooping it up in the future while you are, like John Brown, smoldering in the grave, is not likely to appeal to many. However, Graziano (2019) suggests that while a simulated copy would be uploaded, the biological you would remain intact in every way with your own organic body, the uploading processes only copies your brain connections with your conscious and brain states and processes.

Even if one believes in an immaterial mind (perhaps in the form of a soul), it doesn’t follow that YOU would survive or be uploaded.⁵⁹ If **you** are a soul then mind uploading **via the brain** would not necessarily transfer you, the mind transfer of you would have to be done some other way. Why should one’s immaterial mind accompany a physical brain transfer? Even if something unitary is uploaded, the resulting ‘you’ may be quite different from what existed in association with a physical body. However, here is where debate over the mind-body problem becomes pertinent.⁶⁰ It seems that only within a dualistic framework would **direct** mind transfer seem possible----that is, the actual you being transferred into a new body.

⁵⁹ The dominant world view among present day Western academics is some form of naturalism (the supernatural or immaterial does not exist). On this view, the mind is related to the brain, although philosophers and scientists differ on what the relationship between the two exactly is. However, even though we don’t know exactly how consciousness arises from neural connections, would it matter----would consciousness (however it relates to the brain, on a, naturalistic view ‘come with’ the copying anyway?)

⁶⁰ A relevant overview of the competing views regarding the mind-body problem can be found in A. Kind (2019) ‘The mind-body problem in 20th century philosophy’ in A. Kind (Ed), Philosophy of Mind in the Twentieth and Twenty-first Centuries. Routledge., pp. 52-77. In the context of AI, see Schneider (2019) Artificial You. Princeton University Press, pp. 127-130.

The philosophical debate over consciousness arises here. I'll assume here that most of us would prefer to remain a conscious being after uploading rather than an unconscious zombie. However, a key consideration here is ---can consciousness be non-biological?⁶¹ Would a virtual copy of my brain scan have consciousness? If it was put into a virtual or robotic body would it have **human** consciousness? Or would it have a completely different kind of consciousness? Or would it lack consciousness entirely (which would be the case if consciousness is only possible in organic bodies)? These questions are not answerable, at present.⁶²

Even if mind-uploading becomes possible, a host of social issues will arise. Harari (2015, 346-350; also Digimorphing Team, 2019) suggests that only the financially very well-off may be able to afford such technological extravagances (like mind-uploading).⁶³ Further, those who control who is, or who is not allowed, to be uploaded may have discriminatory criteria. It is unlikely would all have equal access (even if all could afford it or wanted it). Several prejudices or biases might be at play.⁶⁴ Perhaps only those with stipulated 'normal' minds or brains, or those within a particular age-range would meet the criteria.⁶⁵ Further, if minds are uploaded into virtual reality, who or what would design the virtual reality? If those with more power on earth designed it, one would expect, the virtual reality to reflect the values of the designers.⁶⁶

I'll leave it to the reader to reflect on these issues and their persuasiveness. I will now elaborate on some relevant issues that seem underplayed in most discussions on the topic.

⁶¹ The debate in the scientific and philosophical literature on the **nature** of consciousness, how **widespread** consciousness is, and whether it can exist in a variety of **different forms** is the topic of a very large literature base, with little consensus. A good overview of theories of consciousness can be found in T. Crane (2019) 'A short history of philosophical theories of consciousness in the 20th century', in A. Kind (ed). Philosophy of Mind in the Twentieth and Twenty-first Centuries. Routledge, pp. 78-103. See also, E. Schwitzgebel (2018) Is consciousness sparse or abundant. Five dimensions of analysis. The Splintered Mind (blog), <https://schwitzsplinters.blogspot.com/2018/02/is-consciousness-sparse-or-abundant.html>

⁶² See Schneider (2019), pp. 18-26 for more on this topic.

⁶³ Harari (2015, chapter 9) is focused on upgrading human bodies rather than mind-uploading. He suggests the rich will split the human species into castes where the rich dominate by becoming super-humans while the poor will be left behind.

⁶⁴ Some of the prejudices that might influence decisions regarding who could be uploaded could include sexism, ageism, racism along with prejudices against those with particular religious or non-religious beliefs, ethnic identities or those with certain disabilities. Such beliefs might be more insidious when implicit. (M. Laakasuo, M. Drosinou, M. Koverola, A. Kunnari, J. Halonen, N. Lehtonen, & J. Palomäki. What makes people approve or condemn mind upload technology? Untangling the effects of sexual disgust, purity and science fiction familiarity. Palgrave Communications, 4 (1) DOI: [10.1057/s41599-018-0124-6](https://doi.org/10.1057/s41599-018-0124-6).)

⁶⁵ In March 2020 a man was arrested after a high-speed chase for trying to teach his dog how to drive a car. However wealthy, would this individual be considered a candidate for mind uploading? <https://www.cnn.com/2020/03/30/us/washington-man-arrested-pit-bull-drive-trnd/index.html> Given that we all have quirks that deviate from the norm, hopefully any criteria are loose. The concept of 'normal' is itself a tricky concept. In medicine the term is often synonymous with health, but is then often stretched to represent something ideal. See M. Catita, A. Aguas, and P. Morgado (2020) Normality in medicine: a critical review. Philosophy, ethics, and humanities in medicine, 15, 3, 1-6. An attempt at viewing normality in psychology and psychiatry through institutional and personal norms and practices can be found in K. Nielson and T. Ward (2020) Mental disorder as both natural and normative: developing the normative dimension of the 3e conceptual framework for psychopathology. Journal of Theoretical and Philosophical Psychology, 40, 2, 107-123.

⁶⁶ Nguyen (2020) points out that games (video games as well as all other types of games) decide what players can do within the game and how they will act in the game. The challenges we face and the practical interests and abilities of players are part of the game, including positive experiences we might rarely have in everyday life. C. T. Nguyen (2020) Games: Agency as Art. Oxford University Press. See also, Silcox (2018). Virtual realities for uploaded minds will not be designed only for entertainment and learning, however. Not only will the wide variety of values and interests need to be addressed, but the biases and prejudices of the designers. Further, subtle manipulating aspects of the reality would need to be critically examined.

An important distinction: **Mind**-uploading vs **Brain**-uploading

The expression ‘mind uploading’ is usually considered coextensive with ‘brain-uploading’. Strictly speaking, these expressions are not synonymous, and the distinction is worth considering in this context. The **mind** is tied to mental, subjective experiences and the **brain** is an objective, roughly one and one-half kilogram pink-gray biological organ. This does not deny the close connection between mental activity and neural activity, but the distinction is useful to keep in mind.⁶⁷ **Mind-uploading has a wider scope than brain (function)-uploading.** Much of the mind-uploading literature conflates the two. In the academic and popular literature, mind states are usually considered expressed by or are identical with brain states and functions.⁶⁸ For example, Graziano (2019) says,

imagine that a person’s brain could be scanned in great detail and recreated in a computer simulation. The person’s mind and memories, emotions and personality would be duplicated. In effect, a new and equally valid version of that person would now exist, in a potentially immortal, digital form.

Similarly, <http://www.minduploading.org/> tells us:

Mind uploading is a popular term for a process by which the mind, a collection of memories, personality, and attributes of a specific individual, is transferred from its original biological brain to an artificial computational substrate.

I will argue that mind-uploading is more problematic than brain-uploading. I will consequently spend more time on the mind-uploading issue rather than the brain-uploading issue.

Additional complications for **mind**-uploading: No sex please, we’re academics

My main focus in this paper is uploading **human** minds. Contemporary belief in the possibility of mind-uploading, as previously mentioned, generally relies on biological notions of the mind: the belief that the mind is dependent on the brain, indeed, identified with brain processes and states and functions, even if we can’t yet explain the gap between what we consciously experience and neurological states. However, while uploading a brain is one thing, uploading a mind seems something else. What this ‘something else’ is, might be considered under some philosophical complexities explored in the philosophical literature. I will introduce these complexities under topics such as the *externalist view of the mind* and concerns about the *embodied connection* between our emotions, personality and character and our biological bodies.

⁶⁷ While few, if any, would deny the close, dependent connection the between brain and mental activities, the spelling out exactly **how** the brain and mind are related is controversial, and one’s preferred theory describing this relationship will have some impact on how they evaluate the prospects for mind-uploading (and brain uploading) (Kuhn, 2016).

⁶⁸ While much **popular** discussion of mind uploading seems to take place in a mind-body identity context, the **academic** theory under consideration in mind uploading is **functionalism**. This view is very popular with cognitive scientists and those in artificial intelligence and goes beyond identifying the mind with brain states and processes (as with the mind-brain identity theory). Functionalism describes the mind in terms of function (hence the label ‘functionalism’). Beliefs, sensations, hopes, etc are not related to any underlying organic or non-organic process or states but the kinds of causal relationships they have with other mental states, sensations and behaviors. But even if similar mental states can be found in bodies of different substances (e.g silicon) it doesn’t follow that one can upgrade a mind from one substance to another.

My conclusion is that human mind-uploading does not seem feasible, as presented in most articles, and that what might be uploaded would not be human. The reasoning behind this is that the human brain alone does not constitute our human identity. I will defend this view in two related parts: first of all, our mind is inseparately tied to our body, and secondly, our mind seems also to be tied to tools outside of us in the environment.⁶⁹ That is, we can't identify much of what constitutes our **mind** from brain states alone. If these concerns have merit, our expectations and notions of mind-uploading will require rethinking.

1 The Embodied Mind Consideration

[Mind uploading] presumes, of course, that all of the subtleties of a human mind and memory are contained in [the brains] anatomical structure—conventional wisdom among neuroscientists, but it's still a hypothesis (Adler 2015).

While Adler does not expand on his statement, a relevant way of interpreting it is in terms of what is described by philosophers as the embodied mind hypothesis. Montgomery (2012, see also McNerney, 2011) succinctly describes this view as follows:

A widespread belief throughout Western history has been that our minds are separate from, and superior to, our bodies. The mind has been viewed as the exalted seat of reason, identity, and spiritual purity, while the body, with its untamed emotions and crude urges, has typically been seen as the lower, “animal” part of us. But ... this supposed division between mind and body is almost completely illusory. The mind, it turns out, can't really be separated from the body at all, because the body seems to play an integral role in almost everything the mind does. While the *brain* can be anatomically localized to the head region – where we typically perceive our “self,” or sense of self, to be – almost everything the *mind* does, including planning, making decisions, and thinking in abstract ways, appears to critically, inescapably depend upon and involve the body. Without the body, there is apparently no functional mind.

The expression ‘embodied mind hypothesis’ refers to the claim that our human **body** plays an essential role in the activities of our mind (Wilson, 2015).⁷⁰ Similarly, the philosopher Metzinger (2017) argues that our notion of self is essentially tied to the body and would therefore not be possible to upload,

a large part of the human self-model is grounded in the body, in gut feelings, in inner organ perceptions, in the vestibular sense, and therefore you cannot really copy the human self-model out of the biological body unless you would at some point really cut it off, so to speak. And then you would maybe have a sense of self jumping into an avatar, but you would not have all that low-level embodiment, the gut feelings, the emotional self-model, the sense of weight and heaviness—all that would be gone. Maybe we could create very different forms of selfhood and offer them for augmentation, but for a number of reasons I think that the whole idea of actually “jumping” out of the biological brain and into virtual reality completely has probably insurmountable technical problems

⁶⁹ Both the ‘embodied mind’ issue and ‘extended mind’ considerations are mentioned in critiques of mind uploading but usually in passing (see Kuhn, 2016, p. 26).

⁷⁰ The embodied view of the mind also plays a role in the thought of many Feminist philosophers (Davies, 2019).

This means talk of uploading a **brain** bypasses much of what constitutes a human mind. Even if the present state of a person's mind captured all the brain diagram with connections for the uploading, what would continue to exist would seem to be a truncated being.

