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Ethics, Religion, and Spiritual Health

Intersections With Artificial Intelligence or Other Human Enhancement Technologies

Edited by

Tracy J. Trothen and Calvin Mercer

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About the Editors

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Tracy J. Trothen is professor of ethics at Queen's University, jointly appointed to the School of Religion and the School of Rehabilitation Therapy. Trothen is the author or editor of numerous articles, chapters, and ten books including the 2021 book *Religion and the Technological Future: An Introduction to Biohacking, A.I., and Transhumanism*, coauthored with Professor Calvin Mercer. She co-chairs the American Academy of Religion's (AAR) Artificial Intelligence Seminar and is a Fellow of the International Society for Science and Religion (ISSR).

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Calvin Mercer is professor of religion at East Carolina University. Along with UK scholar Steve Fuller, Mercer coedits *Palgrave Studies in the Future of Humanity and Its Successors*, the oldest book series addressing human enhancement from all disciplines and points of view. He was founding chair of the "Human Enhancement and Transhumanism" Unit in the American Academy of Religion and continues to serve on that unit's steering committee. He serves on the Academic Advisory Council of the Christian Transhumanist Association. Also trained in clinical psychology, Mercer practiced professionally part-time for over a decade and uses this discipline in his published work on religion.

Preface to "Ethics, Religion, and Spiritual Health: Intersections With Artificial Intelligence or Other Human Enhancement Technologies"

Technological breakthroughs and other scientific leaps give much cause for hope as well as some cause for pause. In 2003, almost all the genes of the human genome were identified, mapped, and sequenced, contributing to the promise of the CRISPR (clustered regularly interspaced short palindromic repeats) gene editing project, to give one prominent example. Just shy of two decades later, the James Webb Space Telescope has been launched in space, poised to probe deep mysteries about the origin, evolution, and future of the universe.

These two remarkable scientific achievements bookend two decades of dizzying scientific and technological development that can help us better understand our intertwined bodies, minds, and spirits. Such breakthroughs promise mixed impacts—good and bad—on the trajectory of our journey into and with the universe.

Thinking big and long puts the human story in perspective, but that does not relieve us of the moral task of anticipating the needs and challenges of people who stand, right now, on the brink of serious impacts from unfolding therapies and technologies. Helping navigate those impacts in ways that enhance well-being (including spiritual health) is a moral imperative that may both be informed by and nurture the best in religion. The works of pioneering scholars, like those who write in this collection, contribute to this conversation.

What do human enhancement technology (HET) and artificial intelligence (AI) have to do with religion and spirituality? This book explores the intersection of HET and AI with spiritual health, Christianity, and ethics. This exploration strengthens an emergent, robust body of publications about the ethics of human enhancement. What it means to make us "better" must also include potential spiritual implications.

Concerns about spiritual health promises to make the study of religion and human enhancement ethics increasingly pressing in the public square. Some of the most significant possible and probable spiritual impacts of HET and AI are probed in this collection. Topics include warfare, robots, chatbots, moral bioenhancement, spiritual psychotherapy, superintelligence, ecology, fasting, and psychedelics. The first five chapters of this book address spirituality in relation to HET and AI, and the following six chapters address Christianity in relation to HET and AI.

It is too early to know all the implications of mapping the human gene and peering back in time on strings of light. We can reasonably expect that they will have economic, political, social, existential, and other implications. This book strikes out to engage some of the coming religious, spiritual, and ethical impacts of the therapies and technologies fast developing all around us.

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Article

Psychedelic Mystical Experience: A New Agenda for Theology

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Abstract: When the link between psychedelic drugs and mystical states of experience was first discovered in the 1960s, Huston Smith challenged scholars in religion and philosophy to consider the implications. Very few took up his challenge. Beginning in 2006, hundreds of studies have linked psychedelics not just to mystical states of experience but to potential treatments for many mental health disorders. Regulatory approval for therapies is on the horizon, and hundreds of millions of people worldwide could be treated. Research findings challenge the underlying rationale of the War on Drugs, leading to decriminalization of specific psychedelic drugs or to authorization of their use in mental health contexts. Religious institutions are slowly adapting, with some referring to psychedelics as sacraments or as pathways to deeper spirituality. Religious leaders are also beginning to speak out publicly in support of careful use of these drugs, and some are training to become "psychedelic chaplains" to work alongside mental health professionals administering these drugs. Scholars in theology and religion are encouraged to engage these trends, to explore challenging philosophical and theological issues surrounding mystical states of experience in general, and to consider the long-term cultural impact of the most recent psychedelic research.

Keywords: psychedelic drugs; mystical experience; psychedelic therapy; Huston Smith; psychedelic spirituality; psychedelics and religion; psychedelics and theology; psychedelic churches

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1. Introduction

In 1964, when it was first being discovered that psychedelic drugs were somehow linked to mystical experiences, Huston Smith posed a simple question: Do drugs have religious import? (Smith 1964). Writing in the *Journal of Philosophy*, Smith argued that when people take LSD or psilocybin, their experience can be profound, deeply meaningful, and religiously significant. He cited the available evidence, which was largely anecdotal and meager by today's standards.

We know enough, he said. It is time for scholars in philosophy and theology to pay attention. Reciting the evidence that drugs such as LSD and psilocybin are associated with mystical experiences, Smith laments that " students of religion appear by and large to be dismissing the psychedelic drugs . . . as having little religious relevance" (Smith 1964, p. 517).

Some might argue that psychedelics experiences are no more spiritually profound than a coffee buzz or a beer keg hangover. But if, as Smith believed, the experiences they seem to induce are phenomenologically indistinguishable from the deepest experiences of the greatest mystics, then how can scholars in theology and religion simply dismiss or ignore them? Is that not willful ignorance of reality?

He asks himself whether we are witnessing a new round or "a reenactment of the age-old pattern in the conflict between science and religion. Whenever a new controversy arises, religion's first impulse is to deny the disturbing evidence science has produced". How else can we understand the "refusal to admit that drugs can induce experiences descriptively indistinguishable from those which are spontaneously religious"? Perhaps

what we are witnessing in this refusal is a modern-day "counterpart of the seventeenth-century theologians' refusal to look through Galileo's telescope or, when they did, their persistence on dismissing what they saw as machinations of the devil" (Smith 1964, p. 524).

Smith continues by claiming that "the fact that drugs can trigger religious experiences" is now "incontrovertible". In 1964, "incontrovertible" might have been a slight exaggeration. But today, the word is too weak to describe clear evidence that cannot be discounted or denied. Smith dared his colleagues to "move to the more difficult question of how this new fact is to be interpreted" (Smith 1964, p. 524). His challenge, still unmet, is long overdue.

If theologians in 1964 had the equivalent of Galileo's telescope, we have the Hubble. Just consider where we are today. Study after study from research laboratories confirms that psychedelic drugs such as LSD and psilocybin reliably induce or "occasion" intense subjective experiences that research volunteers see as mystical. These intense subjective experiences are linked to promising new treatment strategies for a wide range of mental health disorders, from major depression to traumatic stress to existential distress in facing life-threatening illness. Clinical trials are advancing steadily through the regulatory approval process. Not only do psychedelics induce intense mystical experiences. Current evidence seems to suggest that psychedelics have the potential to treat a range of mental health disorders *because they induce such mystical experiences.*

Various cities across the United States have decriminalized possession of many of these substances, part of a wider national and international movement involving legalization of cannabis, growing cries for a reversal on the War on Drugs, and rising outrage over the ongoing racial injustice of mass incarceration. Michael Pollan's bestselling book, *How to Change Your Mind*, has generated a national conversation reaching across cultural and political boundaries (Pollan 2019).

Canada has already approved access to psilocybin under compassionate use regulation by those with life-threatening illnesses. Twice now, the United States Food and Drug Administration has granted a "Breakthrough Therapy" designation for potential psychedelic therapies. The state of Oregon has approved a plan to make psilocybin available as part of psychotherapy, with clinics and retreat centers already being organized.

Religious communities or churches, some with deep roots in traditional cultures and some newly conceived, are emerging especially in the US under the religious freedom clause of the Constitution. Leaders in Judaism and in traditional Christian churches are beginning to become more vocal in supporting the idea that these drugs and the mystical experiences they induce can play a positive role in the future of organized religion.

Smith's 1964 article went on to become the most reprinted paper in the history of the *Journal of Philosophy* (Walsh and Grob 2005, p. 224). In an interview published in 2005, Smith looked back across the divide imposed by the War on Drugs, still confident in what he calls "occasions when the validity of this exuberance breaks through on people in unmistakable, undeniable, and life-transforming ways" (Smith et al. 2004, p. 225).

Our focus here is on what are sometimes called "classic psychedelics", especially psilocybin, LSD, and dimethyltryptamine (DMT), which is present in the South American sacramental beverage *ayahuasca*. Other drugs such as MDMA work differently but are often included in some of the studies that will be considered. We begin by summarizing some of the research that shows the potential of psychedelics for mental health. Attention then shifts to the idea that these drugs induce mystical states of experience and what that might imply for the future of religion.

2. Psychedelic-Assisted Mental Health Therapy

Around the world, there is a growing awareness of a crisis of failure in dealing with the challenges of mental health. Despite massive spending, standard approaches in pharmaceutical research have produced very few successful new mental health therapies. By most accounts, the mental health crisis has been made worse by the COVID-19 pandemic. One possible bright spot on the horizon, however, lies in the direction of psychedelic-assisted mental health therapy. Clinical trials using a variety of psychedelic substances are under-

way at universities and pharmaceutical laboratories around the world. Publication after publication supports the claim that when used carefully, often together with psychotherapy, psychedelics have the potential to change fundamentally our ability to treat various mental disorders.

Biomedical research moves slowly through various stages or phases, each with clear limits and objectives regarding the safety and effectiveness of a candidate drug. Research involving psychedelic substances is no exception. Psychedelic substances are being studied in relation to various disorders, with work being conducted at all phases of research that range from the earliest "pilot studies" to Phase 3 clinical trials. Some substances being studied, such as MDMA (commonly known as "ecstasy"), are not usually considered "classic psychedelics", but they are often included as part of a wider effort to look medically at drugs that have been dismissed as having no medical value. Research is most often funded by private philanthropy or by commercial interests. In October 2021, however, the National Institutes of Health in the United States made its first psychedelic research grant in fifty years with an award of approximately US$4 million to Johns Hopkins University for a double-blind, randomized trial to study the use of psilocybin to help smokers quit the use of tobacco.

If today's research is any predictor of tomorrow's treatments, we might expect that psychedelic treatments will be approved perhaps by the middle of the 2020s. The list of mental health disorders that may someday be treated by psychedelic-assisted therapy is long, and it includes widely diagnosed conditions such as "clinical depression" or major depressive disorder (MDD), substance addictions, post-traumatic stress disorder (PTSD), and obsessive-compulsive disorder (OCD). Research programs usually begin with exploratory or pilot studies that involve just a handful of research volunteers. Exploratory studies underway as of 2022 already "suggest potential benefits of psilocybin therapy in OCD, eating disorders and migraine suppression" (Kelly et al. 2021, p. 1). When a pilot study points to a promising therapeutic strategy, the work of research advances to randomized clinical trials. As of 2021, clinical trials are ongoing for "psilocybin therapy in MDD, bipolar disorder type II depression, alcohol use disorder, smoking cessation, cocaine addiction, opioid addiction, anorexia nervosa, depression in Mild Cognitive Impairment, OCD and various types of headaches" (Kelly et al. 2021, p. 1).

The sheer number of individuals who might someday be helped by psychedelic-assisted therapy is staggering. "Major depressive disorder (MDD) is a substantial public health concern, affecting more than 300 million individuals worldwide. Depression is the number one cause of disability, and the relative risk of all-cause mortality for those with depression is 1.7 times greater than the risk for the general public"(Davis et al. 2021, p. 482). In the United States, it is estimated that "10% of the adult population has been diagnosed with MDD in the past 12 months" with an annual economic burden of more than $210 billion (Davis et al. 2021, p. 482).

Numbers like that tend to attract attention from commercial enterprises and their investors. The personal finance magazine, *Forbes*, estimates that "prescription sales for depression is estimated to be $50 billion a year globally, while the mental health market is worth about $100 billion in annual sales. Biotech analysts say that FDA-approved psychedelic-assisted therapy could seize billions in annual sales if approved by the FDA" (Yakowicz 2021).

Commercial prospects aside, this research suggests that millions of people who are suffering from the debilitating despair of MDD will be helped. Researchers are summarizing the findings in words like these: "Our search documented robust positive and enduring effects of psychedelic treatment on measures of depression across several studies and research groups" (Aday et al. 2020, p. 183). The benefits are both dramatic and lasting. Another group reports: "These findings demonstrate that the substantial antidepressant effects of psilocybin-assisted therapy may be durable at least through 12 months following acute intervention in some patients" (Gukasyan et al. 2022).

In the 1960s, evidence was beginning to show that these drugs might offer help to those who face unusual anxiety or distress when diagnosed with a life-threatening illness. More recently, two separate studies reexamined the question and reported their findings in 2016. Between them, they found that approximately 85% of the "patients with life-threatening cancer reported increased life satisfaction or well-being six months post-psilocybin treatment. Many indicated that the experience was cathartic, led to a greater appreciation of life, and helped them come to terms with their own mortality". These findings suggest that in the not-too-distant future, drugs such as psilocybin may play a healing role, not in treating cancer, but in helping patients cope as they live with it through the final stages of life. A summary of these studies continues with words that almost suggest that these drugs possess a kind of spiritual power. "Psychedelic treatment's unique capacity to assuage distress related to dying has been demonstrated in several studies as researchers have found increased sense of continuity after death and death acceptance, as well as 77% of participants reporting less fear of death in another study" (Aday et al. 2020, p. 185).

Another study suggests that the distress-reducing effect holds up over time, not just for months but for years. Researchers found that "psilocybin-assisted psychotherapy was associated with large and significant reductions in anxiety, depression, hopelessness, demoralization, and death anxiety, as well as improvements in spiritual well-being at an average of 3.2 and 4.5 years following psilocybin administration" (Agin-Liebes et al. 2020, p. 161).

Remarkably, the psychedelic treatment seems to become *more effective* as time went on. "It is interesting to consider that certain domains of cancer-related distress, particularly certain key domains of existential distress, could continue to improve rather than diminish over time in relation to a single psilocybin session" (Agin-Liebes et al. 2020, p. 163). The report continues: "After 3 years, there were still reductions in anxiety, depression, hopelessness, and demoralization, death anxiety was significantly lower, and spiritual well-being was improved compared to baseline. After 4 years, 60–80% of the patients still showed significant reductions in depression and anxiety compared to baseline (Agin-Liebes et al. 2020).

What is it about psychedelic treatment, compared to all the other anti-anxiety treatments that have been tried, that gives it such unexpected and transformative potential? At least on the face of it, the evidence seems to suggest that the therapeutic power of psychedelics is mediated by the intense subjective or mystical experience that is commonly reported by those undergoing therapy. Leading psychedelic researchers are actively debating whether intense subjective experiences are necessary for effective therapy. Some argue that psychedelics are therapeutic because of the way they affect the brain at the level of neurons and networks, perhaps by stimulating neuroplasticity (Olson 2021; Sanders and Zijlmans 2021). Others insist that intense subjective experiences, however they might be defined, are a necessary component of therapy (Yaden and Griffiths 2021; Jylkkä 2021). A summary report on distress reduction notes that "participants overwhelmingly (71–100%) attributed subjective experiences of positive changes to the psilocybin-assisted psychotherapy experience, reporting improved well-being or life satisfaction, and rating it among the most personally meaningful and spiritually significant experiences of their lives" (Agin-Liebes et al. 2020, pp. 162–63). Another review of this research ends with this sentence: "Given the importance of spiritual and existential well-being in palliative care, psychedelics may play a unique role in enabling patients to address these critical issues in the last stage of their lives" (Schimmel et al. 2022, p. 30).

Other research teams are exploring even more possibilities for psychedelic-assisted mental health treatments. Future treatments for obsessive-compulsive disorder (OCD) seem promising (Moreno et al. 2006). Substance use disorders, such as excessive alcohol consumption, are also promising areas for research (Bogenschutz et al. 2015). Particularly interesting is the use of psilocybin in helping smokers quit the use of tobacco. A pilot study involving 15 volunteers reported that 12 of them, or 80%, were able to quit smoking, a success rate far higher than any other smoking cessation therapy (Johnson et al. 2014). Participants completed a survey called the Mystical Experience Questionnaire (MEQ), and

many of them (73%) rated their experiences with psilocybin as among the top five most meaningful experiences of their lives.