If our **human** identity is inseparately tied to our biological body and developmental environment, this has consequences for those who view mind-loading as somehow copying one's mind and continuing to live on as a 'web person'. The human mind seems strongly tied-in with aspects of our bodies that would not be part of the package during **brain** uploading, with the result that any successful uploading would leave out what most of us consider essential aspects of our humanity.⁷¹ If this contention is plausible, even a successful mind-uploading would be, at best, a very very limited version of oneself---or to use John Gray's phrase only a resultant 'shadow of a person' (Gray, 2018). In this section, I'll consider this in some detail to underscore the point. Further, given that these bodily influences on us, are continuing while embodied on earth, what occurs after uploading would further reduce quickly our human nature.

Our body contains not only aspects from previous animal ancestors (which may move both horizontally and vertically from within and between species) but also more subtle inheritances that have resulted from previous retrovirus infections that have infiltrated our DNA (Quammen, 2019). Some evidence of "severe trauma may [even] be passed along through direct germ lines rather than simply through parenting" (Krippner & Barrett 2019, p. 60)⁷² The field of epigenetics---environmental changes that affect genes and disease include environmental factors, along with diet (Spector (2019), and lifestyle (see John Denu, <https://www.pbs.org/video/epigenetics-health-and-the-mind-6hqora/>; also Rosenfield and Ziff (2018) and Curry (2018)). Social inequalities in our environments also have impacts on our life-spans and experiences (Pennisi, 2020).

Recent evidence further suggests the makeup of our bodily gut bacteria not only differs among people but changes over a lifetime according to age and gender but may also play a role in personality, obesity, mood, and overall health (Kashef, 2019, Johnson, 2020, Schleunes, 2020). While an uploaded brain may contain the cumulative results of such bodily processes at a particular time, the uploaded mind would cease to be influenced by them, becoming a different entity than before.

Hormones are chemical messages from bodily glands that can influence a variety of bodily activities, including mood and behavior (Epstein, 2018). While the brain plays a role in these processes, the connection between mind and body would be cut if only a brain and its connections were uploaded.

Would emotions accompany uploading? Many advocates of mind-uploading assume so. But our particular array of emotions and their expression is tied to the kind of organic **body** we

⁷¹ Mind-uploading is different than the whole-body scans and body transfers found in sci-films such as *Star Trek* (original series 1966-1969) and *Picard* (2020). These whole-body transporters purportedly take apart the whole molecular structure of a human or object and reconfigure the molecules at a distant site. In this case the person is, theoretically, identical as before since the same molecules are in play in the same configurations. Not everyone is convinced, [J. Wenz (2016) You don't want a 'Star Trek' transporter because using it would kill you. *Popular Mechanics*, Mar 7. <https://www.popularmechanics.com/culture/tv/a19793/the-trouble-with-the-star-trek-transporter/>]. Further, the whole-body transporters take one from one's physical body to another physical location, not from a physical to a virtual reality.

⁷² Even if a brain uploading preserved all the elements of our past history, the uploaded mind might soon cease to be human because the influences would immediately be virtual rather than organic. Could a virtual reality duplicate many of these effects our organic bodies are affected by? It is unclear whether this is possible. Further, whether this is important might depend on whether what is uploaded is a copy or the original you, and whether one believes the substratum the uploading resides in changes what is uploaded.

humans have.⁷³ It seems plausible to assume that a creature with different hormones and internal organs would have different kinds, ranges, and intensities of emotions than human beings. Uploading a simulated brain would sever the connections between the body processes that make such (human) emotions possible in the first place. Further, our human reasoning capacities seem to be tied to our specific human emotional abilities.⁷⁴ Demasio (2005, 2018) provides evidence that even our natural human rational capacity is itself intertwined with our emotions. Reason does not function independently of our feelings, desires, and needs. Demasio says,

This is Descartes' error⁷⁵: the abyssal separation between body and mind...the suggestion that reasoning, and moral judgment, and the suffering that comes from physical pain or emotional upheaval might exist separately from the body. Specifically: the separation of the most refined operations of mind from the structure and operation of a biological organism. (2005, pp 249-50).⁷⁶

Demasio found that those with neurological damage to areas of the brain associated with emotional sensitivity, but with undamaged cognitive abilities, tended to have restricted ability in situations of risk.

Emotions may also play a role in immunity (D'Acquisto, 2017). What role would many of these redundant brain connections play in an uploaded brain living in a robotic or virtual body? It would seem that much of the neural activity of the brain would no longer be needed if the embodied claim has merit. Would the uploaded brain functions be able to 'work' if these other connections are eliminated or redundant?

Much of who we consider ourselves to be is tied up with experiences and memories that have emotional or valued content. Even if emotions exist in a different substratum than our physical bodies, they might be something quite different from **human** emotions, meaning that whatever was uploaded might be (at best) a 'something-like you' but not YOU.⁷⁷

The sheer complexity of the brain, our history, and continual internal influences our organic body has on us multiplies complexities upon complexities, making mind uploading (that

⁷³ The identification of emotions is often also influenced by culture and context, and history. See F. Watts (2019) The concept of 'emotion': An historical perspective. History & Philosophy of Psychology. 20/ 1, 13-18. Emotion cannot be straightforwardly read off from brain states alone.

⁷⁴ We tend to talk of 'reason' as if there is only one kind or manifestation of reason. Immanuel Kant (late 18th century) suggested in his, little read, Anthropology From a Pragmatic Point of View (1798) that human expressions of rationality may differ from extraterrestrials. The type of rationality a creature has may depend on its nature and social interactions. He imagines an extraterrestrial creature whose thinking is all done out-loud making lying impossible. One might consider the possibility that 'inner thoughts' would cease to be private to uploaded minds sharing a virtual reality. Whether this would lead to a kind of group mind emerging would be a possibility.

⁷⁵ Rene Descartes advocated a dualism where mind and body are separated. While the body is a material mechanical thing, the mind is an immaterial entity. Descartes says: "[I am] the soul ...[which], is entirely distinct from body...and even if [my] body were [nonexistent], the soul would not cease to be what it is". [p 249]. R. Descartes (1644/2009) Principles of Philosophy. SMK Books, p. 249. This view is also held by the philosopher Swinburne (2019).

⁷⁶ Demasio is not saying that emotions are always positive contributors to our reasoning, it depends on the context.

⁷⁷ The issue I am alluding to here is related to, but different from the issue of identity over time. Human beings differ over time (we age, our beliefs are expanded and modified, etc) but we are considering a different trajectory if our minds are uploaded to another body or the web. Part of our life organically embodied, and what comes next, virtual or androidic.

a recognizably human beings would result) not *a priori* impossible but increasingly difficult a project to undertake.

2. The externalist mind consideration

The embodied-mind thesis described in the previous section of this paper, although controversial, if persuasive, would add a serious problem to notions of uploading recognizably human minds. While the previous argument that our minds are what they are because of the strong intertwining of our bodies with our minds, and therefore, that any uploading would result, at best, in an impoverished human mind, the **external mind thesis holds that our minds extend beyond the body adding another layer of impoverishment in any claim to uploading a human mind from a brain.** Clark and Chalmers (1998) introduce the topic with,

If, as we confront some task, a part of the world functions as a process which, were it done in the head, we would have no hesitation in recognizing as part of the cognitive process, then that part of the world is (so we claim) part of the cognitive process. (p. 8)

On the externalist mind view, also a controversial view in philosophy and cognitive science, we cannot identify mind just with what is going on internally in our bodies/brain, what goes on **outside our bodies** might also an essential part of our mind (Vold, 2018) since they function similarly as our cognitive processes. The externalist thesis can be best considered with an example given by Clark as follows (cited from MacFarquhar 2018, see also, Maclean, 2018):

Consider a woman named Inga, who wants to go to the Museum of Modern Art in New York City. She consults her memory, recalls that the museum is on Fifty-third Street, and off she goes. Now consider Otto, an Alzheimer's patient. Otto carries a notebook with him everywhere, in which he writes down information that he thinks he'll need. His memory is quite bad now, so he uses the notebook constantly, looking up facts or jotting down new ones. One day, he, too, decides to go to *MoMA*, and, knowing that his notebook contains the address, he looks it up. Before Inga consulted her memory or Otto his notebook, neither one of them had the address "Fifty-third Street" consciously in mind; but both would have said, if asked, that they knew where the museum was—in the way that if you ask someone if she knows the time she will say yes, and then look at her watch. So what's the difference? You might say that, whereas Inga always has access to her memory, Otto doesn't always have access to his notebook. He doesn't bring it into the shower, and can't read it in the dark. But Inga doesn't always have access to her memory, either—she doesn't when she's asleep, or drunk.

Clark contends that our minds are not only inseparable from our bodies, but also inseparable from the parts of the environment we use to enhance our understanding of ourselves and the world. Otto's notebook would be considered part of his mind just as our i-phones, calculators, notebooks, and laptops are part of other people's minds. The implication is that our minds are not just housed in our bodies but are also comprised of parts in the external environment, in appropriate situations. Without these external aids, we would not be able to think about many of

the important things in our lives.^{78 79} Uploading a mind from a brain scan would consequently lose much of what makes the person who they are since their external tools would be missing with only a focus on the brain.⁸⁰

If the reader finds either or both of these views persuasive, the topic of uploading one's mind loses much of its appeal (to many). Most advocates of mind uploading assume a relatively fully functional copy of their mind, which would be ruled problematic on these two grounds alone. Further, talk of the debate over whether an original or upload would be the result in an upload would seem to be rendered moot. It would be neither. However, it needs to be pointed out that while uploading one's mind may be rendered problematic by these views (if considered persuasive), **brain** uploading remains on the table.

The uploaded **brain** : Will you still have the brains you were born with?

The previous section brought up some concerns that **mind** uploading does not seem feasible---too much would be left out by uploading brains. But it does not follow that brain-uploading itself is undesirable on other grounds. It would seem that brain uploading would be associated with less baggage. After all, not everyone might be concerned that their own minds be preserved nor their personal identities. Perhaps, therefore, for some, this is a moot issue; whether or not our minds reflect human concerns and structure may be of no or little interest. While some trans-humanists may be interested in upgrading what they consider flaws or shortcomings in the biological form that humans presently have, others may be more interested in becoming

⁷⁸ Clark's most recent foray on the mind can be found in Clark (2016) Surfing Uncertainty: Prediction, Action and the Embodied Mind. New York: Oxford University Press. This book isn't an easy read, but it outlines an approach to mental activity different from what most of us received in psychology classes. Clark contends our minds are predictive machines rather than representational ones. The philosophical picture that emerges describes implications for how we think about memory, imagination, dreaming, our cognitive architecture and neuro-pathologies.

⁷⁹ The external mind thesis has shown itself to be quite popular in academia with applications made within a large variety of topics. Consider the following:

---P. Smart (2017) Extended cognition and the internet. Philosophy & Technology, 30/3, 357-390.

---M. Gallotti & B. Huebner (2017) Collective intentionality and socially extended minds Philosophical Psychology, 30/3, 251-268.

---L. Kersten (2017) Extended music cognition. Philosophical Psychology, 30/8, 1078-1103.

---J.A. Skorburg (2017) Lessons and new directions for extended cognition from social and personality psychology. Philosophical Psychology, 30/4, 458-480.

---G.A. Hoffman (2016) Out of our skulls: how the extended mind thesis can extend psychiatry. Philosophical Psychology, 29/8, 1160-1174.

---J.A. Carter & S.O. Palermos (forthcoming) The ethics of extended cognition: is having your computer compromised a personal assault? Journal of the American Philosophical Association.

---E. Arnau, A. Estany, R. Gonzales del Solar, & T. Sturm (2014) The extended cognition thesis: its significance for the philosophy of (cognitive) science. Philosophical Psychology, 27/1, 1-18.

---J. Sokal (2017) The thoughts of a spider web. Quanta magazine, May 23. <https://www.quantamagazine.org/the-thoughts-of-a-spiderweb-20170523/>

An article examining the external mind thesis along with criticisms of the view can be found in L. Victor & Z. Karim (2017) What is left of the active externalism debate? European Journal of Philosophy, July 13, https://www.researchgate.net/publication/318395475_What_Is_Left_of_the_Active_Externalism_Debate_The_Active_Externalism_Debate

⁸⁰ There are variations of views within those who accept an externalist mind view. For example, Gabriel places less emphasis on technology and more on cultural artifacts such as books in how we view ourselves. M. Gabriel (2017) I am not a brain. Polity Press.

something completely different. The appeal here is that this ‘completely different’ would transcend our physical form in an unknown way---which may be part of the appeal for some people. However, this different form could take a wide range of manifestations, especially over time, if not initially.⁸¹

Summary

The purpose of this article is to provide readers with an introductory, but a wide view on mind-uploading, and some of the present-day philosophical, scientific, and social issues surrounding the topic that I find interesting. The article has focused on whether or not our **human** minds can be successfully uploaded. I have provided some concerns that support the conclusion that (given that our minds cannot be reduced to just our brains) uploading would not wholesale preserve our identities and may not even preserve much of our human characteristics. However, this may not be a problem for some of those interested in the topic. That is, whether uploading preserves our identities or even our human identities may not be of main concern. While many present-day philosophical concerns around mind-uploading center on **human** issues of self-identity, ethical concerns, and whether **you** will be uploaded or a carbon copy or just a shadow copy of ourselves, others may focus on a more trans-humanist view that is less concerned about the continuation of **human** characteristics in what would be uploaded but rather the focus may be on the renewed possibilities that would emerge in transforming ourselves into something else. What this something else might be, of course, is unclear. Given the above discussion as things now stand, what would be uploaded would not likely be recognizable as human, and even if it was initially even **somewhat** recognizable as human, ‘living’ in virtual environments and the lack of boundaries among uploaded minds would soon transform into something unrecognizable. From a present-day **human** perspective, for most of us, this is likely an unattractive scenario.

For further reading (organized according to publication date):

J. Locke (1690/2008) An essay concerning human understanding. (Chapter XXV11, ‘Of identity and diversity’). Oxford University Press. Locke’s views on the human mind are still influential and worth reading. A version with updated English can be found at <https://www.earlymoderntexts.com/authors/locke>.

D. Hume (1755/1998) Dialogues concerning natural religion: with ‘Of the immortality of the soul’, ‘Of suicide’, ‘Of miracles’ (Hackett Classics), Hackett Publishing Co, Inc. A more readable version, in modern English, can be found at

<https://www.earlymoderntexts.com/assets/pdfs/hume1757essay4.pdf>

This book contains Hume’s most relevant critical evaluations of religious claims across a variety of topics. Many of his arguments against religious doctrines are still advocated by many skeptics. Worth studying by both believers and skeptics.

Clark & Chalmers (1998) The extended mind. Analysis, 58/1, 7-19. The original introduction to the ‘extended mind thesis’ the view that the mind can extend beyond the boundaries of the skull. See also Menary (2010). See also, Chalmers on the extended mind on you-tube:

⁸¹ Most people I’ve spoken to assume that some elements of humanity would remain in mind uploading. Which ones? And for how long?

<https://www.bing.com/videos/search?q=chalmers+extended+mind+you+tube&docid=608054587455898914&mid=37FB4760F20EA13A92DE37FB4760F20EA13A92DE&view=detail&FORM=VIRE>

G. Leopardi (early nineteenth century/2013) (Ed.M. Caesar & F. D' Inrno) Zibaldone: The Notebooks of Leopardi. Farrar, Straus & Giroux. Giacomo Leopardi was an Italian poet and thinker of the nineteenth century. He was a wide-ranging thinker who jotted down his thoughts on a large variety of topics in a notebook called the Zibaldone (or hodgepodge of thoughts). These thoughts are highly original and express a pessimistic, materialistic view of life.

M. Anissimov (undated) 'What are the benefits of mind-uploading?'. Lifeguard Foundation: safeguarding humanity. <https://lifeboat.com/ex/benefits.of.mind.uploading>
Anissimov describes mind uploading as copying your brain in a way that preserves all the essential characteristics of your mind. He says he hopes the early adopters don't become dictators and, in time, will pass on benefits to those left behind, who will likely, sooner than later, choose to themselves become uploaded. He advances a variety of arguments supporting the view that mind uploading could result in a better world for all. See also on youtube https://www.youtube.com/watch?v=akSa9gqJ_F4

N. K. Hayles (1999). How We Became Posthuman: Virtual Bodies in Cybernetics, Literature and Informatics. Chicago: University of Chicago Press. Hayes is not impressed with talk of mind uploading and its association with disembodied information. The future rather belongs to the development of our imagination by becoming slowly posthuman. The book ranges across the history of technology starting with cybernetics and how our views of ourselves have been transformed by the computer revolution.

R. Nozick (1989) The examined life. Simon & Schuster. A philosopher's wide-ranging views on a variety of topics such as love, the possibility of life after death, the meaning of life, and various political issues. Not your typical philosophy book.

D. Brin, Kiln People (2002).

An enjoyable science-fiction trilogy with philosophical ideas about personal identity. People in the future can duplicate themselves with clay bodies which include their memories. Both the original organic people and clays can, under certain conditions, upload new memories and personality. The overall story involves a mystery in which the original organic people can disguise themselves as clays. Issues of bodily identity versus the role of personality and memory arise with the reader.

R. J. Sawyer (2005) Mindscan. Tor Books. Another science fiction classic. The financially rich lead character copies his mind to an android to avoid dying of a terminal illness. The android stays on earth but the original biological person goes to the moon. Then the android on earth falls in love with another android and the terminal disease is then unexpectedly cured for his moon copy. Legal battles loom: which of the two is the real person and do both have the same legal rights? The story assumes you can upload emotions and fall in love in an android body, but go with it.

T.W. Rockwell (2005) Neither Brain nor Ghost: A Nondualist Alternative to the Mind-Brain Identity Theory. Cambridge, MA: MIT Press. A defense of the extended mind theory that views the mind is more than just the brain. Contends the rest of the nervous system and the immune system are parts of the mind. Discusses and rejects Cartesian dualism along with contemporary analogues that identify the mind with the brain. The brain cannot be isolated from not only the body but parts of the environment.

A. Damasio (2005) Descartes error: emotion, reason and the human brain. Penguin books. For a long time, in both psychology and philosophy, rationality and our emotional lives have been kept separate. Damasio's book brings them back together. Descartes error was separating the cognitive mind from the body and emotions. There is no mind without the body.

R. Menary (2010) (ed.), The Extended Mind, MIT Press. A useful overview of the extended mind thesis (with a reprint of the original article by Chalmers and Clark). Fourteen chapters describe, critique, and extend in various directions the extended mind thesis. A useful base for those interested in the topic.

V. Vinge, (a trilogy of novels, 1992-2011). A Fire Upon the Deep. Engrossing science-fiction stories involving different forms of consciousness, including collective consciousness. These novels have it all: superhuman intelligence, dog group minds, love, and betrayal, brawling in space, reconstructed future humans (living on space colonies), and an ancient evil intelligence (called, not surprisingly, 'the Blight').

R. Kurzweil. (2011) ("Live Forever-Uploading the Human Brain...Closer Than You Think." Kurzweil Accelerating Intelligence. Kurzweil AI Network, Web. 24 May. <http://www.kurzweilai.net/live-forever-uploading-the-human-braincloser-than-you-think>. An early article that created much of the interest in the topic of mind uploading.

M. Walker (2011) Personal Identity and Uploading, Journal of Evolution and Technology, 22/1, 37-51. A discussion of whether 'you' would be preserved after mind uploading using humor and thought experiments to propose a reduced notion of identity that can be supported by a cost analysis of benefits and losses.

S. McNerney (2011) A brief guide to embodied cognition: Why you are not your brain. Scientific American Blog, <https://blogs.scientificamerican.com/guest-blog/a-brief-guide-to-embodied-cognition-why-you-are-not-your-brain/>. A discussion of the origins of the embedded cognition paradigm which advocates the view that human reason is tied to the functioning of our body in social environments. Gives the background of the view in continental philosophy and the large role metaphors play in our lives.

N. Agar (2011) Ray Kurzweil and Uploading: Just Say No. Journal of Evolution & Technology 22/1, 23-36. The author argues that the risks involved in mind-uploading outweigh the expected rewards. So one should be very careful when considering it if it becomes possible. [see also, N. Agar (2012) On the irrationality of mind uploading: a reply to N. Levy. AI and Society, 27/4, 431-436].

J. Baggini (2012) The Ego Trick: What Does it Mean to Be you. Granta Books. Anything by Baggini is worth reading. This book is an overview of various views of the self and personal identity. The author's sympathies lie with a psychological/mental view of the self and personal identity. Many of the social aspects discussed in the book are relevant to the future possibility of mind-uploading. Very readable.

B. Bradley, F. Feldman & J. Johansson (Ed) (2012) The Oxford Handbook of Philosophy of Death. OUP. Since avoiding death is one reason that many might consider the possibility of mind uploading, it is important to consider what makes death so bad. Chapters in the book cover discussion on the nature of death and persons as well as what makes death so bad.

J. Lyden (2009) Author sums up [famous] philosophers' thoughts on death (interview with Simon Critchley). NPR, Feb 7, <https://www.npr.org/2009/02/07/100384681/author-sums-up-philosophers-thoughts-on-death>. Critchley describes the thoughts of several famous philosophers on death, including Zhuang Zhou, A. J. Ayer and Ludwig Wittgenstein.

R.J. Bernier (2012) The Existence of Mind: In Defence of Mind-Body Dualism. A V Akademikerverlag. A spirited defense of a non-material theory of the mind, distinct from the brain. The book evaluates critically many of the arguments against substance dualism and considers dualism to be more compatible with science and Christian theology. While dualism, in its variety of forms, is not mainstream in philosophy, there seems to be a reconsideration of its validity with what some consider the failings of naturalistic science. See also, Swinburne (2019), Lavazza & Robinson (2016), and Loose, Menuge & Moreland (2018).

G. Prisco (2012) Why we should send uploaded astronauts on interstellar missions. Gizmodo.Com <https://io9.gizmodo.com/why-we-should-send-uploaded-astronauts-on-interstellar-5968280> Interesting thoughts on future space travel. Given that much future interstellar travel may take many years, one solution would be to upload the brains of astronauts (making an e-crew) so that they be behave appropriately in space. Such mind uploads would have the advantages of not requiring "air, water, food, medical care or radiation shielding, and may be able to withstand extreme acceleration. So, the size and weight of the starship will be dramatically reduced." Further, "boredom and isolation would not be a problem". Other possibilities are also considered such as AI's.

J. Corabi & S. Schneider (2012) Metaphysics of Uploading. Journal of Consciousness Studies 19/7-8), 26-44. A thoughtful article that argues that the philosophical case for uploading your personal mind is weak. Personal survival after uploading is unlikely whether the uploading is instantaneous or gradual. (See also S. Schneider (2019) Artificial You. Princeton University Press, Chapters 5 and 6 and pp. 126-134).

M. Hauskeller (2012) 'My brain, my mind, and I: Some philosophical assumptions of mind-uploading.' International Journal of Machine Consciousness, 4/1, June. Argues that we have little reason to suppose that an exact working copy of the brain will produce similar phenomenological effects (if any at all), and we have even less reason to believe that the uploaded mind, even if similar, will be the same self as the one on whose brain it was modeled.

V. Woollaston (2013) “We’ll be uploading our entire minds to computers by 2045 and our bodies will be replaced by machines within 90 years, Google expert claims.” Mail On line, <http://www.dailymail.co.uk/sciencetech/article-2344398/Google-futurist-claims-uploading-entire-MINDS-computers-2045-bodies-replaced-machines-90-years.html> A very short summary of the view of Google’s director of engineering (Ray Kurzweil), who contends that in around three decades we will likely be able to upload our minds to computers and ‘become digitally immortal’ (an event he calls the Singularity’).