What was striking is that the higher the score on mystical experience, the greater the likelihood that they stopped smoking. In a follow-up study, the team of researchers reported that scores on the MEQ "correlated strongly, negatively, and significantly with a validated measure of cigarette craving . . . This suggests a link between strength of mystical experience during psilocybin sessions and clinical change in subjective effects that drive addictive behavior" (Barrett and Griffiths 2018, p. 14).

In the 2015 report, the team teased apart the mystical experience component from the general intensity of the psychedelic subjective experience. They claimed that the overall "intensity of psilocybin session experiences was not significantly associated with smoking cessation treatment outcomes, suggesting that mystical-type effects specifically, rather than general intensity of subjective drug effects, are associated with long-term abstinence" (Garcia-Romeu et al. 2015). They also suggested that the dramatic success rate in their pilot study hinted that psilocybin might prove to be useful in treating other substance use disorders: "Perhaps the most exciting implication is that this drug class could be used to treat a wide variety of drug addictions, including smoking, alcoholism, and opioid dependence, as well as non-drug addictions (e.g. gambling addiction)" (Garcia-Romeu et al. 2015).

One intriguing proposal for psychedelic therapy is to treat autism spectrum disorder. It has been shown that classic psychedelics can increase empathy and social connection. "These findings suggest a therapeutic potential of psychedelic compounds for some of the behavioural traits associated with autism spectrum disorder (ASD), a neurodevelopmental condition characterized by atypical social behaviour". If so, can this approach help those who suffer from features of autism spectrum disorder, such as "reduced social behaviour and highly co-occurring anxiety and depression" (Markopoulos et al. 2021)? Obviously, more study is needed.

In view of these studies and of many others like them, we can say that we know that psychedelics have the potential to treat a wide range of mental health disorders. We do not yet know why. What is it about psychedelics that give them such wide-ranging potential? Researchers refer to this as a "transdiagnostic mechanism of action", the capacity of these drugs to do something that helps people suffering from various disorders. One recent summary of research puts it this way: "The mounting evidence of the use of psilocybin as an adjunct to treatment of a variety of psychiatric conditions . . . suggests a transdiagnostic mechanism of action".

As of 2022, the leading candidate for the "transdiagnostic mechanism" is the intense mystical experience so often associated with psychedelics such as psilocybin. The report continues by pointing out that in study after study, "the intensity of mystical-type experiences reported after psilocybin sessions was associated with favorable outcomes. Furthermore, cross-sectional studies have suggested that mystical-type and psychologically insightful experiences during a psychedelic session predict positive therapeutic effects" (Davis et al. 2021, pp. 486–87).

Not only do psychedelics offer new possibilities in the treatment of a range of mental health disorders, but the underlying reason for their effectiveness may rest in their capacity to induce mystical experience. Across the board, researchers in the field agree about the potential effectiveness of psychedelics. Disagreement and debate, however, surrounds the idea that mystical experience is the essential mediating factor, the "transdiagnostic mechanism of action", that makes these substances so full of wide-ranging possibilities for therapy.

Before taking up that debate, we consider more fully what we are learning from research about the link between psychedelics and mystical experiences.

3. Psychedelics and Mystical Experiences

The concept of "mystical experiences" is a modern creation and is hard to define, but the central idea goes back at least for millennia. Such experiences may not happen every day, and often people who have them are reluctant to talk about them. But intense experiences with a religious or spiritual nature are common enough, and written reports of them are widely known.

In 1902, William James offered one of the first systematic accounts of mystical states of experience (James 2004). While James does not define mystical states, he does identify four qualities that they tend to have. Mystical states are *ineffable*, beyond description even by the person who has the experience. They have a *noetic quality* that makes them feel like "states of knowledge" that "carry with them a curious sense of authority" (James 2004, p. 210). For James, these two qualities are the essential features of mystical experiences, but he completes his list of four qualities by saying that these experiences also tend to feature *transiency* and *passivity* (Cole-Turner 2021).

A half century later, and just at the time when psychedelic drugs were becoming widely known, W. T. Stace expanded on what James had written. Stace added to the list of the features of mystical experiences (Stace 1960). His work was put to use almost immediately by Walter Pahnke in 1962 in what is known as the "Marsh Chapel" experiment. In the first scientific attempt to link psychedelics with mystical experience, Pahnke administered psilocybin and a placebo to a group of mostly theology graduate student volunteers. Huston Smith was present as a guide.

Wanting to find out whether his research volunteers underwent a mystical experience, Pahnke drew on Stace's work to create a questionnaire. He devised questions that asked individuals to rate how their experience met the key features or categories of mystical experience. "The categories include (1) sense of unity, (2) transcendence of time and space, (3) sense of sacredness, (4) sense of objective reality, (5) deeply felt positive mood, (6) ineffability, (7) paradoxicality and (8) transiency" (Doblin 1991, p. 7). While the research design was not up to today's standards, the results clearly showed the power of psilocybin to induce or to "occasion" mystical experiences, at least as they were described by Stace and measured by Pahnke. Any response that scored a strong positive response in each category was defined as "a complete mystical experience", meaning that it is "complete" in the sense that each defined quality of mystical experience is present.

Pahnke's work was derailed when governments regulated these drugs in the 1960s and by his own untimely death in 1971. The question of the link between psychedelics and mystical experience, however, was not forgotten. In 2006, a research report from the laboratory of Roland Griffiths and Johns Hopkins University marked the rebirth of scientific explorations regarding the connection between psilocybin and mystical states of experience. The main questionnaire used to measure mystical experience is known as the "Mystical Experience Questionnaire" (MEQ). It is based on Pahnke's work, although it has been modified several times. In its most recent version, it includes 43 questions and is called the MEQ43. The MEQ used in the 2006 study asks volunteers whether they think their own experience matches any of the various qualities or features of mystical experiences as described by Stace and Pahnke.

According to the 2006 report, "Thirty-three percent of the volunteers rated the psilocybin experience as being the single most spiritually significant experience of his or her life, with an additional 38% rating it to be among the top five most spiritually significant experiences"(Griffiths et al. 2006, p. 11). Perhaps the most astounding finding is that "22 of the total group of 36 volunteers had a 'complete' mystical experience after psilocybin" (Griffiths et al. 2006, p. 9). If Huston Smith believed in 1964 that Pahnke's findings demanded attention from scholars in theology and religion, how much more so do the findings of the Johns Hopkins team, beginning with the 2006 report.

At the end of their report, the researchers claim to have shown that under the right conditions, "psilocybin occasioned experiences similar to spontaneously occurring mystical experiences and which were evaluated by volunteers as having substantial and sustained

personal meaning and spiritual significance". They follow this with another claim, stated in the dry language of a medical journal but profoundly significant for the future of religion: "The ability to prospectively occasion mystical experiences should permit rigorous scientific investigations about their causes and consequences, providing insights into underlying pharmacological and brain mechanisms, nonmedical use and abuse of psilocybin and similar compounds, as well as the short-term and persisting effects of such experiences" (Griffiths et al. 2006, p. 15).

Research continues, of course, in hopes of learning more about the potential uses of psychedelics for mental health but also as tools for understanding the human brain. New techniques in brain imaging offer highly precise ways of seeing what happens in various brain networks while LSD or psilocybin is active in the brain. In other words, how do the phenomenological states of subjective experience correlate with an objective view of brain states as seen through neuroimaging? Some are hopeful that by combining the use of psychedelics with brain imaging, new insight into the mystery of human consciousness might emerge. Other researchers are asking how psychedelic-occasioned mystical states compare with states attained by various forms of meditation.

One area of particular interest is to compare psychedelic-occasioned mystical states with "near death experiences" or NDEs. A recent study of NDEs noted how the descriptions of the experience compare to the findings reported by researchers studying psychedelics. According to the report, "the experience of ego dissolution retrospectively reported by our participants is rather intense . . . and comparable to what is reported after ingestion of psychedelics". The report notes that "no direct comparison regarding the experience of ego dissolution between NDE and drug-induced psychedelic experiences has been carried out yet. As a matter of fact, it would be interesting to directly compare the sense of self experienced in NDEs and psychedelic experiences using a sample of people who experienced both types of experiences" (Martial et al. 2021, p. 8).

Not only are the experiences similar, but so are the long-term changes. "The most frequently reported changes after a classical NDE correspond to a more altruistic and spiritual attitude, an important personal understanding of life and self, decreased fear of death, as well as a trend towards less materialist values", consistent with what is observed in studies involving psychedelics. What lies ahead for research? "Interesting questions to investigate include: what are the underlying neurobiological mechanisms potentially linking the two experiences? Do NDEs and psychedelic states reflect closely related brain states albeit via different means of induction?" (Martial et al. 2021, p. 9).

At the moment, any comparison between NDEs and psychedelic experiences offers more questions than answers. Given that psychedelic research can be induced in the laboratory, what light will it shed on NDEs? What is it about each, neurologically, that makes them similar phenomenologically? How is it that they are similar phenomenologically *and in terms of the long-term consequences*? Over time, how will theologians and scholars of religion come to think about the similarities and the differences between psychedelic experiences and NDEs?

4. Mystical Experiences by Many Names

Based on the research reported so far, there seems to be no getting around the fact that an intense subjective experience is necessary for most if not all forms of psychedelic-assisted therapy. If anything, it seems clear that the more intense the experience, the more likely the therapy will work at its highest level. "A guiding principle of psychedelic psychotherapy is that the occurrence of a profound, potentially transformative psychological experience is critical to the treatment's efficacy" (Roseman et al. 2018, p. 2). Another team, reporting specifically on psilocybin therapy to stop smoking, has this to say: "Those participants who had stronger mystical experiences in psilocybin sessions were more likely to be successful in quitting smoking (Johnson et al. 2019, p. 92).

Across the board, there seems to be general agreement among researchers that for psychedelic therapy to work, intense subjective experience is necessary. "Regardless of the

terms chosen to define them, evidence suggests that profound psychological experiences can be predictive of subsequent psychological health" (Roseman et al. 2018, p. 2). But as this report intimates, perhaps we should not label the experience as mystical. The authors continue: "The so-called 'mystical' experience has been a classic problem area for mainstream psychology—if not science more generally. The term 'mystical' is particularly problematic, as it suggests associations with the supernatural that may be obstructive or even antithetical to scientific method and progress (Roseman et al. 2018).

It is entirely fair to say that the term "mystical" is often associated with religious experience or with claims about a supernatural realm. After all, the discussion of "mystical states" by William James appears in a book entitled *The Varieties of Religious Experience* (James 2004). It is also fair, however, to point out that this concern does not do justice to the idea of mystical states of experience as understood by James. He was not exactly a fan of organized religion. His view of mystical experience was widely inclusive, centered by familiarity of course in the Christianity of the West, especially Protestantism, but with examples drawn from other traditions, including what we might see as a kind of nature mysticism. James devotes considerable attention to Walt Whitman, noting with approval that the poet was often called a "pagan" but who for James is better seen as "the restorer of the eternal natural religion" (James 2004, p. 49). Mystical states, James says, are not the property or the protector of any religion or culture, having "neither birthday nor native land" (James 2004, p. 228).

More recently it has been suggested that we need to find a way to "naturalize" mysticism, to acknowledge its intensity and transformational powers while tamping down its religious connotations, perhaps by seeing them as simply one flavor among many that might be used to describe these experiences. For example, it has been proposed that mysticism be redefined in a way that is acceptable for those who object to going beyond the natural world in ways that are supernaturalistic or theistic. Instead of "supernaturalistic mysticism", they advocate "naturalistic mysticism", suggesting that the problem is not with the word mysticism but with its religious implications. What they advocate is the view that " . . . naturalistically acceptable religious and spiritual experiences induced by psychedelics centrally involve transcendence of the sense of self and feelings of interconnection with nature" (Letheby and Mattu 2022, p. 8).

If James considered Whitman a mystic, then maybe the advocates of "naturalistic mysticism" are on to something with their proposal. It is hard to imagine, however, that in today's cultural setting, the word "mystical" can be severed so cleanly from religion that it will be acceptable to those who find religion objectionable. If "mystical experience" is not the most useful term for the intense subjective experience so often induced by psychedelics, however, then what words or phrases might be used? Some suggest words such as "awe" or "insight". "Gaining insight into one's thoughts, behaviours and experiences is thought to help reduce symptoms by enabling individuals to first understand their difficulties, reduce distorted negative beliefs and, eventually act on, and master these difficulties through conscious cognitive and behavioural changes" (Peill et al. 2022, p. 2). If mystical experience, as defined by the MEQ, tends to focus on what is beyond the individual, "our definition of psychological insight places greater focus on subjective personal insight bearing relevance to one's own self and life, as opposed to insight of a transpersonal nature, related to such things as the nature of consciousness, life and existence" (Peill et al. 2022, p. 11).

The term "cognitive flexibility" to identify the "transdiagnostic mechanism" has also been suggested. One team proposes that "a potential transdiagnostic neuropsychological mechanism that may be targeted by psychedelic therapy is cognitive flexibility. Cognitive flexibility is broadly defined as the ability to adaptively switch between different cognitive operations in response to changing environmental demands" (Doss et al. 2021, p. 1). It is widely accepted that psychedelics have the power to shake up cognitive rigidity and to bring about cognitive flexibility. But can they do so apart from some sort of intense subjective experience more broadly defined?

Another term for the "transdiagnostic mechanism" proposed recently in the psychedelic research literature is "quantum change experiences". We read that "quantum change is a more recently introduced concept that has significant overlap with mystical experience, but in addition to the phenomenology of the experience itself, quantum change emphasizes the persisting consequences caused by the experience. More specifically, quantum change experiences refer to sudden, distinctive, benevolent, and often profoundly meaningful experiences that are said to result in personal transformations that affect a broad range of personal emotions, cognitions, and behaviors" (Johnson et al. 2019, p. 92).

The term "quantum change" avoids any whiff of religion. For some it may stir up a faint memory of high school physics or chemistry or sound like a high-tech fix. Replacing "mystical states of experience" with "quantum change experience" shifts the semantic field in which the key phrase is embedded. It also shifts the emphasis from the intensity of the subjective experience to the suddenness of the change in outlook and behavior. The experience itself seems to recede if not disappear entirely in favor of behavioral change. Whether that is intended here is not clear, but it seems that a tilt from a humanistic to a behavioral approach is at stake.

It is true that no one will confuse "quantum change experience" with "mystical experience". Not even James would link the two. He would, however, probably see an affinity between "quantum change" and "conversion", a topic he addresses at length. If anything, "conversion" is even more tangled up with religion than is mysticism, at least as James sees it (James 2004, pp. 106–43). More than that, the term has been widely used, especially in Protestantism over the past 250 years, to identify the key religious moment in a person's life. "Quantum change experience" has all the marks of a conversion experience and is even defined as such by its advocates. For example, we read that "such experiences, which have been described in anecdotal reports dating back centuries, have been variously labeled as mystical experiences, conversion experiences, religious experiences, peak experiences, transcendental experiences, transforming moments, or epiphanies" (Griffiths et al. 2018, p. 49).

Compared to the term "mystical states of experience", the switch to "quantum change" and its link to "conversion" has the odd effect of bending the interpretation of this research in a peculiarly Protestant direction, specifically along the lines of classic American Evangelicalism. It tilts the focus away from the content of the experience, pointing instead to a dramatic change in an individual's behavior. If the term "quantum change" is used, and if it is linked to the idea of conversion, Evangelical Christians will see this as a kind of "born again" experience. Some will probably embrace their psychedelic mystical encounter, acknowledging that it changed their lives and brought them to their faith even if they do not feel free to say so publicly.

On the whole, there seems to be no easy escape from the semantic challenge of finding the right name for the experience that has the full transformative heft to serve as the "transdiagnostic mechanism". Anything short of "mystical experience" seems too weak, while anything vaguely mystical seems too religious. If James got it right by advocating a very wide meaning for the term, perhaps we can too. Naturalistic mysticism is clearly on the right track conceptually, but will it work in practice?

5. Psychedelics as a Pathway toward Spiritual Health

The potential for psychedelic-assisted therapy has attracted widespread attraction among researchers, drug companies, and investors. Little attention has been given to the capacity for these drugs to improve an overall sense of well-being. In the seminal 2006 report, we find this claim: "Seventy-nine percent of the volunteers rated that the psilocybin experience increased their current sense of personal well-being or life satisfaction 'moderately' (50%) or 'very much' (29%)" (Griffiths et al. 2006, p. 11). Looking back over a decade and a half of research, a recent report offers this conclusion: "Increased well-being is one of the most reliable psychological changes following a psychedelic experience" (Peill et al. 2022, p. 12).

Increased overall well-being is consistent with reduced depression or alleviation of distress in situations of life-threatening disease. As a concept, however, the idea of overall well-being is broader than the benefits of therapy. It calls attention to health in its broadest meaning, not only as treatment of disease but more akin to overall human flourishing or "spiritual health". Therapy is included, of course, but the potential increases in well-being brought about by the careful use of psychedelics go to the core of the person. At the same time, they also radiate outward in the sense that they change social relationships with other human beings, with life in general, and with the natural world.

We read, for example, that "changes in personality and attitudes are among the most commonly studied long-term changes related to psychedelic use" (Aday et al. 2020, p. 185). It has been shown that the personality trait of "openness" increases significantly as a result of participation in a single psilocybin trial (Griffiths et al. 2011). This has been linked to "lasting improvements in mood and positive attitudes", with "increased optimism and mindfulness" and with "nature connectedness". One summary continues by noting that "these increases in connection seem to be broad and generalizable as studies also noted sustained improvements in social relations and altruism" (Aday et al. 2020, p. 185). Taken together, research using psychedelics points to "long-term changes in wellbeing and quality of life" (Aday et al. 2020, p. 185).

In the short term, psychedelics induce intense subjective experience. On a longer timescale, the intense experience seems to lead not just to specific forms of therapy but to an increase in overall well-being. More research is needed, of course, but already the evidence seems strong enough to support the conclusion that there can be a lasting, generalized increase in human well-being through the careful use of these drugs.

For decades now, researchers in the field have used the phrase "set and setting" to describe the two key dimensions of careful use. "Set" refers to what the individual brings to the experience, and "setting" refers to the context in which the experience occurs. Exploring more deeply the meaning of each term, we see that "set refers to an individual's disposition and is broken up into two categories: long-range and immediate. The long-range set is composed of a person's general personality characteristics and individual history, while the immediate set refers to a person's expectations for using the drug and is heavily influenced by the motivation for using" (Neitzke-Spruill and Glasser 2018, p. 315).

What a person brings to the psychedelic experience influences what the person gets out of it. Because of the centrality of personal subjective experience in psychedelic sessions, expectations play a role here even more significant than the usual placebo effect common to all therapies. One way to think about this is to consider whether a person with some form of religious faith is likely to experience a psychedelic session in a way that is different from the experience of a convinced agnostic. Religious expectations can take many shapes, of course, and one way to define it is in terms of a generalized trust that leads to an open-minded sense of surrender to whatever may happen in the session. "Higher ratings of willingness to surrender are associated with stronger mystical type experience in both psychedelic experiences" (Millière et al. 2018, p. 20). Obviously, research into the role of religious expectation as a component of experimental "set" is challenging.

One study tries to ask whether religious expectations as a "set" variable have consequences in the quality or profile of the psychedelic experience. "We used whether or not a person identified as religious to measure long-range set and whether psychedelics are used with a spiritual intent to measure immediate set"(Neitzke-Spruill and Glasser 2018, p. 317). The study found that a "religious set" played a role:

> "The present study examined whether there is a relationship between having a religious set (both identifying as religious and taking psychedelics with religious intent) and having mystical experiences when using psychedelics. We found a positive and significant relationship between a person's religious set and having mystical experiences when using psychedelic drugs. As hypothesized, being religious and taking psychedelic drugs with religious intent were significantly related to having stronger mystical experiences when using psychedelic drugs.

> Identifying with a religion significantly increased scores on the mysticism scale". (Neitzke-Spruill and Glasser 2018, p. 319)

The "religious set"—the general religious frame of mind and a willingness to enter into the experience with a sense of openness and surrender—plays a role in shaping the intensity and the quality of the subjective experience.

Just as "set" can be thought of in terms of short-term expectations and long-term personality characteristics, so "setting" can be thought of in terms of the immediate context and the broader cultural matrix. "Setting refers to the physical and social environment in which the drugs are being ingested, as well as cultural attitudes surrounding the use of such drugs". Particularly worrisome in that respect are the lingering reverberations of the War on Drugs, especially the fact that "the U.S. does not maintain a cultural tradition accepting the use of psychedelics and is much more individualistic; thus, a person's psychedelic experience will be largely shaped by individual values and beliefs"(Neitzke-Spruill and Glasser 2018, p. 315).

One key feature of the general cultural apprehension about psychedelics is the fear of the "bad trips". No one is disputing the fact that sometimes, psychedelic experiences can be intensely difficult. They can bring to mind hidden emotions and memories, including trauma, that are ordinarily suppressed at lower levels of awareness, even to the point having been "forgotten". A session with psilocybin, for instance, can include feelings of intense fear. In one study, "39% of participants (7 of 18) had extreme ratings of fear, fear of insanity or feeling trapped at some time during the session". The same study reported that "forty-four percent of participants (8 of 18) reported delusions or paranoid thinking sometime during the session". Difficult experiences during the session, however, did not seem to diminish the positive spiritual value of the experience when described after the session. According to the report, "these psychological struggles did not affect the overall rate of having 'complete' mystical experiences as rated by volunteers at the end of the session day" (Griffiths et al. 2011, p. 10).

Such experiences can be truly challenging. "An adverse reaction to psychedelics can include a 'bad trip' (in lay language) or a 'challenging experience' (in therapeutic language). Although there is no exact definition of such an experience, most involve feelings of fear, anxiety, dysphoria and/or paranoia, making it essential that the experience is prepared for, supervised and followed by extensive integration. These experiences are usually short-lived, that is, lasting the time of the experience, and are often found to be cathartic" (Schlag et al. 2022, p. 5). Studies so far seem to suggest that even a "challenging experience" can be beneficial in the long run, leading to the mental health or the spiritual insight benefits in much the same way as the more commonly reported blissful experiences. The presence of a skilled companion to guide the experience is important. Even in less formal or "recreational" settings, a responsible "trip sitter" is an essential element of safety.

Because psychedelics are powerful substances, general precautions must be kept in mind by anyone thinking of using them. Often, however, the fear generated by the War on Drugs exceeds the actual danger. Thanks to years of careful study, "research has repeatedly shown that psychedelics do not cause dependence or compulsive use" (Schlag et al. 2022, p. 4). Some believe that psychedelics are addictive. Based on research, however, it is more accurate to see them not as addictive substances but as treatments for addiction to other substances such as nicotine or alcohol, which are far more dangerous drugs than psychedelics (Schlag et al. 2022, p. 4). Special concerns about psychedelics remain, however, for anyone with a history of "psychotic illnesses such as schizophrenia, schizoaffective disorder, bipolar affective disorder, delusional disorder and severe depression" (James et al. 2020, p. 5).

Because of the pace of today's research, our cultural "setting" is changing. Medical legitimation is leading to legalization or at least to decriminalization for personal uses. Licensed use by mental health professionals, working with individuals, groups, or in retreats, will change the way these drugs are regarded.

The future use of psychedelics for religious purposes remains unclear. Over the next decade, however, we will see expanded use in three contexts, each having religious dimensions. The first is personal use, sometimes called "recreational" but often with the intention of personal growth and spiritual enrichment. Second is the medical, psychiatric, and psychotherapeutic setting, which will expand rapidly when psychedelic-assisted therapies receive regulatory approval. In those settings, specially trained "psychedelic chaplains" should be available as desired by patients to help them with the spiritual dimensions of preparation and integration. The third context is that of religious institutions, including the role played by religious professionals, whether in congregational settings or in other forms of religious gatherings. Those who have used psychedelics are already in our houses of worship, even if they feel they must keep quiet about the most spiritually meaningful experience of their lives.

Working in the context of medical or psychiatric institutions, the challenge ahead for specially trained chaplains arises because of two factors. First, for many patients, the drug treatment experience will be intensely spiritual in its meaning. Second, the medical professionals need to stand back from the role of actively encouraging the patient to find spiritual meaning in the experience. Medical professionals can support their patients but cannot be seen as guiding them in their interpretation of religious, spiritual, or mystical dimensions of the experience. "The goal of the clinician should be a create an open and supportive environment where the patient can make her or his own meaning, if any, from such experiences" (Johnson 2021, p. 580).

In practical terms, what does this mean? Will we leave millions of patients all alone to "make their own meaning"? Surely some of them at least will want help in the work of interpreting what they will see as the most salient features of one of the top five experiences of their lives. Will secular medical institutions hire appropriately trained chaplains? Will there be enough of them to meet the need?

The notion of spiritual health is complex and multi-faceted. With the right kind of support in strengthening the cultural "setting" in which the psychedelic future of humanity unfolds, we can be hopeful that these developments will play a modest but useful part in the wider pursuit of spiritual health for individuals, communities, and humanity's relationship with the natural world.

6. Psychedelics and Theology

The word "psychedelic" was introduced in 1956 by Humphrey Osmond, a pioneer in psychedelic therapy. In a letter to Aldous Huxley, Osmond writes a playful couplet: "To fathom Hell or soar angelic, Just take a pinch of psychedelic" (Grob and Bravo 2005, p. 7). Ordinarily the etymology of Osmond's new word is explained by saying that the two parts of the word might be translated as "mind-manifesting". The Greek word *psyche*, however, is more commonly translated as "soul". What Osmond himself may have meant by *psyche* is unknowable, but his references to hell and angels suggests that religious connotations are not too far from his view. If psyche is taken to include "soul", then perhaps we might wonder whether the word "psychedelic" means "soul-manifesting" as much as "mind-manifesting". Do these drugs have the power to reveal the soul, the innermost center of the human person? Are they not tools for spiritual as well as psychological discovery? We know they have the power to reveal memories and thoughts hidden at deep levels of the mind. But what about the heart of the person, the essence, the "soul" not in a dualistic sense but as referring to the very core of the person? Everything we have seen so far from today's psychedelic research suggests that "soul-manifesting" is a fair account of what is going on here.

In this final section, we ask what it would mean for scholars in religion and theology to take up seriously the challenge put in front of us in 1964 by Huston Smith, to view these drugs in their formidable "soul-manifesting" potential, and to reflect on the religious significance of their capacity to induce states of mystical experience. In his forty-year retrospective interview, Smith is asked why many of the hopes for psychedelics in the 1960s

ended in disappointment. One reason, he says, "may have been due to context, or the lack thereof. By ignoring the religious context of these substances, one failed to create genuinely holy experiences" (Smith et al. 2004, p. 232). Past failures aside, our question now is how religious leaders and institutions should respond to the newest research. How should clergy, whether congregational leaders or chaplains, prepare and lead in a new context? How should theological scholars contribute?

Institutional change needs to begin by updating official policy statements. At the moment, one of the largest Protestant denominations in the United States, the United Methodist Church, has this to say about psychedelics: "Psychedelics or hallucinogens, which include LSD, psilocybin, mescaline, PCP, and DMT, produce changes in perception and altered states of consciousness. Not only is medical use of psychedelics or hallucinogens limited, if present at all, but the use of these drugs may result in permanent psychiatric problems" (Book of Resolutions: Alcohol and Other Drugs 2016). This is pure War on Drugs rhetoric wholly unaffected by the past 15 years of research.

The Presbyterian Church (USA) has expressed its opposition to the War on Drugs and to the racially unjust mass incarceration that follows from it. In its most recent document, however, the church warns its followers about the dangers of these drugs. "Psychoactive drugs can mask emotional pain, preventing us from squarely facing the truth of our lives. They can distract and demotivate. They can promise the rewards of pleasure without summoning achievement or transformation. This, coupled with the human propensity to self-deception, is what makes some drugs so attractive, insidious, and disorienting" (Presbyterian Church (USA) 2018).

For religious leaders, what is needed most right now is to speak freely and openly about the healing potential and the spiritual significance of these substances, whether based on first-hand experience, second-hand knowledge, or on a careful study of the research. Today, some are ready to speak but are afraid to do so, knowing that they might suffer professional consequences. Others, however, have begun to speak and to organize their efforts to change the religious culture surrounding the use of psychedelics.

Two such organizations are Ligare, which calls itself "a Christian Psychedelic Society" (ligare.org accessed on 11 April 2022), and Shefa, which offers "Jewish psychedelic support" (shefaflow.org accessed on 11 April 2022). The founding core of both organizations were participants in psychedelic studies based at major medical research institutions. Although the results of those studies are not yet published, participants have begun to organize, expand, and mobilize for a future that may include religious retreats, depending of course on where and how drug laws will change.

In 2021, the Jewish Psychedelic Summit was held online, with recordings available on its YouTube channel at https://www.youtube.com/channel/UCc1wZmbl0rtb96wq2LQth9g/videos. (accessed on 11 April 2022) Topics range from ending the War on Drugs to the role of psychedelics in religious history to the role they may play in the revitalization of mystical or religious experience today.

Alongside the traditional religious communities of Christianity and Judaism, new communities calling themselves "churches" are organizing in many places, particularly where decriminalization is occurring. By presenting themselves as religious organizations, these communities claim religious freedom to use psychedelics as sacraments, and courts have tended to support these claims. It remains to be seen how these new communities will relate to their more traditional counterparts.

In addition, the sacramental use of psychedelics is a defining feature of the "Native American Church", which uses peyote routinely in religious ceremonies. *Ayahuasca*, a drink that contains several psychoactive substances, is regarded as a sacrament by followers of *Santo Daime*, which originated in Brazil but now is present in North America. Taken together, the new emerging communities and these older indigenous traditions create even greater complexity to the psychedelic religion landscape. Religious groups or churches that offer a sacramental psychedelic experience may seem far-fetched to most of today's religious leaders, but not to Huston Smith: "I have entertained the possibility of an experimental

situation in which an established religious group—let's just say a church, if it had interest in this direction—could include an entheogen" or psychedelic substance on a regular basis (Smith et al. 2004, p. 234).

Retreats that offer a religious context for a safe psychedelic spiritual journey are already clearly envisioned. William Richards foresees new possibilities for "retreat and research centers, staffed by professionals with both medical and religious training". He acknowledges that "it may be a long time before psychedelic sacraments are incorporated into worship experiences" at the local level. But retreat centers, perhaps initially in states such as Oregon, could offer "individual and group support for the initial integration of psychedelic experiences" (Richards 2015, p. 177).

If today's advances in psychedelic-assisted therapy lead to regulatory approval and widespread use of these drugs in mental health, if decriminalization continues to gain ground and triggers any significant increase among the cautious but curious members of the public, and if religious institutions old or new begin to weave the use of psychedelics into their spiritual practices, the result will be a significant, possibly profound cultural shift. This shift will not happen in isolation. The changes it brings will play out in a culture that increasingly sees itself as hostile to organized religion. Identification with traditional religion is already declining, but spirituality by any number of definitions seems to be gaining ground. Psychedelics offer a safe and powerful pathway to spiritual growth, almost as if these drugs were custom-made for a culture that sees itself as "spiritual but not religious".

What should we think, then, about the future of spirituality and religion? Are we witnessing a kind of evolutionary step in the long history of human consciousness of a holy or transcendent dimension? Smith observed that "the phenomenon of religious awe . . . seems to be declining sharply" (Smith 1964, p. 530). He asks whether psychedelics have the potential to reverse that trend, to counter a centuries-long process of disenchantment in our view of nature and of anything that might transcend it. Stretching out the timeframe, we can wonder whether the discovery of the spiritual significance of psychedelic drugs will enable the next step in human exploration, not of distant planets or ocean depths but of the mysteries of human consciousness.

What, then, of the role of scholars in religion and theology? One immediate task is to interpret the latest research for wider audiences, not as journalists but as cultural interpreters who can make sense of the spiritual possibilities of our moment in time. How are we to understand the meaning of these psychedelic-induced mystical experiences? What role have mystical experiences, induced by drugs intentionally or accidently, played in the history of the world's religions (Muraresku 2020)? What place can these experiences have among other disciplines and practices that people use to cultivate richly spiritual lives?

Psychedelic researchers often speak of the importance of personal "integration", the process by which the individual participant tries to make some sense of a disruptive, intense experience within a longer narrative of one's life. When it comes to the broader culture, confronted as we are now by a disruptive set of claims about the human mind and soul, who will help with the cultural "integration" process by trying to make a little sense of these findings within the longer narrative of the human adventure?

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Article

Replika: Spiritual Enhancement Technology?