A.Regalado (2013) The brain is not computable. MIT Technology Review, Feb. <https://www.technologyreview.com/2013/02/18/180012/the-brain-is-not-computable/> The author contends that talk of computers replicating the human brain is a “bunch of hot air.” We are not machines. It is more likely that we will augment ourselves with computer implants that replicate brains than upload our minds.

Y.T. John (2013) ‘Will we ever be able to upload our minds to a computer?’ Neurologism. <https://www.quora.com/What-percent-chance-is-there-that-whole-brain-emulation-or-mind-uploading-to-a-neural-prosthetic-will-be-feasible-by-2048/answer/Yohan-John> A readable case against the possibility of mind-uploading. The author contends the philosophical difficulties of mind-uploading alone (apart from scientific difficulties) should make us skeptical. After all, we don’t even know what a mind is, how unified our minds are, and how continuous they are over time. Nor do we know how brain processes are responsible for our subjective experiences. Further, the above problems with mind-unity and digitally simulating continuity make all talk of uploading a complete mind unclear. Finally, ‘Who on earth would be willing to test out the beta versions of these techniques? [And] how would we know [whether or not] the uploading was successful?’

J. Danaher (2013) Can we upload our minds? Hauskellar on mind uploading (part one). Philosophical Disquisitions, (blog), <https://philosophicaldisquisitions.blogspot.com/2013/06/can-we-upload-our-minds-hauskellar-on.html>. Philosophical clarification of what we mean by mind uploading, types of mind uploading, and the assumptions underlying its claims. Part two can be found at https://philosophicaldisquisitions.blogspot.com/2013/06/can-we-upload-our-minds-hauskellar-on_17.html. See also, <https://philosophicaldisquisitions.blogspot.com/2014/07/the-philosophy-of-mind-uploading-series.html>

A. Piore (2013) When brain damage unlocks the genius within. Popular Science, Feb. <https://www.popsci.com/science/article/2013-02/when-brain-damage-unlocks-genius-within/> An article on what is sometimes called “acquired savant syndrome” where individuals sometimes acquire new abilities, often quite extraordinary, after brain damage.

G. Dvorsky (2013) You might never upload your brain to a computer’ io9:we come from the future. <http://io9.gizmodo.com/you-ll-probably-never-upload-your-mind-into-a-computer-474941498> While Dvorsky contends many of the arguments against mind-uploading are based on present-day science which is likely to be transcended, he says there are more serious problems with the whole notion of mind-uploading: brain functions are not computable; consciousness remains a serious problem—not only do we not know how consciousness is generated by the

brain and neither do we know how the continuity of consciousness is maintained over time; duplicating how a mind puts together cognitive processes digitally is problematic, if Panpsychism or dualism are true then talk of mind/brain uploading misses everything; uploaded minds would be vulnerable to hacking and other abuses; and lastly, there are all the associated ethical issues surrounding mind-uploading.

A. Leckie (novels, 2013-2015). *Ancillary trilogy*. Another entertaining science-fiction trilogy with nice ideas about AI and collective consciousness.

J. Danaher (2014) The philosophy of mind-uploading (series index). Philosophical Disquisitions, <https://philosophicaldisquisitions.blogspot.com/2014/07/the-philosophy-of-mind-uploading-series.html>. An excellent set of papers on the topic of mind-uploading. Covers a wide range of issues.

J. Tabery (2014) Beyond Versus: The Struggle to Understand the Interaction of Nature and Nurture. Cambridge, MA, MIT Press. Most students in the social and biological sciences are aware that talk of nature (genes) and nurture (developmental environments) is not a simple dichotomy but our actions and characteristics arise from an interaction between the two. So why then do people still talk about the two? Tabery says the debate persists because of differing views about the notion of 'interaction' and how it should best be investigated (think of ongoing disagreements over controversies over race and IQ and eugenics). The issue is relevant to mind uploading in the sense that how one views interaction might influence who might be considered eligible for uploading, and the notion that interaction would take a different form when considering what is uploaded and how it develops in virtual environments after uploading.

R. Blackford & D. Broderick (eds.) (2014) Intelligence Unbound: The Future of Uploaded and Machine Minds, Wiley Blackwell. A book that more philosophically educated readers will appreciate, the book provides reading by a variety of scholars that cover both sides of the debate. Some of the most relevant articles are described below.

D. J. Chalmers (2014) Uploading: A philosophical analysis. In Blackford and Broderick (2014). Pp 102-118. Distinguishes between three forms of uploading (destructive, gradual, and non-destructive) and their feasibility. Leans toward the plausibility of mind uploading, assuming the available future technology. See also, <https://hplusmagazine.com/2014/09/23/chalmers-vs-pigliucci-philosophy-mind-uploading/> and https://philosophicaldisquisitions.blogspot.com/2014/09/chalmers-vs-pigliucci-on-philosophy-of_19.html

M. More (2014) The enhanced carnality of post-biological life. In Blackford and Broderick (2014), pp 222-230. Future possibilities such as mind uploading are likely desired because of the opportunity to have new and richer experiences and self-understanding.

N. Olson (2014) The values and directions of uploaded minds. In Blackford and Broderick (2014), pp. 212-221. Successful mind uploading will user in a transformation in values but some human values may remain sacrosanct.

I. Thomson & J. Bodington (2014) Against immortality. In Blackford and Broderick (2014), pp. 248-262. Endless life, however conceived, would not be preferable to a life where death is present.

J. Strout (2014) Practical implications of mind uploading. In Blackford and Broderick (2014), pp. 201-211. Strout contends mind uploading will not change our humanity, we will retain our identity with increased superpowers (able to travel as fast as light and explore the solar system). Our basic emotions will remain unaltered.

R. Hanson (2014) What will it be like to be an emulation? In Blackford and Broderick (2014), pp. 298-309. Mind uploading will allow emulated (Ems, copied humans) to live in their cities separate from the rest of humanity. However, problems will exist in such Em cities because inequality will be the result of differing skills. The result will be more identity with teams or clans rather than a focus on individual identities. See also, Hanson (2016).

M. Pigliucci (2014) Mind uploading: a philosophical analysis. In Blackford and Broderick (2014), pp. 119-130. A useful overview of the case against mind uploading. The hypothesis of mind uploading doesn't take seriously the biological nature of consciousness and the difficulties involved in transferring consciousness to another medium.

Wiley, K (2014) A Taxonomy and Metaphysics of Mind-Uploading. Humanity + Press and Alautun Press. See also, <https://www.interaliamag.org/interviews/keith-wiley-mind-uploading/> (2015 interview). This book describes several different hypothetical ways mind uploading might happen. A very thoughtful over of possibilities. The second part of the book provides the author's views on the mind and personal identity.

L. Shapiro (Ed) (2014) The Routledge Handbook of Embodied Cognition. Routledge. A very informative overview of the embodied cognition theory in contemporary philosophy of mind. Includes thirty-five chapters that deal with historical antecedents of the view along with contemporary issues such as language, reasoning, social and moral thinking, group cognition, memory, attention, and the future of the embodied mind thesis.

J. Glover (2014) Alien Landscapes? Interpreting Disordered Minds. Harvard University Press. Glover contends that we have to try and avoid the often harmful, conclusion that people with forms of psychiatric disorders are alien to us because of the strangeness of their actions and words. He contends such individuals are also people who lack a sense of responsibility and control over the world. The intensity of their sensory experiences and thoughts seem to come from outside. Helping many such individuals requires restoring their feelings of control and responsibility. It is worth considering the possibility of those uploaded (assuming they retain many human thoughts and identity) might have difficulty with control over their virtual environment (assuming they are provided with a pre-given environment). Most advocates seem to assume that uploaded minds would live in a world without psychological problems or difficulties---a utopian view. (The writings of Robin Hanson are an exception). On another level, would we restrict access to mind-uploading only to those considered 'normal' or those that satisfy pre-determined criteria?

M. Prigg (2014) ‘The scientist planning to upload his mind to a computer.’ MailOnline, Dec 14, <http://www.dailymail.co.uk/sciencetech/article-2879803/The-scientists-planning-upload-brain-COMPUTER-Research-allow-inhabit-virtual-worlds-live-forever.html> A San Francisco inventor, Randel Koene, contends that we may likely be able to upload our mind to another substance by reducing its activity to computation and copying those computations in code to a computer. Koene, like most advocates, holds a functionalist view of the mind where the mind’s activities are considered functions and if the same functions can be duplicated in another substance, the two different substances can be considered operating in the same way (in regard to those functions).

M.A. O’Malley (2014) Philosophy of Microbiology. Cambridge University Press. Microbes have an essential role to play in a variety of systems on earth, including those of multicellular organisms. Microbes play a role in our environment through the atmosphere, the evolution of life, co-evolution, cooperation, and so on. An informative discussion of microbe classification and mega-genomics. A world without microbes---a virtual world-- would change over time in ways very different than beings that have existed and exist on earth.

E Arnau, A Estany, R González del Solar & T Sturm (2014) ‘The extended cognition thesis: Its significance for the philosophy of (cognitive) science’. Philosophical Psychology, 27:1, 1-18, DOI: 10.1080/09515089.2013.836081 The extended mind thesis is not compatible with the computational view of mind.

R. A. Wilson (2014) Ten questions concerning extended cognition. Philosophical Psychology, 27/1, 19-33. A wide-ranging discussion of several criticisms and topics related to the extended mind thesis. A useful read for academics interested in extended cognition.

A. Johnson (2015) Fortune Smiles. Random House. A wonderfully imaginative set of science-fiction short stories that explore all sorts of philosophical themes. The story ‘Nirvana’ is about a computer engineer that brings forth a holographic resurrection of an assassinated American president. Would the resurrected president be considered the real president or a copy? This issue is also considered in Willis (2015).

J. Adler (2015) ‘The quest to upload your mind into the digital space’ Smithsonian Magazine, May. <http://www.smithsonianmag.com/innovation/quest-upload-mind-into-digital-space-180954946/?no-ist> An overview of the goals of neuroscientist Ken Hayworth and Randal Koene, who hope to contribute to a future where “human and machine consciousness will merge, transcending biological limits of time, space and memory. “This new substrate won’t be dependent on an oxygen atmosphere,” says Randal Koene, who works on the same problem at his organization, *Carboncopies.org*. “It can go on a journey of 1,000 years, it can process more information at a higher speed, it can see in the X-ray spectrum if we build it that way.” Both adopt a functionalist view of the mind. The article claims two assumptions underlie their claims. First, the mind is the brain and a functionalist/computable view of the mind is correct, and secondly, that future technology will be capable of providing a necessary 3-D model of the brain.

K. Wiley & R.A. Koene (2015) The fallacy of favoring gradual replacement mind uploading over scan-and-copy. Institute for Ethics and Emerging Technologies.
<https://ieet.org/index.php/IEET2/more/wiley20150502>

Two leading advocates of mind uploading argue that both gradual-in-place uploading and destructive scan-and-copy types of mind uploading, contrary to some critics, will preserve individual personal identity.

M. Smith (2015) David Eagleman: can a computer simulate a brain? SelfAware Patterns, Nov 13, <https://selfawarepatterns.com/2015/11/13/david-eagleman-can-a-computer-simulate-a-brain/>
 A very short article pointing out neuroscientist David Eagleman's point that mind uploading has application to future space exploration.

O. Willis (2015) "Will it be possible to upload your mind?" The Philosopher's Zone, Aug 14. A philosophical discussion focused on whether the 'uploaded mind' would be your real mind or a duplicate/copy. Philosopher Max Cappuccio and computer scientist Luc Steele contend that, apart from the immense technological challenges, mind uploading will not preserve the identity of the person being uploaded (unless the mind is non-material). We need physical properties to be retained for our personality identity (ourselves) to be retained. Experiments with robots support the necessity of embodiment.