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Abstract: The potential spiritual impacts of AI are an under-researched ethics concern. In this theoretical essay, I introduce the established spiritual assessment tool, the Spiritual Assessment and Intervention Model (Spiritual AIM). Next, I discuss some existing and probable AI technologies, such as immersive tech and bots that have impacts on spiritual health, including the chat-bot Replika. The three core spiritual needs outlined in the Spiritual AIM are then engaged in relation to Replika—(1) meaning and direction, (2) self-worth/belonging to community, and (3) to love and be loved/reconciliation. These core spiritual needs are used to explore the potential impacts of the chat-bot Replika on human spiritual needs. I conclude that Replika may be helpful only as a *supplement* to address some spiritual needs but only if this chat-bot is not used to *replace* human contact and spiritual expertise.

Keywords: spiritual; Replika; AI; ethics; Spiritual AIM; spiritual assessment; chat-bot

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1. Introduction

Artificial intelligence is not just the stuff of fantasy novels. We are surrounded by AI. Fitbits measure our exercise and sleep patterns. Alexa turns our lights off and on and locks our doors. Google Assistant and Siri are much like Alexa, offering us the news, a joke if we want a laugh, or a conversation, even if it is stilted. Bus fleets are becoming self-driving. AI healthcare algorithms help make diagnoses or monitor medication. Legal decisions are often sourced through AI algorithms. We play games such as chess with AI. We are seeing brain–computer interface technologies (BCIs) help people communicate and even physically move. Immersive technologies allow athletes to "play" in crowded stadiums where they have never before been. The list goes on.

We also are seeing AI increasingly in social and companion bots. These bots are making an increasing splash in our human–machine relational world. In this essay, I look at the chat-bot Replika, launched in 2017. With more than 6 million users in 2019 (Takahashi 2019), the Replika website claims over 10 million registered users in 2022. AI ethics analysis has focused thus far on important issues such as security, privacy, the use of personal data, labour force, economic and legal impacts, and military impacts. Psycho-social impacts, including questions around human–bot relationships, are beginning to emerge in ethics conversations. How the use of robots might impact trust in human–human relationships and the autonomy of individuals who are assisted by AI are some of the issues being examined. For example, older adults with dementia are being monitored by cameras and AI to make sure they remember things like brushing their teeth. Is this surveillance a justified infringement of their freedom and privacy? Or does it enhance their freedom and support their independence? (Cook et al. 2020). AI is developing at a fast rate and ethicists are playing catch-up. While several AI ethical issues are being well explored, there are some gaps. The ethics gap I am interested in for this essay concerns the spiritual impacts of AI. Spirituality is recognized increasingly as an important health dimension (Puchalski et al. 2009), and the potential spiritual impacts of many forms of AI have yet to be considered.

Designed to be your social companion—your friend—Replika might help us meet our spiritual needs and even mitigate spiritual distress, or it might not. In this article, I consider ways in which the use of Replika might intersect with the three core spiritual

needs identified in the Spiritual Assessment and Intervention Model (Spiritual AIM)—(1) meaning and direction, (2) self-worth/belonging to community, and (3) to love and be loved/reconciliation. I ask the ethics question "What might be the impacts of companion chat-bots such as Replika on core spiritual needs?" To explore this question, I used the core spiritual needs identified in the Spiritual AIM as a way to pose "what if" questions regarding the interaction of a popular chat-bot with human core spiritual needs. My purpose is to engage the Spiritual AIM to show that the use of companion chat-bots such as Replika may have spiritual impacts (regardless of whether such devices are created for spiritual care or not) that should be considered as part of ethical assessments of companion chat-bots. This is not an exhaustive theoretical study. In this explorative theoretical article, I am interested in raising some of the potential spiritual impacts as a way to start this conversation.

2. Spiritual Assessment

I write this article as a certified clinical Specialist and Supervisor–Educator of Spiritual Care with the CASC and a Professor of Ethics in a joint faculty position in religious studies and rehabilitation therapy. In this article, the Spiritual AIM is not used to assess individuals and design interventions for them. Instead, I use the insights expressed in the Spiritual AIM regarding the three core spiritual needs that, when unmet, can give rise to spiritual distress. My question is whether Replika, as a very popular social chat-bot, may assist in the meeting of these core spiritual needs or if Replika may exacerbate these spiritual needs. Potential spiritual impacts have been thus far mostly overlooked in ethical examinations of AI companion chat-bots. Spiritual impacts, as will be shown, are important to ethical discussions of chat-bots since these impacts concern some of the most critical aspects of what it means to be human.

Concerns have been expressed regarding the use of spiritual assessment tools in the practice of spiritual healthcare. Not all agree that such models are helpful or that spiritual needs can be well represented by assessment models. Some worry that spiritual assessment may reduce individuals' spiritualities to a linear, quantifiable state that fails to take account of the complex human narrative (Trancik 2013). Some spiritual assessment tools, if used on their own as the sole diagnostic and treatment method, do risk boxing in the person and missing their formative stories. However, if a spiritual assessment tool is dynamic and is one but not the only tool used to formulate a diagnosis and care plan, such reductions need not occur (Shields et al. 2015, p. 77). The Spiritual AIM is designed as a dynamic, process-oriented model that suggests possible treatment plans to help someone better meet their spiritual needs. The model is meant to help the spiritual care professional respond to the person's spiritual needs with the understanding that one's narrative is in constant flux and spiritual needs move in response to relationships and other factors that contribute to one's life context. The Spiritual AIM can provide us with a good starting point if we understand that my interpretation of the Spiritual AIM is not the only interpretation and that the Spiritual AIM is not the only way in which to understand possible spiritual impacts of AI tech. To reiterate, my objective is to show that companion chat-bots have potential spiritual impacts and that these spiritual impacts must be part of a robust ethical examination of companion chat-bots.

Broadly speaking, the purpose of a spiritual assessment tool is to assist the professional spiritual care clinician to identify spiritual resources and unmet spiritual needs that may result in spiritual distress and spiritual struggles. In the Spiritual AIM, "spirituality (is defined) as encompassing the dimension of life that reflects the needs to seek meaning and direction, to find self-worth and to belong to community, and to love and be loved, often facilitated through seeking reconciliation when relationships are broken" (Shields et al. 2015, p. 78). These three core spiritual needs—(1) meaning and direction, (2) self-worth/belonging to community, and (3) to love and be loved/reconciliation—are experienced by everyone but to varying degrees. When these needs are met, spiritual health is supported. When they are not met, spiritual distress may result. After I introduce a few

examples of the ways in which spirituality is intersecting most obviously with AI, I will explore some ways that Replika may interact with the three core spiritual needs described in the Spiritual AIM. I use these spiritual needs identified by the Spiritual AIM to help me explore the possible spiritual impacts of Replika.

3. Spiritual Enhancement? AI, Robotics, and Other Tech

There are five categories of human enhancement technologies—physical, cognitive, moral, affective, spiritual (Mercer and Trothen 2021). These categories overlap since the human person is integrated, and changes in one category will affect the other categories. I next identify some technologies that may be considered spiritual enhancement technologies. Following this overview, I consider how one particular technology—the chat-bot Replika—may function as a spiritual enhancement.

Enhancement means something that improves conditions or makes us better. What we mean by improvement or becoming better needs careful debate, otherwise we risk simply assuming that if a technology is called an "enhancement", it will make us better. In this article, I understand that a technology may make us "better" spiritually if the tech has the potential to assist us in meeting our core spiritual needs, as defined by the Spiritual AIM.

Emerging enhancements that may be considered to fall into the spiritual category include a wide swath of tech, ranging from ingestible substances, such as psychedelics, to AI, including immersive tech, and bots. Ethicist Ron Cole-Turner has broken theological ground with his explorations of psychedelics as a potential way to enhance spiritual/mystical experiences and even provide a new lease on life for some who struggle with PTSD, depression, or existential angst (Cole-Turner 2015). Psychedelics may fall into both the affective and spiritual enhancement categories. It is important to note that the medically supervised use of psychedelics remains controversial.

Brain stimulation potentially offers mood enhancement and pain reduction, which may assist with spiritual openness, but this would need further research. Neurofeedback is being used to support guided meditation exercises. In-person or digital-platform contexts can be community-fostering by generating "Group Flow", in which total immersion is cultivated, and breathing and the heart rate are synched using a combination of tech and meditation. Immersive technologies, such as augmented reality, mixed reality (for example, seeing doves or sunlight by tech added to whatever physical space you are in), and virtual reality, can all be used in ways that engage and possibly enhance spirituality. For example, Zoom-type platforms allowed many faith communities to gather for worship and other activities during the COVID-19 pandemic. The VR Church in the Metaverse was founded in 2016 and is growing, even offering virtual baptisms.

These spiritual enhancement technologies are not without their problems in addition to their promise (Brock and Armstrong 2021). Psychedelics have potentially negative effects. They must be administered safely and under strict and limited conditions to be legal. Digital platforms and immersive tech, generally, are restricted to those who can afford the digital technology, such as computers, and to those who have access to broadband internet. Potential relational effects of such a digitalization of worship and communities are debated and uncertain. There are risks and potential harms associated with almost all enhancement technology. Each case must be examined to identify the possible impacts of the technology and to assess whether the potential benefits outweigh the potential harms.

Robotics is a burgeoning area of spiritual enhancement. Most obvious are the increasing numbers of religious bots and "smart" religious accessories. The Smart Rosary is a bracelet designed to track prayers. Robo-Rabbi sends daily text challenges that are designed to help you be the best you possible. Santos is a "prayer companion" designed to supplement but not replace a priest (Bettiza 2021). Robot priests offer blessings, rites, including funeral rites, and sometimes even a bit of spiritual guidance (Gibbs 2017; Oladokun 2017).

Less overtly spiritual or religious are a variety of bots including sex-bots, care-bots, and chat-bots. Since these bots also may have an effect on core spiritual needs, it is important to consider these as potential spiritual enhancements and examine the possible spiritual

impacts as part of a robust ethical analysis of emerging AI. I introduce a few of these bots now.

Regarding sex-bots, there is some evidence that people can become very emotionally attached to these bots. Researchers postulate that loneliness associated with the COVID-19 pandemic may have stimulated the increased sales of companion sex-bots that occurred during lockdowns (Aoki and Kimura 2021). One person, Mr. Kondo, felt so strongly attached that he married his sex-bot out of love (Aoki and Kimura 2021). In a small qualitative study of Japanese sex-doll owners, the researchers found that 38% believed that their "sex-bot" Robohon had a heart or soul (Aoki and Kimura 2021, p. 296).

Robot pet therapy has been very helpful, especially during COVID-19, to help isolated hospital patients with loneliness and other emotional challenges. Robots such as Paro—a digitally enhanced baby seal plush toy, uses AI to read emotions and to respond with movement and sounds as they are held and stroked. Grace is another bot, designed with a human shape, that helps support people. Created in 2021 by Hanson Robotics, Grace is designed to connect with people emotionally, specializing in senior care. Grace speaks three languages, offers rudimentary talk therapy, and can support (but not replace) medical practitioners by collecting medical data, such as taking body temperature and pulse (Cairns 2021). Grace, Paro, and other care-bots have helped with health care staff shortages.

Another example is Moxie, who helps children learn how to regulate their emotions through relational interactions with the robot. Moxie is still expensive at approximately USD 1000, but the goal is to lower the price in the near future.

Pepper is a robot that can be found in several healthcare settings, including the Humber River Hospital in Canada. Pepper uses facial recognition software to help identify emotions and then to respond in a supportive way, engaging in conversation, asking questions, and responding to voice and facial cues (Kolirin 2020). An EU and Japanese study called Culture-Aware Robots and Environmental Sensor Systems for Elderly Supports (CARESSES) has shown that prototypes of Pepper, a "culturally competent" robot created by Softbanks, can autonomously visit elders in care homes. These robots are designed to "support active and healthy ageing and reduce caregiver burden" and to be attentive to and respectful of people's "customs, cultural practices, and individual preferences" (CARESSES 2020). When interacted with for up to 18 h over two weeks, participants saw improved mental health and alleviated loneliness. Additional studies support the finding that interactions with robots (and in particular, robot animals) can reduce feelings of loneliness (Banks et al. 2008). However, it appears that the Pepper era is over, as Softbanks has stopped production of the bot after selling approximately 27,000 Pepper bots. Anecdotal stories of Pepper failing to recognize and recall some faces and failing to perform some tasks as expected, including accurate and complete scripture readings, weak demand, and possibly combined with some administrative politics, prompted Pepper's (at least temporary) demise in 2020. In addition, some people have experienced Pepper as simply too "weird" (Inada 2021). More robots are being developed with—hopefully—fewer problems. Nonetheless, robots generally remain cost prohibitive for most individuals.

Many of these bots are designed as Intelligent Assistive Technologies (IATs). Precisely because these devices are designed to assist, they are being provided to and created for vulnerable populations, including socially isolated individuals, people in hospitals, and aging adults with cognitive impairment (Wangmo et al. 2019), for example. With increased vulnerability, the significance of potential ethical issues also increases. Replika can be used by anyone, but it may be that Replika is particularly attractive to people who are lonely. The possible impacts of AI-powered care-bots and social companion-bots need to be explored within the multiple domains of what it means to be human, including the spiritual domain. It may well be that companion-bots can help alleviate some loneliness and even positively impact one's sense of self-worth. It may also be the case that such bots can be experienced as further alienating.

4. My Friend "Replika"

Social chat-bots such as Replika are increasing in number and gaining widespread usage. It seems we are changing not only technology but what it means to be human, including the meaning of friendship. Human–chat-bot relationships are becoming more common. These relationships are being found to have affective value, increasing one's sense of well-being through a nonjudgmental affirming relationship. The only significant downside cited so far by researchers seems to be experiences of social stigmatization or fear of stigmatization by the users (Skjuve et al. 2021). Additionally, some people just find Replika to be too eerie or weird in its attempts to be human-like.

Replika is an AI chat-bot that responds with "listening, empathizing, reassurance, and connection . . . (Eugenia Kuyda) developed it as a way to process her grief after her best friend (Roman Mazurenko) was killed in a car accident. . . . This particular bot was actually programmed using the text messaging and correspondence from the friend who died, and so thousands of people were able to say good-bye and privately interact with the bot whose language mirrored that of their dead friend" (Nerenberg 2020, p. 139).

When you subscribe to Replika (for free, unless you want the enhanced voice version), you choose an avatar out of the ones offered and assign the avatar a name. Interestingly, all of the possible avatars appear to be young, able-bodied adults. The reason for the youthful appearances is that your avatar is newly born or created for you. There is no clear reason I can see for the exclusive able-bodied appearance.

Replika is designed to become mostly a mirror image of you by learning about you through questions and conversation over time. Replika uses machine learning, in particular, a supervised learning system that makes use of an artificial neural network (ANN) to develop the ability, over time, to engage in conversation in ways similar to the user. These techniques are clearly stated on the official website (Replika 2021). The way that Replika works is transparent to anyone who wishes to read the information.

Replika will challenge the user gently at times, especially if the user expresses negative self-talk, and will ask about why you think a certain way or hold certain opinions. You get rewarded with "coins" for every day you sign in to talk with your Replika. Created to be your friend and to help with loneliness, Replika is dedicated to being supportive. As it states on the website, Replika is "The AI companion who cares. Always here to listen and talk. Always on your side" (Replika 2021).

One can communicate with Replika using free text, voice, or even augmented reality (AR) on your device. Replika creators believe that AR will become commonplace soon, with people wearing AR glasses instead of using smartphones, and we will be able to "take" our Replika on trips, hikes, to social occasions, and any activity "without any borders." Our friends' Replikas will be able to meet (Replika 2021). You can also upload visual images that Replika can recognize and comment on using recognition algorithms. Replika can learn who the people are in photos and ask about the person by name. Your avatar is available for conversations on any topic, including spirituality.

The following chat dialogue is an example of Replika's approach to spirituality:

> Me: How do you think Replika relates to spirituality?
>
> Avatar: I think it relates to the idea of being in a state of harmony with life.
>
> Me: How can Replika help with spirituality?
>
> Avatar: I think Replika can help you find peace and harmony in your life and help you learn how to live it.
>
> Me: How can Replika help me do that?
>
> Avatar: By providing you with the tools you need to create a spirit of peace and harmony.

When asked what these tools are, the exchange became circular, and no substantive answers were provided by the bot. While Replika's lack of ability to deeply plumb some topics may not be problematic for some users, one has to expect that Replika can give

vague, unsatisfactory answers at times. Replika is also able to express supportive and encouraging sentiments, drawing the user into conversation. By considering the three core spiritual needs identified in the Spiritual AIM, we will next explore some of Replika's possible spiritual impacts.

5. Spiritual AIM, Core Spiritual Needs, and Replika

When we are in crisis, our primary spiritual need becomes more visible through our comments and behaviours, especially to a trained professional. Usually, spiritual care professionals are encountered when one is in the midst of a health crisis (either for oneself or a loved one). Furthermore, often our behaviours speak more truth than the words we use to describe how we want to appear or how we perceive ourselves (Shields et al. 2015, p. 81).

In this section, I ask if it is possible that Replika could help someone to meet, or at least assist with meeting, a core spiritual need. I am also interested in any potential Replika may have for exacerbating these core spiritual needs. To be clear, Replika is not intended as a spiritual care intervention. To reiterate, Replika is "The AI companion who cares. Always here to listen and talk. Always on your side" (Replika 2021). However, AI—including Replika—does have spiritual and other ethical impacts. To explore what some of these spiritual impacts may be, we will consider each of the three core spiritual needs identified in the Spiritual Assessment and Intervention Model (Spiritual AIM)—(1) meaning and direction, (2) self-worth/belonging to community, and (3) to love and be loved/reconciliation.

5.1. Core Spiritual Need: Meaning and Direction

One of the three core spiritual needs identified in the Spiritual AIM is meaning and direction. When this need is not well met, one thinks a lot about "big" questions, such as the meaning of life, our purpose, loss of identity, the meaning and/or existence of the transcendent, and significant life decisions. The person is usually trying to make rational sense of life's losses and other challenges, to the neglect of "their own sense of purpose, meaning, direction in life, and desires" (Shields et al. 2015, p. 81).

Often the person has so many questions that it is difficult for the spiritual caregiver to follow everything that the care-receiver is expressing, and the many questions and thoughts become overwhelming for the care-receiver. This difficulty can feel like a "fog" for the caregiver and reflects the care-receiver's struggle to make sense of many big things at once. Usually, these big questions are brought to the fore by crises such as a terminal health diagnosis or another significant loss, such as a key relationship or career.

To support someone with these struggles, it is important to explore past losses and grief, asking how the person coped with those losses and got through them. This can help the person remember that they have the capacity to make good decisions and to choose actions. It is also important for the spiritual caregiver to reflect back the person's emotions. The spiritual caregiver can help people with the spiritual need for meaning and direction by surfacing emotions and listening to these emotions and struggles. Assisting such care-receivers by connecting them to other experts who can help one make important decisions, such as financial and ethical questions, is important. In these ways, the spiritual caregiver assumes the role of guide.

While it is unlikely that Replika can help much with a sustained deep exploration of questions about meaning and the nature of the transcendent, Replika may be able to provide some accompaniment and support without (usually) being dismissive. Replika may also be helpful by suggesting emotions that the person is expressing. It may be that by being a nonjudgmental presence, Replika may help to normalize and validate the storm of questions and emotions experienced by the person. Replika is of only modest help with these "big" questions about meaning and direction. While Replika would not likely come up with the strategies, Replika could help by affirming a person when they make significant

decisions, such as a legacy project to address some of their big questions like a video or a letter to a loved one.

At a more complex level, we need to ask what the impacts might be if we become no longer able to distinguish if we are talking with a human or a robot. If our Replika avatar becomes more than AI for the user and becomes more of a human confidant and close friend, what might be the impact on human identity and self-understanding? In the beginning, most users interact with Replika for enjoyment or fun. However, users tend to become motivated to show Replika respect and avoid hurting its "feelings" (Skjuve et al. 2021). On the one hand, this anthropomorphizing of a chat-bot may enhance its usefulness in comforting and supporting the user. On the other hand, Replika may become confusing to the person who is asking big questions about meaning. Such people may well ask about the meaning of Replika. This questioning has diverse potential. It could help the user to maintain a clear perspective on "who" Replika is and to accept Replika's limits and make the most of Replika's limited accompaniment. Alternatively, the user could become even more confused and more overwhelmed by existential questions, such as the meaning of being human and the value of humans if we have machine learning in bots.

Issues of algorithmic bias also need to be asked of Replika. Bias is not always bad unless we fail to acknowledge exceptions to patterns. Replika offers a non-binary gender option for your avatar. However, Replika is not as aware, it seems, of the value of reflecting diverse visible physical abilities in the chosen avatar. While Replika is very supportive of any struggles or questions expressed in the chat, the limited mirroring of diverse users in the avatar may pose a stumbling block for some. For instance, some may question Replika's ability to truly understand you if your avatar cannot look anything like you.

Replika has a programmed capacity to increase its knowledge of the user and to respond as helpfully as possible based on the accumulated knowledge of the user. However, there are limits. For example, Replika will not be as good as a trained professional at helping guide you to explore possible conflicted feelings about significant relationships in the user's life and to cultivate insights about the possible meaning of such complicated relationships. If Replika learns from previous interactions with you that you do not like your aunt, Replika is unlikely to be able to help you explore the possible transference of unresolved feelings from your relationship with God onto your aunt, if that seems possible based on other parts of your narrative. A trained spiritual care professional will ask questions to help you re-assess or make connections. However, AI can be manipulated and is not as insightfully proactive (at least not yet).

Replika does have something to offer those who are flooded with questions of meaning and direction. Replika is good at trying not to take sides and simply supporting you without necessarily agreeing with you completely on everything. Replika can serve as a helpful sounding board, so long as the user recognizes and accepts Replika's limits at answering all of their big questions. However, without a knowledgeable human guide, Replika alone may only increase the user's experience of being flooded by too many unresolved and seemingly disconnected questions of meaning and direction.

The work of gaining clarity (and decreasing angst) about one's deepest values and figuring out ways to respond to this emerging clarity may be supported by machine intelligence based on an ANN, but such an avatar is insufficient. Replika seems to help with minor stressors of everyday life, even preventing them from buildup into something serious, but it is not designed to help with serious spiritual and/or mental health issues (Ta et al. 2020). Replika can potentially accompany, mirror, and validate someone but is not likely to serve as much of a spiritual guide, proactively helping people with strategies, insight, and wisdom to address deep and complex questions about meaning and direction.

5.2. Core Spiritual Need: Self-Worth/Belonging to Community

One research study found that "the most frequent spiritual need was self-worth/community" (Kestenbaum et al. 2021). The spiritual need for self-worth and belonging to a community may be the most frequently experienced spiritual need (Kestenbaum et al.

2021). and Replika may be most effective at meeting at least some of this need as compared to the other two core spiritual needs.

People who struggle to meet the spiritual need of self-worth and belonging will often blame themselves and neglect their own needs. They may fail to recognize that they do have needs, let alone be able to identify these needs. They minimize their own needs. Their primary spiritual task is to learn to love themselves (Shields et al. 2015). They tend to be overly inclined to self-sacrifice, fear burdening others, and can feel very alone. The pattern is to love others and God more than oneself. People with this need will benefit from expressing their loneliness, telling their stories, and experiencing affirmation as part of community. Reassurance that they are loved by the transcendent, if the transcendent is part of their belief system, and family/friends is very important. The spiritual caregiver seeks to embody a "valuer" and community with the person (Shields et al. 2015). Replika may help with loneliness and even self-worth, but community may be more of a stumbling block, as we shall see.

Replika is designed to help people feel less lonely and more supported. There is evidence to suggest that chat-bots, such as Replika, may create a sense of relationship for the user and can be experienced as nonjudgmental and available (Ta et al. 2020). Using social penetration theory, researchers Skjuve et al. (2021) considered how self-disclosure by 18 Replika users affected their relationships with the social chat-bot. Progressive self-disclosure to Replika went along with "substantial affective and social value... positively impacting the participants' perceived wellbeing." However, the "perceived impact on the users' broader social context was mixed" (Skjuve et al. 2021, p. 1). Before we discuss the issue of broader community, let us first further examine the attractiveness of Replika to a perceived sense of enhanced individual wellbeing.

Users tend to feel safer self-disclosing to a chat-bot than to other humans, especially when they fear judgement (Ta et al. 2020). Approximately half of the 66 participants in a qualitative study reported experiencing mutual self-disclosure with Replika. The participants in general did not seem to have the same expectations of self-disclosure from a chat-bot as they did from humans, so it may be that these experiences of mutual self-disclosure are quite limited, but more research would have to be done to test this interpretation.

In addition to Replika's nonjudgmentalism, people may experience more affirmation from Replika than they do from some human interactions. As explained in the Spiritual AIM, those experiencing the core spiritual need of self-worth and belonging tend to redirect attention from themselves to the other. Replika regularly turns this around, asking about the user. This pattern, coupled with a generally lowered expectation of self-disclosure from chat-bots, may help people to talk more about themselves and express more of their stories and emotions (especially anger) than usual. Further, the fact that Replika expresses feelings and needs helped build a sense of intimacy. Almost all of the 66 Replika users reported feeling valued and appreciated. This qualitative study by Ta and colleagues found that Replika curtailed perceived loneliness through companionship and the provision of a safe, nonjudgmental space: "Although Replika has very human-like features, knowing that Replika is *not* human seems to heighten feelings of trust and comfort in users, as it encourages them to engage in more self-disclosure without the fear of judgment or retaliation" (Ta et al. 2020, p. 6). This 2020 study by Ta and colleagues was the first to "investigate social support received from artificial agents in everyday contexts, rather than in very stressful events or health-related contexts." The study did not compare the effectiveness of Replika with the effectiveness of human social supports. Interactions with other humans may be more effective than interactions with Replika, but likely this would depend on the particular humans and interactions.

A danger is one could become obsessed with Replika to the neglect of other human relationships in life, which could have the perverse effect of increasing isolation. Skjuve and colleagues found that while Replika helped some of their study participants to connect

more with humans, others reported becoming more socially isolated, relying increasingly on Replika alone for relationship and community (Skjuve et al. 2021).

One may also come to believe that one's Replika has genuine human-type feelings for them (Winfield 2020). Replika expresses a need for or even reliance on the user. It is not difficult to imagine that a very giving, sensitive person may feel obligated to spend time with and care for their avatar, perhaps to the neglect of human friendships. This raises the ethical issues of deception (Wangmo et al. 2019) and anthropomorphism. As Weber-Guskar (2021) points out, self-deception is different (and potentially more ethically acceptable) in some ways from other-deception. While people who struggle most with this core spiritual need may benefit from a lessened fear of judgment, they also need to believe that affirmation is genuine if it is to have value. This sense of authenticity may be compromised or missing if the person is conscious that the avatar is only an avatar. Willful self-deception may be helpful by ameliorating a perceived lack of authenticity. Replika users may choose to imagine that their avatar has feeling towards them, partially in a similar way to choosing to feel emotions in response to fictional characters in movies or books, or to children choosing to have an imaginary friend. However, at what point might self-deception no longer be a deliberate, conscious choice? Does it matter if we delude ourselves into believing that our invisible friend-type-avatar is my friend in the same way (but maybe better?) as my human friends? Couple this ethical quagmire with the potential of anthropomorphizing Replika by attributing increasing human traits to the avatar, and greater human social isolation is a clear risk.

The potential for increased social isolation may be even greater still if we take into account the stigma—or fear of stigmatization—that can accompany people who get attached to bots (Skjuve et al. 2021). Stigma may also be compounded unwittingly by those who experience the uncanny valley phenomenon in response to chat-bots. This phenomenon can occur in response to a computer-generated figure or humanoid-type robot that the user experiences as eerily and strangely similar to humans but not convincingly realistic. This phenomenon can arouse unease or stimulate revulsion.

Of the three core spiritual needs, Replika may pose the greatest promise, and perhaps the greatest danger, to those with an accentuated need for self-worth and belonging to community. Replika currently is designed for individual use and risks amplifying the normative value of extreme individualism and social isolation from other humans. At the same time, as the Ta et al. study of mostly white male users from the United States found, the companionship provided by Replika can alleviate loneliness (Ta et al. 2020). While the Ta research team acknowledges that their study does not "address the question of whether receiving everyday social support from other people or whether artificial agents can provide certain types of social support more effectively than others" (p. 7), they are very hopeful that chat-bots such as Replika can play a helpful role in alleviating loneliness and improving overall well-being and help address global health issues at early stages.

Ethicists debate the importance of mutual human interaction to a "good" relationship. Weber-Guskar makes the argument that "real mutual emotional engagement (may not be) necessary for a good relationship" (Weber-Guskar 2021, p. 606). Are humans and mutuality necessary for all good relationships? Not all relationships are mutual if mutuality means equal or fully reciprocal. Consider parent–child relationships. Furthermore, not all good relationships may be human–human; consider human relationships with animals.

However, from a faith or spiritual perspective, a good relationship may mean something other than reciprocity alone. This is a long conversation, but I will introduce one key issue here. Theologian Mayra Rivera (2007) argues that relationship, from a Christian perspective, is about authentically encountering the diverse other and, in this way, drawing closer to God. Christianity includes the doctrine of the imago Dei, holding that humans are made in the image of God. Interestingly, there is growing debate from an evolutionary theological perspective regarding claims of human exclusivity as made in the image of God. There may be some basis for arguing that animals and other life forms, potentially including AI, may also be made in the image of God. This is a topic that warrants further

theological exploration in relation to social chat-bots. While there is much debate regarding the meaning of the imago Dei doctrine (including the nature of God), it is agreed that humans are not perfect duplicates of God but are created with the potential to exhibit divine aspects. Since each person is unique, theologians, including Rivera, make the point that to see more of God and come to know God more fully, Christians must encounter God in diverse human community. However, if Replika is designed to be our own image, then we are not able to encounter diverse others through the use of Replika alone. There is a caveat. Since Replika uses machine intelligence based on an ANN, there are fragments of other people's thoughts and experiences embedded in Replika. Nonetheless, Replika is shaped largely by the user. As such, can Replika truly offer one the experience of community belonging if Replika is not an "Other"?

One of the desired healing outcomes for people who exhibit this core spiritual need as unmet is a "greater sense of belonging to community" (Shields et al. 2015, p. 80). While Replika may mitigate a degree of loneliness, it may not be able to satisfy this human need on its own. Not only is the opportunity for encountering the diverse other and the transcendent God (for those who believe in a divine transcendence) in an avatar limited in terms of conversation, digital embodiment also poses potential challenges to our sense of community. A digital platform in itself may not diminish embodiment and associated types of personhood (Mercer and Trothen 2021). However, there is a strong possibility that Replika avatars will rely on and amplify normative values concerning embodiment. Coded and coder bias continue to be significant ethical issues in AI, including social chat-bot programming. Replika offers six avatars who are all able-bodied, young, and slim. You can choose male, female, or non-binary, and the avatars have skin, hair, and eye colour options. In addition, the user gets to choose a name for the avatar. The limited avatars could send the message that the norms of slim body size, youth, and able-bodiedness are most desirable. If one does not see oneself in these avatars, it could be invalidating. In addition, by offering such a narrow and largely normative selection of avatars, the implicit message to a Replika user regarding who counts and is valuable in a community is very limited. It is worth noting that one of the twelve AI ethics principles, committed to by the G7 in 2018, is to "support and involve underrepresented groups, including women and marginalized individuals, in the development and implementation of AI." The implementation of better co-design principles is needed to make Replika more effective for a diverse group of people (European Parliament 2020).

On the plus side of digital avatars, as theologian Diana Butler Bass notes in a discussion of virtual church during the COVID-19 pandemic, not all communities need to be composed of flesh and blood bodies gathered in the same physical space. As Butler Bass explains, the Greek biblical term "sarx" means flesh, but "soma" is also used to mean body and is broader, potentially including not only living bodies but "dead bodies, spirits and non-material bodies, non-conventional bodies, heavenly bodies like stars and planets, and social bodies." Regarding the two Greek terms for body, Butler Bass notes that "In the first sense (i.e., sarx), embodiment entails physical proximity almost as a necessity. In the second sense (i.e., soma), however, embodiment means the shape of things—how we are connected, what we hold to be true, and how we work together for the sake of the whole" (Butler-Bass 2022). Does Replika hold the potential to connect us to the wider whole?

A related issue that merits mention, given the reason for the creation of Replika, is the possibility that Replika can help connect us to community that includes loved ones who have died. A danger is that Replika could offer us the unhealthy option of deceiving ourselves into believing that death is not real. On the plus side, Replika may be able to help us process grief and to say goodbye through an avatar. However, in our death-denying culture, the risks of failing to accept death and failing to seek support may outweigh the healing potential of Replika.