A. Roskies (2015) 'Do brain interventions to treat disease change the essence of who we are?' The Conversation. <https://theconversation.com/do-brain-interventions-to-treat-disease-change-the-essence-of-who-we-are-45943> A thought-provoking article on the unanticipated effects of brain implants and drugs on moods, desires, and emotions of recipients. With more powerful brain inventions coming in the near future, issues of responsibility and personal identity will be raised alongside them. For those considering the future possibility of altering aspects of our brains before or after uploading these issues will be very relevant.

A. Salis (2015) Health Check: the science of Hangry, or why some people get grumpy when they're hungry. The Conversation, July 19. An interesting overview of how interactions between bodily nutrient and hormone levels can influence not only brain functions but mental states such as anger. If mental states such as concentration along with moods and emotional states such as anger are cut with brain uploads, how much of our humanity will be lost?

C. Friedersdorf (2015) 'Immortal but damned to hell on earth' The Atlantic, May 28, <https://www.theatlantic.com/technology/archive/2015/05/immortal-but-damned-to-hell-on-earth/394160/> How would we punish people who have uploaded their minds for crimes committed while embodied? Assuming being uploaded would render a long lifespan (barring destruction of supporting computers) how would we factor this into their punishment? Our whole justice system would need to be re-thought. Could a suicide switch be built into the system? Provocative article.

A.Kind (2015) Persons and Personal Identity. Polity Press. A clearly written overview of the mainstream theories of personal identity---what makes you the numerically same person over time? Considers proposed theories through questions such as What characteristics (properties) make a person? What makes us the same person over time? And What makes us the special,

unique person we are? No (present-day) theory seems to capture all we would wish from it. See also, Johansson (2019).

BBC (2016) “The immortalist: uploading the mind to a computer.” BBC Magazine, March 14. A Russian internet millionaire’s supportive efforts to upload a human brain to a computer. A short piece on Russian multi-millionaire Omitry Itskov’s ambition to live longer by transferring his personality into a completely new body. This theoretical possibility is evaluated by input from both those who consider it sometime likely and those who consider it remotely possible, but unlikely.

M. Graziano (2016) ‘Why you should believe in the digital afterlife.’ The Atlantic, July 14. <http://www.theatlantic.com/science/archive/2016/07/what-a-digital-afterlife-would-be-like/491105/> Graziano, a neuroscientist contends that in the future we will be able to upload our minds to the web:

Imagine scanning your Grandma’s brain in sufficient detail to build a mental duplicate. When she passes away, the duplicate is turned on and lives in a simulated video-game universe, a digital Elysium complete with Bingo, TV soaps, and knitting needles to keep the simulacrum happy. You could talk to her by phone just like always. She could join Christmas dinner by Skype. E-Granny would think of herself as the same person that she always was, with the same memories and personality—the same *consciousness*—transferred to a well regulated nursing home and able to offer her wisdom to her offspring forever after. Think about the quantum leap that might occur if instead of preserving words and pictures, we could preserve people’s actual minds for future generations. We could accumulate skill and wisdom like never before. Imagine a future in which your biological life is more like a larval stage. You grow up, learn skills and good judgment along the way, and then are inducted into an indefinite digital existence where you contribute to stability and knowledge.

Future copies of our brains will retain all our quirks. Describes some hurdles to uploading and how they might be circumvented.

K. Kelly (2016) The Inevitable: Understanding the 12 Technological Forces that Will Shape Our Future. Viking. This book describes some of the underlying intersecting causes of technology that will extend into the future. The author contends these forces will enhance our humanity and future. Some of these forces are worldwide sharing of information, augmenting of intelligence, Interacting with our devices in augmented and virtual realities. We will interact with our devices and with others in realistic virtual and augmented worlds. We will be transparent to ourselves and other people.

D.E Bailey (2016) ‘What you see is not always what you get: how virtual reality can manipulate our minds’. The Conversation, August. <http://theconversation.com/what-you-see-is-not-always-what-you-get-how-virtual-reality-can-manipulate-our-minds-> Virtual reality technologies are not an unvarnished good. Immersive technologies can subtly manipulate our perceptions without us knowing it. Provides present-day examples of such manipulation. Something to keep in mind with talk of uploading minds to virtual reality.

F. Minerva & A. Rorheim (2016) What are the ethical consequences of immortality technology? Aeon magazine, <https://aeon.co/ideas/what-are-the-ethical-consequences-of-immortality-technology> .This article points out that while mind uploading would offer something close to true

immortality, it would introduce several very new ethical problems: for example, the moral status of such minds, the kinds of risks one would consider in doing so, and the problem of personal identity if many copies were made of people.

D. Purver & B. Hale (2016) ‘Non-Identity for Non-Humans’ Ethical Theory and Moral Practice, 19, 1165-1185. The authors contend that we should consider arguments about the effects of environmental changes on living creatures in terms of harm to species or ecosystems rather than singling out effects individuals. If most or a large segment of the population is eventually uploaded (an unlikely possibility), it will be important to consider the environments of creatures left behind.

K. Hayworth (2016) ‘Mind uploading: an argument for the scientific and technical plausibility of preserving thoughts indefinitely’. The Skeptic, 21/2, 15-21. The author, a neuroscientist, and futurist contends that mind uploading via the brain is “technically achievable and potentially desirable” p.15. This might be achieved via a preservation technique whereby a brain may be stored for centuries by cryogenic storage and later uploaded. Contends the requisite technology maybe centuries away and that it is only a promising possibility (see also Curello, 2016).

R. Hanson (2016) The Age of Em: Work, Love and Life When Robots Rule the World. OUP. What makes this book stand out is that the author provides a detailed possible future where brain emulations (‘Ems’) who retain many human characteristics of the particular human brain copied. As Hanson says, “A good enough em has close to the same overall input-output signal behavior as the original human. One might talk to it, and convince it to do useful jobs.” (p. 6). Unlike other proponents of brain emulation, Hanson puts forward arguments for his views. The em world will include much of what human life is like in some ways (e.g marriage between ems, jobs for ems). Some social issues will remain such as inequalities, nepotism, wealth, and poverty. I learned a lot more about several topics reading this book. Worth reflecting on. See also, www.overcomingbias.com/2019/01/how-does-brain-code-differ.html and www.overcomingbias.com/2019/07/why-age-of-em-will-happen.html

P. Kassan (2016) Uploading your mind does not compute. The Skeptic, 21/2, 22-25. Contends there are several good reasons for thinking mind uploading is ‘away with the fairies’ thinking. The mind is not like a computer, the complexity of modeling the brain is prohibitive and the time and money required would be astounding, and it wouldn’t be you but a copy and likely not conscious.

R.L. Kuhn (2016) Virtual immortality: Why the mind-body problem is still a problem. The Skeptic, 21/2, 26-34. Brain complexity and the requirement of the body for normal thinking are serious obstacles to mind uploading. Kuhn considers consciousness the main problem confronting theories of mind uploading. The article is a readable overview of theories of mind-brain and theories of consciousness.

H. Rosner (2016) ‘Would you live forever (if you could)?’ Scientific American, Sept. The author contends that uploading your brain into a computer is probably impossible. But for the sake of argument: What would you do if it were possible?

J. Condliffe (2016) 'Virtual reality with feeling'. MIT Technology Review, Sept 8. Describes several companies attempts to increase the realism of virtual realities by introducing realistic movements and observable emotions and feelings into those we interact with in virtual reality. This would be important if we could upload our minds to virtual reality, interacting with stoic others would not be a plus for most of us.

A. Weinstein (2016) Children of the New World. Picador. An enjoyable collection of short fantasy stories about the relatively near future where technology rules, but human nature stays the same as it is now.

J. Danaher (2016) Human enhancement, social solidarity and the distribution of responsibility. Ethical Theory and Moral Practice, 19, 359-378. The project to enhance humans involves many potential personal and social benefits. However, we need to consider objections to the project such as the possibility that enhancement might lead to an erosion of social responsibility for failures along with unfairness that may result. It is unclear that such problems might arise in an uploaded reality, although some advocates consider it likely (e.g Hanson, 2016, pp. 243-256).

G A. Hoffman (2016) 'Out of our skulls: How the extended mind thesis can extend psychiatry.' Philosophical Psychology, 29:8, 1160-1174, DOI: 10.1080/09515089.2016.1236369 . This article provides a nice overview of the extended mind thesis and its relationship to character traits, emotions, beliefs, memories, and cognitive functions and evaluates several main objections to the view. The author considers the thesis has useful practical implications for psychiatric diagnosis and treatment.

A. Paliwal (2016) 'Beyond sexual orientation' Nautilus, Oct. <http://nautil.us/issue/41/selection/beyond-sexual-orientation> While it is not clear whether sexual orientation will be available in an uploaded form (without physical bodies with working reproductive equipment or desire), it is useful to keep in mind that sexual orientation is not exclusively male and female but might exist on a continuum.

A. Dalela (2016) 'Computers and the mind: what's the difference?' Oct. <http://www.ashishdalela.com/2016/05/20/computers-and-the-mind/> A lengthy post that offers a critique of the notion that the mind is some kind of computer. The main obstacle to viewing them as the same is that choice and free will cannot be converted to the kind of definite states required for viewing them in the same way.

D. Wescott (2016) 'Is this economist too far ahead of his time?' The Chronicle of Higher Education, Oct 16. A very readable overview of the views of American economist Robin Hanson on a variety of topics, including his imaginative speculations on what a society based on uploaded minds (he calls 'ems') might look like. See also Hanson (2016).

Penrose, W.D (2016) Postcolonial Amazons: Female masculinity and courage in ancient Greek and Sanskrit Literature. Oxford University Press. A fascinating book that describes how powerful women have been maligned across history. Covers ancient Greek women (Greek amazons), Cleopatra women in Alexander the Great's court, and women as bodyguards in

ancient India. A useful guide to what has stayed the same over time---attacks on women---think of Clinton in the USA and May in Britain. Would misogyny disappear in a virtual ‘lived-in’ world? Would human uploaded minds be ‘neutral’ in regards to sexual characteristics?

S. Leach & J. Tartaglia (Eds.) (2016) Consciousness and the great philosophers: what would they have said about our mind-body problem? Routledge. The topic of consciousness is central to many of the debates over the plausibility of mind uploading and what might or might not be uploaded. This book provides a background to how many of the philosophers of the past might respond to the contemporary issues in the philosophy of consciousness: Plato, Aristotle, Avicenna, Descartes, Locke Spinoza, Hume, Kant, Nietzsche, Russell, Wittgenstein, Heidegger, Derrida, Rorty, and so on.

A. Lavazza & H. Robinson (Eds) (2016) Contemporary Dualism: A Defence. Routledge. While materialistic views dominate in the West on theories of mind, the perceived shortcomings of such theories have increased the number of those who contend some kind of dualistic theory is best. This book consists of a defense of substance dualism along with those who provide alternative theories of dualism. The first part of the book includes critiques of materialistic views of the mind. See also, R. Marshall (2020) Interview with John Cottingham: reflections on Descartes, reflections on religion. 3.16, June, <https://316am.site123.me/articles/reflections-on-descartes-reflections-on-religion?c=end-times-series>. See also, Bernier (2012), Swinburne (2019).

G. B. Cunningham (2016) ‘Obama experienced subtle racism, but sexism toward Clinton was right out there’ The Conversation, Nov 14, <http://theconversation.com/obama-experienced-subtle-racism-but-sexism-toward-clinton-was-right-out-there-68201>? An article pertinent to those who contend mind uploading will preserve our minds, including prejudices. While explicit forms of racism and sexism are largely discouraged in society, such attitudes remain in implicit forms. How would we deal with such prejudices in uploaded realities?

K. Timpe, M. Griffith, & N. Levy, eds. (2016) The Routledge Companion to Free Will. Routledge. Talk of free-will arises whether we are describing embodied human beings or uploaded minds in virtual bodies. This volume introduces the contemporary debate to readers covering recent theological, philosophical, and scientific contributions to the reader. Debates, pro, and con, on popular positions such as compatibilism and various conceptions of free will are well covered. The book includes what is usually missing from such books, namely the inclusion of non-Western perspectives (Indian and Chinese) on free-will.