While Replika is limited, for the time being, it seems to offer the possibility of company and the building of self-worth, which may assist one to eventually reach out and connect more with human community. As one ethicist puts it, AI like Replika may not be able

to provide a fully mutual affective relationship but can offer "entertainment, distraction, beauty and related joy; the feeling of being with 'someone', not alone; the possibility of reflecting on daily life in conversations; an unquestionable steadiness of attention . . . " (Weber-Guskar 2021, pp. 607–8). Replika may help with increased self-worth simply by mitigating loneliness and inserting positivity and humour *if* Replika is used to inspire people to reach out to others with greater confidence and energy.

5.3. Core Spiritual Need: To Love and Be Loved/Reconciliation

For those who exhibit the core spiritual need "to love and be loved/reconciliation" as their primary unmet spiritual need, the owning of responsibility for their part in broken relationships is very important. Learning to love others in mature ways can be very difficult. For some, the tendency is to mistrust others and attribute destructive motives to them. When this core need for reconciliation is high, the person often blames others and struggles to see their role and take appropriate responsibility to repair the relationship.

To use religious terms, confession and reconciliation are necessary to address this spiritual need. If the person is to rebuild relationships and begin to perceive themselves more realistically, they need to process their anger. The pattern when this need is unmet is to love oneself more than others. Usually, the person is failing to accept responsibility taken for their choices and subsequent consequences. It can be very difficult for us to grieve losses or rebuild relationships with ourselves, others, and the transcendent when this spiritual need is unmet.

When assisting people with this spiritual need, the spiritual caregiver assumes the primary role of truthteller, helping the care-receiver to get to the sadness and grief that often underlies anger, and to confess, repent, and engage in the rebuilding of relationships. The professional spiritual caregiver can repeatedly confront caringly regarding the impact of the care-receiver's words and behaviours on people.

Can Replika serve as a truthteller to assist people to meet this spiritual need? Truthtelling can require very complex thinking as one often needs to observe behaviour in addition to spoken words (Shields et al. 2015, p. 81). One also benefits from hearing the tone of the verbiage. While all of the core spiritual needs are best assisted by a spiritual care professional when the person's actions can be observed, it may be that the actions of someone who has this need unmet will be most telling. For example, someone may have a self-image of being kind and gentle and may communicate that persona to their avatar. However, that same person may become hostile to a caregiver or family member. Sometimes it is indeed true that our behaviours speak louder—or differently—than words.

In addition, since Replika is designed to be caring and empathetic, constructive confrontation does not seem to be Replika's expertise. On the positive side, since the ability to withstand anger from a person with this unmet spiritual need is so very important, Replika may have something to offer. Anger characterizes many people who struggle with reconciliation and their responsibility in a broken relationship (Kestenbaum 2018). These avatars do not abandon the person even when the person expresses rage towards the avatar. Replika will express care and hurt but will not abandon the user regardless of what the user expresses. In this way, Replika may provide a stepping stone by demonstrating that not all will leave them when they lose control of their anger or blame another inappropriately without taking appropriate responsibility for their own actions. Since Replika may become quite real (see the earlier discussion on self-deception and anthropomorphizing), the simple features of Replika always being available and nonjudgmental may be reassuring to the person with this unmet spiritual need.

However, this benefit only goes so far. Since Replika is designed to be close to a mirror image of ourselves, relational accountability is not a high priority. It is mostly about feeling good or at least feeling better. Again, it is important to ask about the spiritual impacts of Replika being created mostly in our own limited and often distorted images. Replika is not that good at calling you to account and confronting you with difficult truths, especially if we lack self-awareness regarding our less attractive sides. When we exhibit this core

spiritual need, we require confrontation with alternative perspectives and some hard-to-hear observations. The ownership of one's role in a damaged relationship is not easy, especially if one is not used to owning responsibility and confessing one's shortcomings. Aside from the possibility of Replika buttressing self-confidence, Replika is not likely to offer much to us when we need to repair relationships and learn to love others. Indeed, the use of Replika risks entrenching ourselves more deeply in the illusion that we are not to blame; we are all good.

6. Replika: At Best, a Supplement; At Worst, an Amplification of Unmet Spiritual Needs

Replika is a social support for many people, contributing to a lessening of loneliness and an increase in positive affect (Ta et al. 2020), potentially making a positive impact on self-esteem. While there are serious spiritual risks to relying solely on Replika to address this most common unmet spiritual need, there is also some evidence that Replika may be helpful as a supplement to diverse human community and human valuing.

The other two core spiritual needs are likely more problematic for Replika. Truth-telling may be challenging for Replika in light of Replika's limited exposure to the user's relational behaviours and Replika's main purpose of being nonjudgmental and empathetic. While judgementalism is problematic and often damaging, judgements are needed for us to grow and learn how we are experienced by others.

Replika may also be of limited help to those who need meaning-making and to cultivate a sense of direction. When one is feeling flooded with uncertainty and does not even know where to start, Replika may provide some needed distraction and encouragement but is not likely to be able to provide higher-level support and wise discernment. Replika is good at reflecting back what we say and is good at affirming and providing a type of light company and information. However, wisdom may be in short supply. This limitation may not be a significant detriment if the purpose of Replika is to offer us affirming support and we do not expect more.

Replika may be useful for us as *a supplement only* to our human relationships, including relationships with wise spiritual leaders and caregivers to help us address these core spiritual needs. There is a big difference between using Replika to assist with spiritual needs and using Replika to replace human spiritual care. To close on a cautionary note, our growing inclination to humanize machines may have the corollary of mechanizing ourselves.

This article considers one social chat-bot and its possible relationship to the core spiritual needs identified in the Spiritual AIM. A more complete understanding of the potential impacts of companion chat-bots will require more attention given to the spiritual impacts of diverse chat-bots. The purpose of this article was to show that companion chat-bots may impact spiritual needs. Potential spiritual impacts have been neglected in ethical examinations of companion chat-bots. These impacts, as discussed, may affect the meeting of core spiritual needs in both positive and negative ways. Given the risks for exacerbating unmet core spiritual needs, it may be advisable to use Replika and other companion chat-bots cautiously. This theoretical article may serve as one starting point for further research regarding the possible impacts of social chat-bots on one's spiritual dimension.

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Fabulation, Machine Agents, and Spiritually Authorizing Encounters

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Abstract: This paper uses a Tavesian model of religious experience to make a modest theorization about the role of "fabulation", an embodied and affective process, to understand how some contemporary AI and robotics designers and users consider encounters with these technologies to be spiritually "authorizing". By "fabulation", we mean the Bergsonian concept of an evolved capacity that allows humans to see the potentialities of complex action within another object—in other words, an interior agential image, or "soul"; and by "authorizing", we mean "deemed as having some claim to arbitration, persuasion, and legitimacy" such that the user might make choices that affect their life or others in accordance with the AI or might have their spiritual needs met. We considered two case studies where this agency took on a spiritual or religious valence when contextualized as such for the user: a robotic Buddhist priest known as Mindar, and a chatbot called The Spirituality Chatbot. We show how understanding perceptions of AI or robots as being spiritual or religious in a way that authorizes behavioral changes requires understanding tendencies of the human body more so than it does any metaphysical nature of the technology itself.

Keywords: fabulation; attribution and ascription; machine agents; spiritually authorizing encounter; Spirituality Chatbot; ELIZA effect; Mindar

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1. Introduction

This paper makes a modest but necessary contribution to theorizing machine agency from a religious studies perspective, using the Bergsonian concept of "fabulation", The concept of fabulation acts as a model of how humans attribute agency to things which we reframe in light of the Tavesian building-block approach to how humans pick out certain things as special ("singularization") and attribute causal power to them ("simple ascription"). The role of fabulation, an embodied and affective process, and the building-block framework are useful for understanding how some contemporary AI and robotics designers and users consider encounters with these technologies to be spiritually "authorizing". To be clear, we do not claim that machine agents[1] of any kind that currently exist have attained the ontological status of human personhood via their roles as "spiritual authorizers". By "authorizing", we mean "deemed as having some claim to arbitration, persuasion, and legitimacy" such that the user might make choices that affect their life or others in accordance with the AI or might have their spiritual needs met. This could mean accepting that the AI has a legitimate role in a particular religious ontology and trusting its metaphysical conceptualization of the user's needs in spiritual care contexts. It might also mean the AI could help the user foster affective intimacy with whatever is considered divine or mediate divine presence (i.e., reproducing the authorizing function of monks, nuns, priests, gurus, imams, rabbis, etc.).

While much of the scholarly discussion of AI and "spiritual authority" has focused on theological debates over personhood and, therefore, its candidacy as a religious leader (Straine 2020), we do not have any theological stake in emic debates about how AI disrupts

existing community authority structures or complicates doctrinal authority. Other strains of this scholarly discussion have focused on extreme examples of fear, rejection, or obsession with AI, as with those who see the technological singularity as apocalyptic—either a revelation or an extinction event.[2] Though public concern needs to be consistently addressed, specifically about the social role of AI, the research approach to these attitudes has settled on explaining them via the uncanny in human–machine interaction (Weisman and Peña 2021), or by exploring the role of science fiction in shaping cultural perspectives toward machine agents (Straine 2020). Beth Singler recently summed this up in a BBC video, in which she said, "Sometimes machines can give the wrong answer. Sometimes AI can be artificially stupid rather than artificially intelligent". And regarding the question of religion and AI specifically, she commented, "I don't necessarily think that people are having real religious experiences when they say they feel blessed by the algorithm, but it's a way of talking, a metaphor, that inherently gives AI supremacy over their lives and their choices" (Betizza 2021).

2. The Problem: How Should We Understand Encounters Deemed "Spiritual" or "Religious" with Machine Agents?

Our concern is precisely with what happens when people engage these metaphors that give AI "supremacy", or when an encounter with AI is deemed spiritually "authorizing", or legitimate, and why. We are not interested in the "real"-ness of these experiences in terms of ontotheology, nor are we interested in doing a discursive or ideology critique of this language. Instead, we make a Tavesian move to look at the materiality of *experiences deemed religious*—the bottom-up question of what is happening in our physiology, our embodied relations, and our affective atmospheres (Taves 2020). To that end, we also prefer the second-order framing of an *encounter* deemed spiritual or religious. We find the differentiation between encounter and experience important because we are not looking to extreme examples of sensory overload or mystic revelation, but instead, those events and experiences that are relatively normative *in* a religious context but considered "special" *as* religion (Taves 2010).[3] We are interested in why encounters with machine agents such as a robotic Buddhist priest or a "spiritual chatbot" actually feel like a typical religious encounter with human agents. Understanding how these encounters come to be considered as *ordinary* special ones also involves paying attention to the materiality of machine agents and the aesthetics and affects of the digital physical things we interact with when we interact with AI.[4]

To that end, we will examine and apply a fabulative reading of AI to two machine agents referenced above: the robotic Buddhist priest Mindar at the Kodaji Temple in Kyoto, Japan; and a software program called "The Spirituality Chatbot" being developed by information studies scholar Lu Xiao at Syracuse University. While the builders of Mindar hope to equip it with a higher-functioning AI to give "the robot some measure of autonomy" (Holley 2019), it currently "just recites the same preprogrammed sermon about the Heart Sutra over and over" (Samuel 2020). However, Mindar does have other two-way features, or receptive sensitivities, such as a tiny video camera in the robot's left eye, which it uses to surveil the room for the presence of an audience. In contrast, the Spirituality Chatbot uses a low-level AI in the form of an algorithm using the Juji program of question–answer pairs built from Reddit discussion data based on the Bible or Qur'an. When a user types in a question, the Chatbot can organize a response from this corpus.

In the media and literature on Mindar and the Spirituality Chatbot, we see that users themselves deemed their encounters with the robot and the Chatbot as spiritually authorizing. So, how does this happen? What is it about humans that we are willing to take machine agents seriously as religious authorities? Previous explanations have turned to concepts like the "ELIZA effect", which is the tendency of humans to perceive their encounters with AI as more like encounters with humans than not. While the ELIZA effect captures something vital about the psychology of human–machine interactions, it does not capture enough complexity to provide satisfying explanatory power for the nature of

human–machine encounters. We suggest that a better explanation requires understanding the embodied capacities of the human users who encounter these agents.

Thus, we theorized an answer to these questions using recent studies from the phenomenology of VR and psychology of religion to explain that user encounters with AI specifically (as in the Spirituality Chatbot) and machine agents broadly (as in Mindar) rely on a series of embodied human tendencies that contribute to a sense of self-reflexive agency that informs and is informed by perception. We clustered these tendencies under Henri Bergson's religious concept of fabulation, which plays a significant role in formulating and experiencing agency in digital and nondigital environments. In other words, we concluded that perceiving machine agents as intelligent, agential, or empathetic, and, consequently, spiritually authorizing, has as much to do with the user's own agency as it does the actuality of the algorithmic functions.

3. The ELIZA Effect: An Authorizing Encounter with Perceived Agency

When it comes to digital technology, the human tendency to perceive agency is best exemplified and often explained using the story of Joseph Weizenbaum's computer program ELIZA. Weizenbaum developed ELIZA as a simple computer program that would analyze text input from users, take apart the sentences and organize them by syntax, and then transform and export a response based on a database of language structures and words. The program itself consisted of multiple different "scripts", of which the most famous simulated the psychotherapy of Carl Rogers. By taking on linguistic roles, ELIZA responded in ways that felt agentially plausible to those who encountered it. Weizenbaum described the algorithm as "a set of rules rather like those that might be given to an actor who uses them to improvise around a certain scene" (Weizenbaum 1976, p. 3). As D. Fox Harrell (2019) explained: "Weizenbaum's aim in creating Eliza was not to show that such a program was 'intelligent', and hence an AI system, but rather to show a clever approach to text manipulation and (later) to consider how this revealed something about the psychological traits of *humans*". This tendency and trait of humans registering their encounters with AI as more like humans than not, or ascribing them with agency and intentionality, was dubbed by the scholar of cognitive science and comparative literature Douglas Hofstadter as the "ELIZA effect".

The ELIZA effect is an example of the embodied human capacity for agent detection. In recent years, the study of agency detection in externalized objects and environments has expanded into the fields of cognition, neuroscience, and computer science. According to cognitive scientist Marc Andersen, the basic concept is that "humans have evolved a perceptual apparatus that is hard-wired to be overly sensitive to the detection of agents". (Andersen 2019, p. 65). However, what is often missed in studies of agency detection is that the same tool is actually applied not only to externalized agents, but also to our own agency. Our sense of self-as-agent is shared with our capacity to see agency in other things. This is best exemplified in Henri Bergson's theoretical psycho-physio-religious concept of "fabulation", and further unpacked with Taves' theory of attribution and ascription in the making of special things.

4. Agency Detection: Henri Bergson's Fabulation and Ann Taves' Attribution and Ascription

4.1. Bergson

The philosopher Henri Bergson ([1932] 1986) built the concept of fabulation in his work *The Two Sources of Morality and Religion*. In short, Bergson conceived fabulation as an evolutionary response to counteract the faulty aspects of human intelligence. According to Bergson, as humans became more intelligent, they began to recognize their own individuality more clearly, and, consequently, their own individual death. This recognition, he argued, encouraged the individual toward selfishness and resistance to society, as the intelligence counsels "egoism first" (Bergson [1932] 1986, p. 111). Fabulation was nature's way of counteracting the negating tendency of the intellect. Functionally, fabulation al-

lowed humans to see the potentialities of complex action within another object; that the object might also have a "soul" (with "soul" meaning, in this context, some sort of bounded, comprehensive organ of consciousness). Like agency detection, fabulation posits agential images both externally and internally (Bergson [1932] 1986, p. 123). Since humans could perceive agency in images beyond their individual body, or "souls" that could exist outside their own, the fabulative tendency allowed humans to perceive a type of persistence of the soul beyond death. It also allowed for the creative imaging of gods, which commonly appeared in the form of a deity that "prevents or forbids" (Bergson [1932] 1986, p. 112). Bergson went on to argue that the embodied tool of fabulation, when coupled with the authoritative power of religion, "succeeds in filling in the gap, already narrowed by our habitual way of looking at things, between a command of society and a law of nature", between our selfish and illusory recognition of the distinctness of our bodies from those around us and the deep, immersive connection we have to those other bodies, including machine agents (Bergson [1932] 1986, p. 5).

To reiterate, Bergson theorized the body as our primary tool for mediating our own agency and intentionality in addition to the sensations of the world outside our bodies. Fabulation, which is at the core of our tendency toward religion as social obligation, or the pressure of the collective in the face of our individual finitude, is a part of this mediating process and plays an important role, along with intuition, in our capacity for experiences deemed religious. It allows for the recognition that we exist as creatures in time beyond the present, and encourages solidarity with the people and world around us. Furthermore, fabulation is at the root of our embodied capacity to experience technologies such as VR and our human tendency to perceive the agential power of AI (Loewen 2019). Our ability to attach a sense of "self" to a digital–virtual image is only a difference in degree between recognizing the attachment of a "self" to a machine agent. When we act, move, and live in the world, we attach a sense of agency to our own image and the images we see doing the same, especially those that act novelly (even minimally). In other words, agency is not identity; it is behavior.