M. A. Cerullo (2016) The ethics of exponential life extension through brain preservation. Journal of Evolution & Technology, 26, 1, 94-105. Provides a history of thought on brain preservation and argues that it is ethical for people to choose to have their brains chemically preserved if they wish since the potential benefits to society will outweigh the potential harms.

C. Linssen & P. Lemmens (2016) Embodiment in whole-brain emulation and its implications for death anxiety. Journal of Evolution & Technology, 26, 2, 1-15. Death anxiety is complex, multifaceted anxiety and while brain uploading may increase our lifespans, the possibility of hardware or software problems will reduce but not do away with death anxiety.

A. Shachar (Kulchitskaya) (2016) Mind-uploading; the hard problem of Transhumanism. Presentation at 19th Annual University of Kentucky Graduate Philosophy Conference. Saturday, March 5. http://www.academia.edu/24268306/Mind_Uploading_the_hard_Problem_of_Transhumanism. A well-written overview of various problems that arise in considerations of mind-uploading. A detailed account of some of the neurological issues that arise that are often overlooked in the literature. Worth reading.

G. Piccinini (2016) 'The Myth of Mind Uploading'. Presentation at Minds, Selves and 21st Century Technology in Lisbon, June 23/24. Piccinini contends "mind uploading presupposes three strong assumptions: (1) that we will soon have the ability to construct a realistic computational simulation of an entire human brain; (2) that a realistic computational simulation of an entire human brain would have a conscious mind like the one possessed by the brain being simulated (computational functionalism); (3) that the mind putatively created by building a realistic computational simulation of an entire human brain is numerically identical to the mind possessed by the brain being simulated." Piccinini argues that each of the first two assumptions are implausible and the third one is false.

IEEE (2017) 'Henry Markram talks brain simulation' IEEE Spectrum, June 21. <http://spectrum.ieee.org/robotics/artificial-intelligence/henry-markram-talks-brain-simulation> Markham is the founder of the Human Brain Project. A readable overview describing future possibilities regarding artificial intelligence, which may include human desires and emotions.

C. B. Miller (2017) The Character Gap: How Good Are We?, Oxford University Press. Most of us and neither saints nor bad much of the time, we are (as David Hume pointed out) a mixture of the good and bad. We follow some virtues more than others, and we are often inconsistent across situations. Character is an important part of who we are. While character would seem to be important in retaining our identity with uploading, little seems to have addressed the topic in the mind uploading literature. What would wrongdoing consist of in a known virtual world that is relatively endless?

J. Danaher & S. Bamford (2017) Transfer of personality to synthetic human ('mind uploading') and the social construction of identity. Journal of Consciousness Studies, 24, 11/12, 6-30. A problem that needs to be addressed by those who believe their personalities will be preserved through mind uploading need to keep in mind that much of our personality is socially constructed and requires a network of others.

J A Skorburg (2017) 'Lessons and new directions for extended cognition from social and personality psychology.' Philosophical Psychology, DOI: 10.1080/09515089.2017.1282606 The person/character—situation debate asks whether the individual's character or the situation influence our behavior more. Skorburg contends this debate is best resolved within an interactionist extended cognition position. This interactionist view opens up new areas for empirical exploration.

S. Gallagher (2017) Enactivist Interventions: Rethinking the Mind, Oxford University Press. A wide-ranging overview of the enactivist view in philosophy of mind---the view that the body

plays an essential role in activities of the mind. Callagher ties the view in with other contemporary views such as pragmatism and the views of Daniel Dennett. Applications are made to a number of philosophical issues. Not for beginners in philosophy.

J. Gackenbach & J. Brown (Ed.) (2017) Boundaries of self and reality. Academic Press. This book has chapters describing the influence of technology on our identities, self, and relationships with others. Several of the chapters (8, 12, 13, and 15) are very relevant to those interested in the topic of virtual reality and its impact on people.

P. J. Bowler (2017) A History of the Future: Prophets of Progress from HG Wells to Isaac Asimov. Cambridge University Press. A cautionary history of several best-known views of the future by futurists such as H. G. Wells, Huxley, and Verne along with other figures. The emphasis is on how science-fiction writers saw the future. The gap between the less optimistic literary figures---who emphasize or human proclivity for war and destruction-- and more optimistic predictions by scientists and engineers----who emphasize the newest technologies such as electricity leading to utopia--- is noteworthy. They missed a lot----the internet, the personal computer, Google, and Amazon. The same caution is needed for future speculations.

O. Deroy (2017) (ed.), Sensory Blending: On Synaesthesia and Related Phenomena, Oxford University Press. We usually think of our senses as separate, but with those individuals who have synaesthesia, there is a rare overlapping of sensory experiences at the same time, for example, hearing colors, tasting sounds, and so on. Presumably, such an ability would be uploaded on popular views of mind uploading, or would only some variations of the ability be uploaded. For example, if one's taste is absent, that variation would not be uploaded. This book provides a series of chapters utilizing scientific research along with philosophical reflection on the topic. Worth reading along with R. Cytowic (2003) The man who tasted shapes. MIT press.

F. D'Acquisto (2017) Affective immunology: where emotions and the immune system converge. Dialogues in Clinical Neuroscience, 19, 9-19. While the relationship between gut bacteria and states of our mind has been mentioned earlier, another area worth exploring is that between the immune system and our emotional states. Both these areas are of interest because they would not be components of any mind upload and would thereby contribute to another gap between embodied human beings and what was uploaded.

D. Neiva & S.S. Gouveia (2017) The problem of consciousness on the uploading hypothesis. In M. Curado and S.S. Gouveia (ed). Philosophy of Mind: Contemporary Perspectives. Cambridge Scholars Publishing. An overview of the computational/functionalist theory of mind along with consideration of the philosophical zombie and Chinese room arguments against it. The author contends that these arguments require updating of the computational theory along the lines of utilizing programmable evolutionary algorithms. The resulting theory will increase the plausibility of mind uploading. A useful overview of the computational theory and the main objections to it.

Mark Silcox, ed. (2017) Experience Machines: The Philosophy of Virtual Worlds. Rowman & Littlefield. While the chapters in the book do not directly consider mind-uploading, the book covers a modern rethinking of Nozick's 1974 thought experiment ---would you plug yourself into a machine that would allow you to have any experience you desired? This book is an

essential read for those interested in virtual reality and those who would like to upload their minds (assuming it becomes possible) into virtual reality. Some of the relevant chapters are briefly described below. See also, M. Silcox (2019) The experience machine, simulation, and videogames. <https://www.youtube.com/watch?v=AWP4mHAX9UA>

D. Pietrucha (2017) Intuition and imaginative failure. In Mark Silcox, ed. Experience Machines: The Philosophy of Virtual Worlds. Rowman & Littlefield. Chapter 2, 33-42. Pietrucha contends that it would be entirely rational to plug into a Nozick experience machine if one's life circumstances were unbearable in some way. However, it might also be reasonable to plug into such a machine for most of us, even with our relatively content lives since virtual reality could increase our well-being, and only a failure of imagination on our part would prevent us from so doing. Does this apply also to uploading our minds into virtual reality? (it might depend on the characteristics of the virtual reality).

J. McBain (2017) Epistemic lives and knowing in virtual worlds. Mark Silcox, ed. Experience Machines: The Philosophy of Virtual Worlds. Rowman & Littlefield. Chapter 10, 155-168. Could you have knowledge in a virtual world? Many would say No since the beliefs you have in virtual reality would not reflect reality (physical embodied reality one lives in on earth). For example, Graziano (2019) speculates that you upload your mind to a facsimile of New York, but "Here, you can't be injured because your virtual body can't break. You stop at a cafe and sip a latte. It doesn't taste right. It doesn't feel like anything is going into your stomach. And nothing is, because it isn't real food and you don't have a stomach. It's all a simulation." Would such beliefs constitute knowledge? McBain contends the information you obtain in the simulated reality would play a similar role to that acquired in the real world and therefore could constitute knowledge.

M. LaBossiere (2017) Digital tears fell from her virtual eyes: on the ethics of virtual beings. Mark Silcox, ed. Experience Machines: The Philosophy of Virtual Worlds. Rowman & Littlefield. Chapter 11, 183-202. LaBossiere considers how we should treat virtual beings in a virtual world. He contends that we should treat them (along Kantian lines) that mistreatment of bots would negatively impact our selves morally. This would be relevant in a virtual reality of uploaded minds because it would seem feasible to generate new artificial beings that look and act like human beings by combining elements of real uploaded minds---creating new beings (especially if only a few can afford to be uploaded). See also McMillan and King (2017).

J. McMillan & M.King (2017) Why be moral in a virtual world? Journal of Practical Ethics, 5/2, 30-48. The authors argue that morality could exist and flourish in a virtual world. Veracity, promise-keeping, and trust will be important even in a virtual world.

B. Shea (2017) The problem of evil in virtual worlds. Mark Silcox, ed. Experience Machines: The Philosophy of Virtual Worlds. Rowman & Littlefield. Chapter 9, 137-154. Brendon contends that to have a meaningful virtual world we need some moral or natural evil that results in the suffering of some kind that we might be able to ameliorate. This is an interesting issue, assuming the standard view of mind-uploading into a virtual world that contains uploaded minds that retain all their particular personality and emotions. It would be of interest to consider what

kinds of potential suffering should be built-in by designers of a virtual reality that would accept uploaded minds and provide them with virtual bodies of some kind.

G. Tavinor (2017) Welcome to the achievement machine: Or how to value and enjoy pointless things.' Experience Machines: The Philosophy of Virtual Worlds. Rowman & Littlefield. Ch. 7, pp. 99-112. Tavinor contends that games video games can provide meaning to players by letting players achieve difficult goals of their choosing. We might think that this might also be the case in a virtual world for uploaded minds as long as such minds can follow pursuits with achievable goals that are challenging. This may not be easy to accomplish if such minds are immortal or nearly so.

J. McMillan & M. King (2017) Why be moral in a virtual world? Journal of Practical Ethics, 5/2, 30-48. These authors take a different stance from LaBossiere regarding how we should act toward artificial beings in virtual reality. Likely a virtual world would include bots along with 'genuine' uploaded minds. Since **artificial** bots are very different from real-life people (they have no feelings and cannot act) we have no moral obligations towards them. On the other hand, in an uploaded world which retains individual minds (with the individual's personality and emotions) we would presumably have moral obligations to them, and they would with each other. It is unclear what obligations we would have with each other.

C. Delistraty (2017) You can't upload your 'self' into a virtual world: Thomas Metzinger on the nature of subjective experience. Nautilus, April 27, <http://nautil.us/issue/47/consciousness/you-cant-upload-your-self-into-virtual-reality>
Thoughtful speculations on the self and avatars. Holds the view that the human self is an evolutionary mechanism for defending the integrity of the organisms. He is skeptical of mind uploading the self because it is tied in with our biological bodies.

M. Gabriel (2017) I Am Not a Brain. Polity. Gabriel provides a sustained critique of the reductive position he calls neuro-centrism---the view that the mind is the brain or found in the brain. His view is that our mental states are those of a whole animal, not of parts such as the brain, rather parts of a whole network, which includes the internet, books, etc. Further, the consciousness we experience when we feel or have sensory experiences is not one thing, rather our experiences are correlated with different parts of the brain. The brain may be a necessary condition of having a mind, but it is not a sufficient condition. Interesting discussions of free-will, consciousness, and self.

L. MacFarquhar (2018) The Mind-Expanding Ideas of Andy Clark. The New Yorker, April 2. <https://www.newyorker.com/magazine/2018/04/02/the-mind-expanding-ideas-of-andy-clark> A very readable overview of Clark's view that the human mind is not tied to the brain alone, but merges with many aspects of the environment when they are used to help us think. Clark believes that one reason we are different from other animals is that we have this heightened ability to incorporate external devices as parts of our thinking. The article also ties Clark's externalist view to his theories on perception, the self, and ethics.