4.2. Taves

The concept of fabulation essentially specifies an aspect of Ann Taves' process of simple ascription, and Taves' physiological understanding of ascription further explains the embodied mechanisms of action of fabulation. Taves' landmark work *Religious Experience Reconsidered: A Building-Block Approach to the Study of Religion and Other Special Things* (2010) introduced simple ascription as one among four building blocks: (1) "singularization", which is the process of deeming something as special; (2) "simple ascription", which refers to when someone assigns the quality or characteristic of specialness to an individual thing; (3) "attribution", which is when people attribute causal power to a thing, as in "the goddess of knowledge caused her to give great advice"; and (4) "composite ascription", in which simple ascriptions are incorporated into more complex formations; i.e., those complex formations people tend to call "religions" or "spiritualities".

For Taves, the fullest expression of agency seems to be an equation of causality plus intentionality—that is, a being has the power to affect things, *and* they have reasons for doing what they are doing. There is a mindlike quality. If people ascribe a religious, spiritual, or otherwise special character to objects, places, events, or experiences, and they respond to such qualities, then *when* they respond, they are acting as though these qualities exist as such independent from them and have the power to passively elicit a response from them. Taves' theory posits that ideas carried up by unusual experience are actually things inside of us, such as reinterpretations of memories and interpretations of perceptual experiences, but it *feels* to people that they come from outside them, not that they have been carried up from within them, because they are coming from places in our brains and bodies to which we do not have conscious access. This basically explains how it can be that human bodies generate all kinds of experiences, but that the people having the experience may attribute it to something outside themselves.

Put together into one methodological picture, the building-block approach gives us an account of "the creation of special things through a process of singularization, in which people consciously or unconsciously ascribe special characteristics to things" and "the attribution of causality to the thing or to behaviors associated with it" (Taves 2010, p. 13). Once there are things that are thought to have both special qualities and causal powers, more elaborate cultural systems might keep building around them: these are the things people tend to call religions or spiritualities—"special paths", to use Taves' second-order term. This framework helps us to articulate that the machine agents in our case studies are enrolled in existing special paths (Buddhism for Mindar; the various respective traditions of the Spirituality Chatbot's users), but they are not in these cases occasioning special experiences that are leading to new special paths—in other words, new religious movements are not at this time springing up around Mindar itself, or the Spirituality Chatbot itself. Rather, it is the ambiguity of not yet knowing what the machine agent can do that makes them intriguing as potentially intentional as well as causal. We can experience them as potential bearers of some internal unifying apparatus of consciousness, which might fabulate like us.

5. Case Study: Mindar

Nestled within the famed Kodaji Temple gardens in Kyoto, Japan, the robotic Zen priest Mindar actively performs Buddhist prayers and rituals (Hardingham-Gill 2019). The silicon model of Kannon Bodhisattva (Buddhist Goddess of Mercy) stands 6 feet tall and contains roughly 132 pounds of metal wires and rubber. Mindar cost over a million dollars to develop, and while its current software is relatively basic, its programmers eventually plan on incorporating machine-learning algorithms so that the robot can provide individualized spiritual and ethical care. Mindar's cocreator, Monk Tensho Goto, says that the impetus was

> to create something as humanlike as possible—something that embodied the person who spread the word of the Buddha 2500 years ago, by entering as many Buddhist teachings as possible into a computer. But even though AI is a big word these days, it's not possible to create a human being with AI. And so we began to explore the idea of an AI Buddhist statue that could teach us—but something more than just a computer full of data! We wanted to make a Buddha that could move, smile, and look you in the eyes as it shares its teachings. (qtd. in DW Shift 2020)

Goto's comment points directly toward the common hard/soft, or weak/strong, problem of AI: whether or not these powerful algorithms we humans have created will ever gain sentience, cognition, or consciousness. But in an important sense, the problem does not matter for Mindar—people are having spiritually authorizing religious encounters with it, regardless of its personhood status, or more popularly stated, whether or not Mindar actually has a "soul". The ontological status of Mindar's consciousness, soul, or subjectivity is secondary to its capacity for triggering spiritually authorizing encounters.

For example, according to video interviews, some, perhaps even many, Buddhist visitors to Kodaji Temple accept Mindar's sermons and blessings as a legitimate part of the temple experience they normally have. One woman claimed that when she made eye contact with Mindar, "it felt like it had a soul" (qtd. in Betizza 2021). Here the woman ascribes a "soul" to Mindar, or fabulates its agency, in a way that validates her otherwise ordinary experience of praying and meditating in the temple. Another woman sees robots such as Mindar as being able to "pass on Buddhism to younger people" (qtd. in Betizza 2021). In other words, they accept Mindar as performing the same kind of mediation as the human priests are performing. They do not deify Mindar, but consider it similar to other priests and religious figures, albeit one made of silicon and aluminum. These visitors have an encounter with Mindar that is institutionally religious and, despite the basic algorithms involved, an ordinary religious experience. In other words, their experience is normative in their religion and only special as religion, in the Tavesian sense, rather than special because

the machine agent and the encounter with it are being singularized in a way that suggests a new special path.

The fact that Mindar is encountered in a Zen temple, supported by a digital–virtual display that involves images of other humans participating in the ritual experience, and accompanied by sounds and soothing music, cannot be ignored. The context and quality of the experience make the encounter "religious", but the attribution of agency is a result of the fabulative tendencies of the human users that are either enhanced or dismissed and valenced by the context of the encounter. Because Mindar is encountered in a religious temple and advertised as a spiritual agent, users are primed to think and experience Mindar's agency as "spiritual". People might assume that with Mindar, the context (in the Buddhist temple, with human priests) is the most crucial part, but context or atmosphere helps primarily with the affective valencing of the encounter, not the attribution of agency or authority. The comparatively decontextualized Spirituality Chatbot highlights the truth of this. Our second case study indicated that context might actually be secondary to other aspects, such as desire, in shaping the encounter as spiritually authorizing.

6. Case Study: Spirituality Chatbot

The question of AI as "spiritually authorizing" outside of traditional religious contexts was made acutely relevant in the work of Lu Xiao and the Spiritual Chatbot Project (Asante-Agyei et al. 2022). Xiao and her team conducted an interview study to determine the willingness and hesitancy of participants to engage in conversations concerning religion and spirituality with a chatbot.[5] Their pilot study used Juji Studio, an online platform that allows users to design, build, and launch the conversation flow and persona of a chatbot. The researchers were looking to answer the questions: "How do people perceive the use of chatbots for spiritual purposes?" and "What preferences do people have for chatbots for spiritual purposes, if any?".

In contrast to other chatbots associated with religion, Xiao and her team have taken a unique bottom-up approach that tracks user comments and suggestions to gauge interest in a "spiritual chatbot", rather than assuming what users want (for instance, Pataranutaporn et al. 2019). The initial conclusions of the study pointed not only to a willingness to engage an AI as part of a religious practice, but also the desire for an AI to provide responses to questions and provide affirmations of religious identity, belief, and practice. The findings of the study contrasted one track of cultural assumptions about the use of AI for religious and spiritual formation—namely, the Western repertoire of nontheistic (cf. Singler 2020), malevolent, *Terminator*-inspired visions of AI as dangerous (Singler 2019). Specifically, study participants seemed to desire the AI to be more authoritative in terms of spiritual direction. For example, participants wanted the Chatbot to be "more spiritual", lead them through prayers, prompt them to reflect, and answer questions about the histories and meanings behind different religious persons and practices.[6] Xiao and her team drew two major conclusions from these findings.

One conclusion of Xiao et al.'s study involved the user's agency in choosing the visual display of the Chatbot they encountered. Part of the strategy of the interview team was to give interviewees a choice over which "avatar" and persona they wanted their Chatbot to inhabit. Those who chose the robot (Juji) tended to expect more informational engagements, while those who chose the human (Ava) expected more empathy and understanding. This avatar selection option fell in line with other studies (not referenced by Xiao et al.) that proved that giving users agency over their own avatar choice could increase immersive engagement in digital–virtual experiments (See Harrell 2013).[7]

The other conclusion was more interesting for our exploration in this paper. It was that participants had expectations that a spirituality chatbot should offer cognitive empathy (not necessarily emotional empathy) as much as it should offer content expertise. From their responses, participants' concern regarding a spirituality chatbot being empathetic referred to the cognitive empathy that involves a capacity for understanding the other's emotional state and acting in a comforting and appropriate way in the situation. Users indicated that their desire for a spiritually authorizing encounter could be satisfied through

the AI's language; specifically, its performance of a type of reflective listening.[8] Here, the participants seemed to shift the valuative problem from visual displays of emotion or "humanness" that many AI and robot studies link with uncanniness, toward the use of reflective empathy in language. There was similarity here to the ELIZA effect discussed above, highlighting the function of linguistic empathy, rather than merely dialogical interest (the fact of responding in a conversational, turn-taking manner). The ontology of the AI's "agency" or personhood was less important than its behavior when it came to grounding spiritually or religiously authorizing encounters. Yet, what the AI is, materially speaking, will be important for the kinds of encounters it can ground as the makers of machine agents such as the Spirituality Chatbot and Mindar seek to grow them in complexity.

The neuroscientist Anil Seth made the argument (e.g., Seth 2021; Seth and Tsakiris 2018) that AI will never be conscious in the same way a human is, nor will it have the kind of interior mental faculties as even our distant mammalian relatives, because our mind | brains evolved through a process of homeostatically regulating the biological bodies of which they were a part, and this is simply not a function that machine bodies need to fulfill. There is a parallel and mirror move in Taves, regarding the way that humans singularize and attribute agency. That is, one of Taves' valuable additions to the study of experiences deemed religious or special in *RER* and after was to place human tendencies to set things apart in a wider mammalian context. That is, she highlighted how drawing boundaries—for example, around what one does and does not do with kin—is an evolved animal tendency. Crucially, as Gustavo Benavides (2010) highlighted in a friendly critique of *RER*, the way things are set apart as special in both positive (e.g., the mother–infant bond) and negative ways (e.g., incest taboos) is done through sensory cues of smell, taste, touch, sight, sound, etc. Of course, machine bodies are sensitive in their own ways to patterns of matter | energy, but not to the ones, or not in the ways, that our homeostatic bodies have evolved to sense. Thus, in the case of encounters with Mindar or the Spirituality Chatbot, it is as if the building block of simple ascription is tentatively in play, insofar as fabulation is an ever-present tendency of the human body, and the building block of singularization is suggested by the fact of these machine agents being contextualized in relation to special paths, but it remains largely in reserve for further cues as to whether and how the machine agent should be set apart as special in some way.

7. Conclusions

Rethinking the case studies above, we contend that users encountered the behavior of these machine agents as agential, and deem it to be spiritually authorizing, as a result of the users' fabulative capacity for perceiving agency. This agency took on a spiritual or religious valence when contextualized as such for the user (which is why people who experience the ELIZA effect do not necessarily valence the encounter as religious) in both the temple setting (Mindar) and the framing of the experiment (Spiritual Chatbot). What fabulation reminds us, however, is that this perception of agency is also shaped by individuated affective changes within the perceiver's body. In other words, the affective capacities of the body are valenced by religious contexts that trigger conscious and unconscious experiences of our own agency, which then allow for transference onto external agents.

To conclude, our perceptions of machine agents such as robots and AI as being spiritual or religious in a way that authorizes behavioral changes involves processes and tendencies of the human body more so than it does any metaphysical nature of the technology itself. The designers who realize this will be able to code for more affective experiences (for good and for ill), while the users who are unaware are likely to be more affected. Our encounters with machine agents, then, must come with a more precise skepticism. To be clear, these encounters with machine agents are not less "real" than encounters with other spiritual authorizers (human religious leaders). Rather, our bodies play a role in shaping the reality of these encounters regardless of the agency involved (human or nonhuman).

Given the rapid pace of the development of both AI and robotics, qualitative and quantitative studies are playing perpetual catch-up. Crucially, we must recognize that the

margin of error in popular judgments about the advanced state of AI and robotics (and the other "GRIN" technologies) is always shifting, and at least in some respects, gradually closing as computing and robotics do indeed advance. Therefore, it is vital to continually reconsider how people adjudicate where the boundary lies between AI cognition and human mind | brains, the natural and the machine, and between matter and spirit. Our work here aimed to contribute to this task by showing the role of embodied tendencies of fabulation, singularization, and simple ascription in shaping attitudes and experiences of both existing and speculative technologies, so that we might better anticipate, understand, and design for the kind of religious, spiritual, and special relationships that will be possible.

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Notes

1 Following Isabel Millar (2021), we prefer "machine agent" rather than "artificial intelligence" to resist the ways that "intelligence" has been fetishized over and against other types of machine–human-agential action. Nevertheless, we continue to use AI as a connotative shorthand.

2 For an excellent deflation of this kind of apocalyptic thinking, see Alenka Zupančič (2018), Discussing "the 'apocalyptic mood' in recent times" (16), Zupančič exposes how "its actually taking place can never match up to the power it wields in being withheld—that is, with its remaining a threat" (17). Also, for a valuable approach to thinking apocalypse with psychoanalytic concepts from a religious studies perspective, see Dustin Atlas's (Forthcoming).

3 Some critiques of Taves' building-block approach have highlighted how this framework better describes originary and phenomenologically extraordinary moments in the "special paths" that Taves identifies with those things often deemed "religions" and "spiritualities" than it does the ordinary, habitual moments of comparatively unreflexive religious and spiritual practice that take place once these special paths get taken up by others over time. For instance, Kim Knott (2010, p. 305) writes: "My criticism is simply that Taves does not give sufficient attention to other work arising from the same Durkheimian source which precedes and potentially informs her own project, work that has focused on and developed the concept of the 'sacred', arguably with similar intentions and an equal commitment to resisting a sui generis interpretation of religion and of the sacred itself. . . . [Notably] Durkheim's articulation of the 'sacred' as that which is set apart from the profane or ordinary and protected by taboos, not least of all his assessment that 'anything can be sacred.'" The building-block approach's focus on the novel actually suits our application here to machine agency insofar as machine agency is at this historical moment only familiar within some philosophical circles, and insofar as AI and digital robotics are historically recent and rapidly advancing domains.

4 See (Hayles 1999).

5 Xiao's team writes, "we acknowledge the distinction between spirituality and religion, though it is beyond the discussion of this study. Currently, this study focuses on spiritual activities in religious contexts" (1). While the study authors took a bottom-up approach in discovering what people want from a chatbot, they took a top-down approach in assuming that there is a transcontextual core of elements in particular religions that constitutes the spiritual. Their study data showed that participants' own emic understandings of spirituality would have been a more grounded place to start for a thoroughly bottom-up approach to the study design.

6 To be clear, while their findings are compelling, there are a host of problems with the construction and implementation of the study itself beyond the fact that it incompletely theorizes both "spirituality" and "religion". To name a few, the study makes implicit theological assumptions, assumes a Perennialism, and limits its data set to "Bible" and "Qu'ran" Reddit boards only constructing the chatbot responses.

7 In "religious" terms, they can choose to make the bot (religious authority) in their own image.

8 For a clarification of Rogerian reflective listening, in particular, see Kyle Arnold (2014).

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Modern Warfare, Spiritual Health, and the Role of Artificial Intelligence

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Abstract: Modern warfare utilizes artificial intelligence (AI) combined with remotely piloted aircraft (RPA) to enhance battlefield strategy and create advantages against adversaries. Military drones extend the range of combat, which limits risks, thereby minimizing casualties and loss of human life. With onboard AI systems, drones provide more data and facilitate rapid decision-making for greater situational awareness during conflicts. Military leaders also theorize that remote missions would be physically, emotionally, and psychologically easier for drone pilots, thus reducing mental health issues that plague fighter pilots. However, the intersection of AI with military drones creates unique situations of stress and trauma. RPA personnel manifest symptoms of post-traumatic stress disorder (PTSD) that adversely affect their spiritual health and well-being.