T. Goldschmidt and K. L. Pearce (ed.), (2018) Idealism: New Essays in Metaphysics, Oxford University Press. Idealism is a metaphysical view that emphasizes the mental over the physical

in defining reality. This book contains seventeen chapters by leading thinkers on the topic of idealism. As far as I know, idealism has not been explored in regards to mind uploading. The traditional approach has been tied largely to a naturalistic world view where the physical brain is the root of our self and is the only focus of uploading. If consciousness is the ground of the mind, rather than matter, what does this say about mind uploading?

B. Ehrenreich (2018) Natural Causes. Twelve Pub. The author contends that we have less control over our bodies than we believe. Indeed, our bodily defenses at times can be subverted or turned against us. She critically contests the so-called ‘wellness industry’ that can be associated with both modern medicine and a variety of dubious alternative medical beliefs---the barrage of screenings, and medical tests we are recommended to have as we get older, alongside the simplistic thinking of food fads and many panacea schemes that flood our advertisements in the media. Instead of looking for ways (largely without good evidence) of prolonging our lives, we might spend more time with friends and family and interests.

R. H. Epstein (2018) Aroused: The History of Hormones and How They Control Just About Everything. WW Norton. A useful overview of how much our hormones control aspects of our bodies and minds. Provides a historical overview of endocrinology along with stories of misunderstandings and false starts along the way. Of relevance to mind uploading in that we are reminded how much our body contributes to the kind of creature we are, and that without hormones and other aspects of our body chemistry, what would be uploaded by our brains, even if successful, would not be recognizable in many ways.

S. Paulson (2018) Yuval Noah Harari is worried about our souls. Nautilus, Dec. <http://nautil.us/issue/67/reboot/yuval-noah-harari-is-worried-about-our-souls> An interview with well-known Israeli historian Yuval Noah Harari on technological change and its possible implications of our lives and well-being. He is especially concerned about the fast pace of areas such as artificial intelligence and bioengineering where we can hack our genomes and include artificial parts into our bodies, creating new life forms. A special concern is that those in power will take advantage of such tools to manipulate and control the rest of us. Worth thinking about.

J.J. Loose, A.J. L. Menuge, & J.P. Moreland (Eds) (2018) The Blackwell Companion to Substance Dualism. Wiley-Blackwell. Substance dualism in its various forms is not a mainstream view in philosophy or academia but is gaining in popularity in some quarters. This book is a very good survey of present-day thinking on the topic. The book has three main parts. The first part describes various kinds of substance dualism such as emergent, Cartesian and Thomist versions. The second part of the book critically considers physicalist alternatives, and the third and last part of the book describes various (especially theological) implications of substance dualism. While mind-uploading is not considered, it would seem that some kind of substance dualism is true, the emphasis on **brain** uploading simulations would miss much of who we are. See also Lavazza and Robinson (2016), Swinburne, 2019.

R. J. Gennaro (Ed.) (2018) The Routledge Handbook of Consciousness. Routledge. Sometimes it seems that a new theory of consciousness comes out every few months. The topic is a central one in areas such as philosophy of psychology and artificial intelligence (can there be non-biological forms of consciousness?) The 34 chapters in this book are placed into three major parts: the first part provides a historical overview of the topic along with related topics such as

free-will and personal identity (does personal identity consist of your memories and character?). The second part elaborates various prominent theories of consciousness, including the popular topic of quantum theories of consciousness. The third part covers relevant related issues such as dreaming, animal consciousness, and possible robot consciousness. The topic is very relevant to mind-uploading: would a brain simulation preserve consciousness? Would a successful mind upload (that preserves consciousness of individuals) change over time in form from ‘living’ in a virtual world? Is a group consciousness possible with uploaded minds? ⁸²

A. Damasio (2018) The strange order of things: life, feeling, and the making of cultures. Pantheon. The author claims the body is intertwined with the mind and both are necessary to not only our thinking and everyday lives but our cultural innovations and progress as well. A thoughtful read.

M. Silcox (2018) A Defense of Simulated Experience: New Noble Lies. Routledge. A book that ranges over past and present philosophical views on simulating reality from Plato’s Cave to modern games and online worlds such as Second Life. The author points out that simulations are largely socially stigmatized. However, on the contrary, simulated worlds can enrich human experiences without real-life consequences. The book does not play down the possible negative effects of simulated worlds. The book would be worth reading for those concerned about the design and content of possible web ‘worlds’ where minds would be uploaded.

I. Rosenfield & E. Ziff (2018) “Epigenetics: The Evolution Revolution” The New York Times Review of Books, June 7, LXV, 10, 36-38. A readable overview of the field of epigenetics---the view that our biology can be altered by our lived environments and such changes can be passed onto future generations. In other words, the complexity of our lives is not related to our DNA alone but also through how the nature of our environment (e.g. its stresses) can influence how the genes are expressed (activated or deactivated).

K. Vold (2018) Are ‘you’ just inside your skin or is your smartphone part of you? AEON, Feb 26. A defense of the view that our brain does not capture all of who we are (the extended mind thesis). Introduces some possible implications regarding rights and freedoms along with our notions of law and after-death bequests.

D. Maclean (2018) Where is my mind? An interview with Andy Clark. Iai TV, Nov 9. <https://iai.tv/articles/where-is-my-mind-an-interview-with-andy-clark-auid-1162>
A wide-ranging interview with one of the original proponents of the extended mind thesis.

R. Epstein (2018) Aroused: The History of Hormones and How They Control Just About Everything. An extensive overview of the large role hormones contribute to our behaviors, emotions, etc. Very witty history of research into hormones, warts, and all.

⁸² A relevant topic not considered in any detail in this book involves the common phenomena we experience when we try to articulate our thoughts. This is considered in E. Alshanetsky (2019) Articulating a Thought, Oxford University Press.

D. Treffert (2018) Brain gain: a person can instantly bloom into a savant---and no one knows why. Scientific American (blog), July 25, <https://blogs.scientificamerican.com/observations/brain-gain-a-person-can-instantly-blossom-into-a-savant-and-no-one-knows-why/> A fascinating write-up on ‘sudden savant syndrome’ (sudden genius) where people with no prior interest or ability become suddenly gifted in an area such as music, art, or mathematics. This differs from autistic savant cases and new interests arising after brain injury. Underscores that we have much to learn about the brain and its functions and processes.

A. Curry (2018) Why living in a poor neighborhood can change your biology. Nautilus, June 14. Living in poor stressful neighborhoods may induce long term effects that re-wire the brain and make people more susceptible to various types of chronic illness. What consequences would this have for uploading minds if successfully copied?

M. Laakasuo, M. Drosinou, M. Koverola, A. Kunnari, J. Halonen, N. Lehton & J. Paloki (2018) ‘What makes people approve or condemn mind upload technology? Untangling the effects of sexual disgust, purity, and science fiction familiarity’ Palgrave Communications, 84, <https://www.nature.com/articles/s41599-018-0124-6>. A study worth reading not only for the findings on biological and cultural factors related to people’s views on mind uploading technology but also a useful historical overview of religious and cultural sanctions of analogous views regarding soul transfers. Very relevant.

Tallis, R (2018) ‘Technoimmortalization’ Philosophy Now, #128, Oct/Nov. A wide-ranging critique of mind uploading, especially the informational/computational view of the mind, which is a central plank in the possible technology.

B. Frischmann & E. Selinger (2018) Re-Engineering Humanity Cambridge University Press. A critical overview of the impact (largely hidden) threats that emerging technologies may have on our human values and human nature----especially through emerging cyborg technologies.

B. Nelson (2018) ‘You might be able to upload your mind into an android by 2050’ MNN.Com, July 25, <https://www.mnn.com/green-tech/research-innovations/stories/you-might-be-able-to-upload-your-mind-android-body-2050>. Some interesting speculations on what might happen if mind uploading becomes successful soon, but we remain living within a capitalistic society where corporations control where you might be uploaded and demand money for renting android bodies or cyberspace and possibly use slave androids. Worth reading.

C. Ram-Prasad (2018) Human Being, Bodily Being: Phenomenology from Classical India. Oxford University Press. While our Western languages such as English start with intuitions that we are both a mind and a body, different traditions have different intuitions. Ties in with thoughts about the ‘experienced body’ that can be related to many of the thoughts in Feminism and medical thinking.

G. Andrade (2018) Philosophical Difficulties of Mind Uploading as a Medical Technology APA NEWSLETTER | PHILOSOPHY AND MEDICINE, 18/114-20. <https://cdn.ymaws.com/www.apaonline.org/resource/collection/250A3149-F981-47C2-9379-618149806E75/MedicineV18n1.pdf>. A useful paper for those interested in the problem of

personal identity in mind uploading (are we the same person as before uploading?). The author contends traditional theories of identity are problematic in such a context, but suggests, following the philosopher Parfit, that there is no precise criterion, so preservation of mental content is enough.

W.J. Smith (2018) 'Your mind uploaded in a computer would not be you.' First Things, <https://www.firstthings.com/web-exclusives/2018/03/your-mind-uploaded-in-a-computer-would-not-be-you>. The author contends any uploaded mind will not be **you** because real life requires a living body with emotions and feelings that cannot be duplicated by any computer.

Popular Science (2018) Popular Science: Special Issue (Your New Brain: When Humans and Computers Merge). 'Will mind transfer ever happen': pp.83-94. A series of short (2-3 page) articles on various aspects of the possibility of mind uploading by leading proponents of the procedure. A good discussion of Boltzmann brains on pp. 85-87. Provides a useful neurological background to the topic of mind uploading. (For more on the notion of Boltzmann brains read (2012) 'Confessions of a Boltzmann brain' The Splintered mind blog, July 12, and subsequent discussion at <https://schwitzsplinters.blogspot.com/2012/07/confessions-of-boltzmann-brain.html>).

A.Brockless (2019) Thought, consciousness, brains and machines. Philosophy Now, 130 (Feb/March), pp. 16-19. A Wittgensteinian critique of the use of words like 'thinking' and 'consciousness' in regards to machines. Contends the meaning of these words is determined by the social uses of these words in our lives along with our built-in attitudes to other human beings. See also, S. Schroeder (2019) Wittgenstein and his legacy. In Philosophy of Mind in the Twentieth and Twenty-First Centuries. (The History of the Philosophy of Mind, Volume 6). Routledge. Oxon. pp. 233-255).

K. Farkas (2019) 'The boundaries of the mind' in A. Kind (ED). Philosophy of Mind in the Twentieth and Twenty-First Centuries. (The History of the Philosophy of Mind, Volume 6). Routledge. Oxon. pp. 256-279). An overview of present thinking by philosophers on whether the mind extends beyond the brain. Discussion of extended mind and embodied cognition. Relevant to present-day speculations on uploaded mind thinking.

S. Schneider, & P. Mandik, (2019) 'How philosophy of mind can shape the future' in A. Kind (ED). Philosophy of Mind in the Twentieth and Twenty-First Centuries. (The History of the Philosophy of Mind, Volume 6). Routledge. Oxon. pp. 303-319). A high-quality overview of superintelligence, artificial intelligence, brain enhancement, and mind uploading and how such topics will influence future thinking about the mind. Will be of special interest to students interested in the philosophy of mind.

Schneider, S. (2019) Artificial You: AI and the future of your mind. Princeton University Press. A thoughtful, non-dogmatic, wide-ranging discussion of consciousness and AI, mind enhancements, mind uploading, with a background consideration of scientific possibilities and ethical considerations. Highly recommended. See also, https://www.edge.org/conversation/susan_schneider-the-future-of-the-mind

J. Johansson (2019) 20th century theories of personal identity. In A. Kind (ED). Philosophy of Mind in the Twentieth and Twenty-first Centuries. Routledge. Pp. 126-147. An excellent description of the dominant theories of personal identity in philosophy: the psychological-continuity view (and variations such as branching and non-branching forms, the stage view), and animalist challenges. See also, Kind (2015).

F. Ferrando (2019). Philosophical Posthumanism. Bloomsbury. An overview and criticism of how ‘human’ has been depicted in Western history through an ‘Us/Them’ paradigm. The author advocates a monistic-pluralistic vision of humanity. Not an easy read, but helped with a glossary and frequent summaries. A thoughtful vision of what humanity might become. See also, <https://www.bing.com/videos/search?q=Ferrando+You+Tube&docid=608052341193313699&mid=4952729BE3CB71F5BD9E4952729BE3CB71F5BD9E&view=detail&FORM=VIRE>

M. Graziano (2019) What happens if your mind lives forever on the internet? The Guardian (UK), Oct 29. <https://www.theguardian.com/technology/2019/oct/20/mind-uploading-brain-live-for-ever-internet-virtual-reality>. Mind uploading would introduce a simulated **you** that your original biological you could interact with through electronic media. Suggests people might be required to acquire a certain amount of lived experience before they would be allowed to be uploaded, meaning that the balance of power would shift to the cloud world. An optimistic view of the future with mind uploading. See also, <https://www.bing.com/videos/search?q=mind+uploading&docid=608034177832390195&mid=F38A65AD126784442307F38A65AD126784442307&view=detail&FORM=VIRE>

V. Lorrimar (2019) ‘Mind uploading and embodied cognition: A theological response’. Zygon, 45/1, 191-206. <https://onlinelibrary.wiley.com/doi/full/10.1111/zygo.12481> While most responses to mind uploading do so from a secular perspective, this article does so from a religious perspective, as does so from an informed thoughtful one. Mind uploading still requires a body of some kind and this may suggest new opportunities for theologians since religious belief cannot be separated from a body. New ways of worshipping may arise, after all, “if the task of theologians is to find new ways of understanding and expression of timeless truths in every age, then theologians ought to be at the leading edge of new experiences of embodiment and cognition’ (p. 206).

D. Klinghoffer (2019) ‘John Lennox on Uploading the mind would mean eternal death’. Evolution News & Science Today (podcast), March 22. <https://evolutionnews.org/2019/03/lennox-marks-uploading-the-mind-would-mean-eternal-death/> The main problem with mind uploading is that while computers operate algorithmically, human minds do not. Mind uploading would miss what makes our mind human even if what was uploaded could exist eternally.

Digimorphing Team (2019) 3 reasons why mind uploading will never work. Digimorphing, March 25, <https://digimorphing.com/mind-uploading/> A short overview of the pros and cons of mind uploading, including some social concerns. Well written and understandable.

Y. Deigin (2019) Mind uploading done right. <https://becominghuman.ai/mind-uploading-done-right-2388fee4b72d> . Gradual uploading would stand a better chance of uploading the real you than a copy. The difference between you at the start of such an upload would be analogous to the natural change in ourselves over time.

M. E. Farrell (2019) What is the human microbiome exactly? Nautilus, June. <http://nautil.us/blog/what-is-the-human-microbiome-exactly> If the ecosystem of micro-organisms with the body (the microbiome) can influence one's bodily development and health, along with one's mood and behavior, then identifying ourselves with our brain is an oversimplification.

T. Spector (2019) You are what you eat – why the future of nutrition is personal. The Conversation, June 27, <https://theconversation.com/you-are-what-you-eat-why-the-future-of-nutrition-is-personal-119477> The foods we eat affect our microbiome in individual ways. Our health and behavior can be influenced in differing ways depending on what we eat. This adds to the variability of our body health and mind, again showing the brain alone does not affect what we are.

S. Ziesche & R. V. Yampolskiy (2019) Do no harm policy for minds in different substrates. Journal of Evolution & Technology, 29, 2, 1-11. This article addresses a topic usually neglected in discussions on mind uploading. While the uploaded world is usually described as blissful, several things could go wrong that increase the suffering of uploaded minds from problematic subroutines, failed neural connections to the presence of bad actors. The authors provide a useful overview of ways things might go wrong and explore some suggestions that might avoid some of the worst mistakes.

S. Davies (2019) Women's minds matter: Feminists never bought the idea of the computational mind set free from its body. Cognitive science is finally catching up. Aeon magazine, <https://aeon.co/essays/feminists-never-bought-the-idea-of-a-mind-set-free-from-its-body> Very readable critique of the computational mind from a Feminist perspective of embodied cognition. A well-written review of the history of feminist thought as, until recently, outside the mainstream views of cognition.

S. Krippner & D. Barrett (2019) Transgenerational trauma: the role of epigenetics. The Journal of Mind and Behavior, 40, 53-63. There is some evidence that the effects of environmental trauma may be found not only in offspring but third-generation offspring. If supported by further research this would suggest epigenetic effects (environmental effects that affect genes but not directly through DNA changes) and would be another factor supporting an embodied mind position.

B. Caddy (2019) Will you ever be able to upload your brain to a computer? Metro, June, <https://metro.co.uk/2019/06/05/will-ever-able-upload-brain-computer-9819234/> A nice overview of the problems that can arise if we take seriously brain uploading. For a start, we would need to distinguish between those brain functions necessary for the brain to be uploaded and those having a supportive function. We still have a lot to know about the brain. Further, the computer power required to upload a brain would be phenomenal.

K. Vold (2019) Are 'you' just inside your skin or is your smartphone part of you? Aeon Magazine, <https://aeon.co/ideas/are-you-just-inside-your-skin-or-is-your-smartphone-part-of-you> A thoughtful outline of the extended mind thesis and some of the radical implications that emerge if we accept the view. Implications will influence privacy issues along with impacts on

cultural and legal institutions if the boundaries of our minds are extended beyond what is in our heads.

C. Stokel-Walker (2019) ‘Introducing the immortalists: the quest by Silicon Valley rich to find ever-lasting life’. National Post, Oct 17, p. FP 13-14. A description of the many ways very rich people are investing money into various possibilities of life extension.

C. Barr & N. Cristianini (2019) Can machines read minds? Minds and Machines, 29, 461-494. Contends machines can already infer information about our psychological states (emotions, personality, attitudes, values, etc) by observing our behavior. This raises all sorts of ethical issues about privacy, and online manipulation, etc.

R. Jay Wallace (2019) The Moral Nexus, Princeton University Press. Provides a relational account of moral reasoning where morality (all talk of right and wrong) consists of binding obligations we have to others with whom we share the world we live in and are affected by our attitudes and actions. This raises the question of what uploaded minds might owe to us and vice-versa given that we would not live in a shared world where obligations go both ways.

D. Amir (2019) Personality is not only about who but also where you are. Aeon, Dec. <https://aeon.co/ideas/personality-is-not-only-about-who-but-also-where-you-are>. The environment we grow up in may influence some of our personality traits more than has been thought. Uploading the brain alone may therefore miss out much of what makes our personality what it is. One might also consider that even if mind uploading becomes successful, the influence of what is uploaded by the virtual environments ‘lived in’ may make uploaded minds diverge in various ways over time from earthly counterparts.

M.M. Gullette (2019) How old would you want to be in heaven? The Conversation, Dec 19, <https://theconversation.com/how-old-would-you-want-to-be-in-heaven-127410>. Traditional views of heaven portray inhabitants as young. The author considers such portrayals as ageist prejudice. It would be interesting to find out what mind uploading advocates consider to be the ideal age to upload or the age of the bodies they inhabit on the web!

S. Carls-Diamante (2019) Out on a limb? On multiple cognitive systems within the octopus nervous system. Philosophical Psychology, 32/4, 463-482. A high level of cognitive sophistication does not have to be associated with a centralized nervous system. The octopus may house multiple independent cognitive systems. One might speculate about multiple cognitive systems existing in a single virtual body if uploading becomes possible.

R. Swinburne, (2019) Are we bodies or souls? Oxford University Press. An energetic and sophisticated defense of the view that we are souls. While we are also human beings (a combination of soul and body), the self or the ‘I’ is a simple, undividable soul independent from the brain, memories, and character. On Swinburne’s view, mind uploading could upload character, memories, and emotions but not ‘you.’ See also, Swinburne (2019) Are we bodies or souls? The Philosophers magazine, 87, pp. 26-32. A useful outline of Swinburne’s views can also be found in S. Lathan (2014) Swinburne’s separations, Philosophy Now, 102, https://philosophynow.org/issues/102/Swinburnes_Separations. See also, Bernier (2012), Lavazza and Robinson (2016), and Loose, Menuge & Moreland (2018) for other defenses of dualism.

A. Schleunes (2020) Gut microbiome composition linked to human behavior. The Scientist, June 1, <https://www.the-scientist.com/the-literature/gut-microbiome-composition-linked-to-human-behavior-67566>. A review of some of the intriguing evidence that suggests gut-microbiomes may be related to some personality traits. For example, “people who have larger social networks are more likely to have greater gut microbiome diversity, which research indicates is associated with both gut health and general health”. It isn’t clear, as of yet, the direction of causation or the strength of causation but it seems a potentially useful research area. See also, K.V. A. Johnson (2020) Gut microbiome composition and diversity are related to human personality. Human Microbiome Journal, 15, 1-15, and E. Pennisi (2020) Meet the ‘psychobiome’: the gut bacteria that may alter how you think, feel, and act. Science, May 7, <https://www.sciencemag.org/news/2020/05/meet-psychobiome-gut-bacteria-may-alter-how-you-think-feel-and-act#>

M. Cobb (2020) Why your brain is not a computer. The Guardian, Feb 27, <https://www.theguardian.com/science/2020/feb/27/why-your-brain-is-not-a-computer-neuroscience-neural-networks-consciousness>

Metaphors are useful because they guide our thinking. However, the metaphor that the brain is a computer is now outmoded in many ways. The metaphors used by many neuroscientists are only partially useful. There is still so much we don’t know about the brain, and theories about mind uploading are so far beyond our current understanding of the brain, that present talk of such endeavors is metaphysical thinking at best.

C. W. Fahn (2020)

Perfecting Bodies: Who Are the Disabled in Andrew Niccol’s *Gattaca*? Philosophies, 5, 6; doi:10.3390/philosophies5020006. Argues that “Disability rights advocates remind us that a bio-technology which enables the selection of so-called ‘good’ and ‘healthy’ genes and ‘normal’ traits will ultimately devalue the importance of diversity and disability as part of the human condition. Genetic editing will surely impact the social structure of disability, and cause even more discrimination to those already disabled”. The same concerns arise regarding who will be allowed to upload and those rejected, and the bodily images those uploaded may choose to exhibit in the virtual worlds, and the values held in those worlds.

D. D. Hutto (2020) From radical enactivism to folk philosophy. The Philosophers Magazine, 88, first quarter, pp. 75-82. A defense of the radical enactivist thesis that minds are “extensively and **constitutively** connected to their surroundings rather than merely embedded within them” (p. 75). Indeed, “what and how we think are constituted by aspects of our shared world, which includes our folk philosophies and cultural traditions (p. 82). Would the same hold for those uploaded in virtual realities that may evolve very differently from those left behind? (Assuming mind uploading is successful in ways most advocates contend).

H. Liu (2020) Of integrated information theory: a philosophical evaluation. Philosophical Psychology, 33/3, 442-468. A critique of Tononi’s integrated information theory of consciousness. Tononi’s theory is a new take on consciousness and provides a mathematical view that would be relevant to claims of mind uploading. Liu critiques this view.

E. Pennisi (2020) Animal and human studies reveal health impacts of social inequality. Science, <https://www.sciencemag.org/news/2020/06/watch-how-social-inequality-impacts-everything->

health-longevity . It seems likely that any uploaded mind would retain the baggage from that lived on earth. The effects of factors such as social inequality will be part of the minds of those uploaded. If we choose to reduce such effects before uploading, who will decide what should be kept or eliminated? Would uniformity be a result of uploading minds?