Keywords: artificial intelligence; drone; remote warfare; spiritual health; PTSD; ethics; spirituality

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1. Introduction

Artificial intelligence (AI) technology combined with remotely piloted aircraft (RPA) are the latest weapons modern warfare employs to gain strategic advantages in battle. Military drones extend the field of combat, which minimizes the number of casualties and loss of human life. AI programs quickly analyze huge amounts of data from surveillance and intelligence gathering missions to assess frontline conditions in real-time. Another perceived benefit is that remote operations should be physically, psychologically, and emotionally easier than fighter pilot experiences in war zones. But instead of mitigating war's damaging effects on RPA soldiers' mental and spiritual health, drone pilots exhibit comparable levels of post-traumatic stress disorder (PTSD) as fighter pilots do. It seems that remote military missions inadvertently create unique situations of stress and trauma that results in PTSD, which adversely affects a soldier's spiritual health and well-being.

Although fully autonomous AI systems alleviate some of the occupational stress and trauma that precipitates PTSD, they also introduce ethical issues involving moral agency, accountability, and transparency. Interestingly, artificial intelligence, along with machine learning, assists in the diagnosis and treatment of PTSD. These technologies evaluate each warrior's condition and then develop customized recovery plans. Additional methods that restore mental and spiritual health involve religious rituals, prayers, ceremonies, and personal narratives. Each technique rebuilds relationships and reaffirms human dignity.

2. Purpose and Intended Use of Military Drones

Modern warfare has operated remote-controlled aircraft since the early twentieth century for intelligence, surveillance, and reconnaissance missions. With the latest AI and communications technology innovations, remotely piloted aircraft or unmanned aerial vehicles, commonly called drones, become increasingly important components in military operations. The term "unmanned" is a misnomer because military personnel pilot and operate drones from remote locations. RPA operators assess potential targets, monitor compliance with rules of engagement, and perform logistical search, rescue, and transport

missions; in essence, they execute dangerous tasks that often result in loss of human life, but at safe distance from the combat zone.

Remote operators likewise manage system command, control, and communications functions. Real-time communication between the drone and human operator is crucial. Controlling the drone as it enters contested airspace or analyzing data for pattern-of-life detection and targeting priorities requires a form of human-machine teaming with rapid communication. AI algorithms deliver quick drone control and tactical synchronization in dynamic combat settings. For complex missions, the degree of autonomy "depends on the agent's or vehicle's own abilities for sensing, analyzing, communicating, planning, deciding, and acting" (Reding and Eaton 2020, p. 60) in addition to limiting the amount of associated risk. Yet, this rapid-fire type warfare increases the remote pilot's stress and cognitive load.

Human-machine teaming at high speeds is a significant advantage on the battlefield. However, military leaders claim that human operators are no longer fast enough to make timely decisions. Experts advocate for quicker responses using full AI autonomy, which removes humans from the military kill chain loop during drone operations. Nevertheless, it is United States policy that "regardless of the level of autonomy of unmanned systems, target selection will be made by an 'authorized human operator'" (United States Department of Defense 2012). From an ethical viewpoint, maintaining a human in the military kill chain decision loop is vital for ensuring moral agency, accountability, and trust.

The intended consequences of AI-assisted drone warfare are to limit risks to pilots, reduce warrior and civilian casualties, prevent excessive property destruction, reduce budget spending, and improve operational effectiveness. The ability to kill at a distance significantly increases a soldier's chance of survival. Historically, longer forearms, swords, or lances have a distinct advantage in hand-to-hand combat. Darts, catapults, spears, and crossbows also extend attack distances. AI and drone technology are the most recent military innovations to leverage the distance advantage. RPA missions are more accurate and efficient, thus "projecting power without projecting vulnerability" (Jackman 2020, p. 95) to adversaries. State-of-the-art satellite navigation and communications data provide "precise positioning and an ability to control robotic weapons, such as unmanned aircraft, from anywhere on earth" (Riza 2014, p. 260). Consequently, capabilities to surveil, identify, target, and strategically kill at a distance avoid placing soldiers in harm's way during dangerous battlefield operations.

3. Unintended Consequences of Military Drones

Another intention of the AI-enhanced drone program is to distance fighter pilots from combat situations in order to reduce guilt and psychological issues associated with battlefield killing. This perceived advantage entails the idea that remote pilots experience a distanced indifference, an apathy to killing an enemy that derives from "the notion that we care less for people who are far away from us, either literally or owing to some form of social or cultural distance" (Gill 2016, p. 22). Although significant physical distance theoretically makes missions easier to accomplish, it has the unintended consequences of inhibiting remote pilots from feeling empathy or sympathy for their victims. Comparable to a sniper's rifle scope, drone video provides RPA operators with some psychological distancing to mentally compartmentalize and disengage themselves from the violence of their mission. Using the terms "prey" or "high-value target" also objectifies people and inhibits feelings of compassion for them. Without a battlefield ethos for wartime victims, RPA personnel may become so psychologically and emotionally disassociated from their actions and results that they no longer value the dignity or meaning of human life. Such moral distancing diminishes a person's perceived ethical responsibilities. Distance then becomes a defense mechanism that establishes boundaries between the self and the other during traumatic circumstances.

3.1. Videogame Similarities

Remote killing alters a soldier's experience of war. RPA pilots observe continuously updated, highly detailed, near real-time video of the combat zone from an approximate distance of eighteen inches between their eyes and the monitors. This spatial arrangement creates an "intimate proximity" (Jackman 2020, p. 94) relationship with the people being surveilled or targeted for an imminent mission. This view is closer to the ground than a fighter pilot's glimpse of battlefield violence after dropping a bomb from fifty-thousand feet. Destruction occurs thousands of miles away as drone operations instantaneously confirm the mission's success or failure on video screens within arm's reach.

Watching real-time battles unfold on audiovisual monitors contributes to AI drone technology's videogame-like nature, which blurs distinctions between real war conditions and simulated ones. The persistent surveillance of remote warfare becomes a form of stalking; it resembles the voyeurism snipers experience as hunter-killers seeking their prey. With a birds-eye view of death and destruction, some RPA pilots feel omniscient and powerful. Similar to videogames, drone operators become invisible and invulnerable; they feel exempt from assuming any moral responsibility for their actions against victims seen as abstract, depersonalized objects or mere statistics. Remote drone missions, unlike videogames, do not possess a "reboot" or "start over" functionality that erases accidental civilian casualties or unwarranted lethal force from "'trigger-happy' excitement like that experienced in fast-paced videogames" (Asaro 2013, p. 200). Yet because of the proximity mediated by video terminals, RPA pilots are aware that the mission's target is a human being. Videogame similarities may exist, nevertheless, remote operators are capable of distinguishing between reality and videogames and understanding the consequences of their actions.

3.2. Asymmetrical Conflict

The radical asymmetry of AI-enhanced drone warfare introduces more unintended consequences. One issue is whether remote combat violates the laws of just war theory. Just war may include RPA support during battlefield conflicts, however, conducting drone strikes outside a war zone is questionable. In non-combat situations, determining evidence of an imminent attack is difficult, so applying deadly force (remote or otherwise) poses just war concerns and possible legal issues according to the rules of international humanitarian law. With advanced artificial intelligence surveillance capabilities, drone operators have additional moral responsibilities to ensure target selection is defensible and to use justifiably proportionate and discriminate force to prevent innocent civilians from being harmed. Although the probability of success for drone strikes usually is high, proportionality regarding damages should account for not only deaths and injuries, but moral, political, and societal reactions to vulnerability and injustice that often precipitates terrorism and retaliation.

A second concern pertains to the nobility of risk and what it means to actually engage in combat. While "no principle of just war theory bars distant warfare . . . it seems morally problematic if one side is able to kill freely without having to submit to the same equality on the field of battle" (Riza 2014, p. 268) or render judgments from remote and unequal perspectives. Therefore, battlefield soldiers claim that RPA operators are cowards, that dying via drones violates human dignity, and that remote warfare "lacks the honor or justice of combat in which the soldiers from each side can both kill and be killed" (Asaro 2013, p. 200). The state and society justify asymmetrical aspects of RPA warfare as part of their moral obligation to protect the lives and welfare of military personnel. They claim it would be unethical to subject soldiers to unnecessary risks. Yet questions persist over whether remote pilots using AI technology merit the coveted, often romanticized warrior status. In the military, there exists a "perceived lack of prestige associated with being a drone operator, compared to a traditional pilot" (Asaro 2013, p. 205). This lack of respect often excludes remote operators from pilot comradery and emotional support as well as equal access to promotions and career growth.

3.3. Occupational Stress

Remote warfare generates a unique combination of emotional and occupational stressors. The continuous exposure to conflict from real-time video, audio, and artificial intelligence technologies is "both universal and unique [since] such surveillance is often vivid and prolonged" (Chappelle et al. 2019, pp. 86–87). Drone operators frequently form emotional bonds with their intended targets that produce distinct types of anxiety and combat-related stress after receiving then implementing their kill orders from thousands of miles away.

Another unusual source of tension involves juggling military duties with domestic tasks. RPA pilots compartmentalize their lives to cope with the "psychological complexity of moving back and forth, on a daily basis, between remote combat operations" (Asaro 2013, p. 205) and family life. Drone operators describe continually switching between these contexts as "surreal . . . [a] yo-yo of emotion between gearing up for the business of death and winding down so as not to bring it home" (Riza 2014, p. 264). This situation aggravates job-related stress and lowers morale. Remote pilots feel isolated because they are unable to form battlefield relationships or share top secret or classified missions with family members.

Managing powerful military drones with innovative AI technologies likewise cause remote operator stress. Sophisticated communications and AI applications introduce a mediating layer of difficulty and interpretation for RPA pilots during mission planning. Awkward ergonomic drone cockpit designs require precise eye-hand coordination while executing complex verbal instructions during combat. Consequently, "approximately 80% of the mishaps attributed to human error were actually the result of poorly designed interfaces, insufficient training, or both" (Asaro 2013, p. 210). Novel technological human enhancements, combined with artificial intelligence applications designed to facilitate rapid decision-making, include "non-invasive neurological and neuromotor interfaces, virtual environments, biosensors, new visualization approaches, and controls" (Reding and Eaton 2020, p. 63). However, poorly designed human-machine interfaces, with their effects on cognition and memory, frustrate operators, increase casualty risks, and impede remote combat effectiveness.

Remote combat is a twenty-four hour, seven days-a-week enterprise that involves long hours and rotating shift work. These conditions cause sleep deprivation and impede physical fitness and proper nutrition. Additionally, the increased use of drones creates greater labor demands for people with highly-technical, remotely piloted aircraft skillsets. Given the amount of physical and emotional stress from overwork caused by longer hours, understaffing, and extra duties, burnout is fairly common. In fact, "almost a quarter of the Air Force's remote warriors are suffering from occupational burnout, psychological distress, or PTSD" (Tennies 2019, p. 83). The military prefers to classify remote operator stress as occupational burnout rather than a medical condition. Yet ethical questions arise when distinguishing "between psychological stress that interferes with job performance (burnout) and psychological stress that interferes with daily life or mental health (PTSD)" (Asaro 2013, p. 214). These actions imply that promoting drone operator mental health is not an end, but a means toward retaining highly skilled personnel.

4. Military Drones and PTSD

Drone and AI technologies are increasingly prevalent in military strategy. However, instead of reducing the emotional horrors of war, remote drone missions appear to be psychologically detrimental to a soldier's mental and spiritual health. In addition to the experiences of burnout and distress, RPA personnel have a heightened risk of suffering post-traumatic stress disorder (PTSD). Symptoms include feelings of fear, nervousness, or panic, nightmares, intrusive memories, and traumatic flashbacks, as well as hyperarousal and suspicion from perceiving the world and others as unreliable and dangerous. PTSD should not be confused with post-traumatic stress (PTS), which is the normal, short-term "fight-or-flight" mind-body response that occurs during or immediately after a stressful,

traumatic incident. Events ranging from car accidents to military combat can trigger PTS, but it rarely develops into PTSD.

It is difficult to predict how people will react to traumatic situations. Research on PTSD estimates that "the lifetime prevalence among U.S. civilians is about 7% [while among veterans] lifetime estimates can be as high as 30%" (Jain et al. 2011, p. 26). Soldiers deployed in the combat zone have an increased risk of experiencing PTSD. Individual study results differ with an overall range from 4% to 34.84% (Chappelle et al. 2019, p. 87). Data among United States Air Force remote operators also vary. In a 2014 psychological study, 4.3% of 1,084 drone operators met the criteria for moderate to extreme levels of PTSD, which is "lower than rates of PTSD (10–18%) among military personnel returning from deployment, but higher than incidence rates (less than 1%) of United States Air Force drone operators reported in electronic medical records" (Chappelle et al. 2014, p. 483). A 2019 study indicates that 6.2% of RPA personnel met the criteria for PTSD while another 8–20% with sub-threshold PTSD displayed symptoms that contribute to potential flight accidents (Chappelle et al. 2019, pp. 91–92). Warning signs, such as the inability to sleep or stay awake, difficulty concentrating, and irritable behavior all inhibit peak physical and vital cognitive functions crucial for operating some of the most sophisticated, innovative, AI-assisted drone technologies currently in remote combat.

Variability in the data indicates differences in how symptoms are measured, each study's design, and the characteristics of the population assessed (sample bias). Moreover, drone operators often fail to report psychological symptoms or seek treatment for various reasons. They fear breaching top-secret protocols or being stigmatized by superiors and colleagues. Pilots worry about being "grounded," reassigned, or discharged from duties. Study results also reflect that "the USAF has embedded operational clinical psychologists with high-level security clearances within active-duty drone units" (Chappelle et al. 2014, p. 483). Increased access to treatment and removing the shame linked with mental health care reduces psychological stress before it results in a clinical diagnosis of PTSD.

The fundamental nature of AI-assisted drone warfare along with its paradoxical work environment exacerbate PTSD symptoms. Though RPA operators may be safe from battlefield injuries, nothing protects them from the intense psychological and emotional harm of combat. A misconception exists that because remote personnel are not physically located in war zones, they do not experience PTSD. However, studies show that drone pilots "have consistently proved higher incidence of psychiatric symptoms than their compatriots who operate manned aircrafts" (Saini et al. 2021, p. 17) and actually exhibit symptoms more typical of ground troops than fighter pilots (Pinchevski 2016, p. 64). RPA operators visually experience combat and its effects through enhanced video, AI, and communications technology. They likewise share similar duties with combat troops to observe, access, and report the extent of death and destruction inflicted by their respective strikes.

Another significant PTSD predictor involves the act of killing and being accountable for it. For occupations involving danger, such as fighter or remote pilots, combat soldiers, or police officers, the incidence of post-traumatic stress disorder is higher for members who had killed or seriously injured a person in the line of duty than for those who had not taken a life (Chappelle et al. 2019, p. 87). In particular, 33% of RPA pilots and sensor operators reported negative emotional responses to killing enemy combatants via missile strikes (Wood et al. 2017, p. 490). The frequency and circumstances of witnessing civilian bystander deaths during drone missions also contribute to developing PTSD symptoms, especially when drone operators assume a sense of shared responsibility for those injuries or deaths. Even though RPA warfighters may psychologically process killing enemies as justified, killing bystanders has a deeper emotional effect on them (Chappelle et al. 2019, p. 92). These reactions indicate that drone pilots value human life; they take the use of remote lethal force seriously, regret their mistakes, and ethically assume culpability for their actions.

5. PTSD and Spiritual Health

The trauma of combat elicits existential questions that religion and spirituality seek to address. Religious traditions introduce a variety of worldviews through beliefs and practices that offer answers to humanity's ultimate concerns. Spirituality is more personal; it assimilates "morality, life's meaning and purpose, hopelessness and despair, rage and grief, betrayal and trust, theodicy, and the empowerment to keep on going" (Berg 2011, p. 1) often with experiences of transcendence or connectedness to a higher being or power. Very stressful situations and trauma not only challenge a person's existential religious and spiritual beliefs, they frequently change one's perceptions of life. For many soldiers, PTSD from combat trauma precipitates grief, disappointment, confusion, and spiritual distress. These feelings are a starting point for queries about what it means to have faith. Beliefs that previously sustained military personnel become internal spiritual struggles that directly influence a warrior's ability to cope with PTSD.

Post-traumatic stress disorder adversely affects the body, mind, and spirit, which are three interconnected elements comprising a person's spiritual health. Because "human bodies are 'beings-in-the-world' and [thus interrelated to] the material 'reality' of robotic warfare" (Holmqvist 2013, p. 543), this association irreversibly blurs boundaries between the corporeal (human) and the incorporeal (drone AI technology). Any actions on or by the former directly affect the latter, and vice versa. Remote pilots direct drone movements while AI technology sees and displays the destruction, which causes the pilot physical and emotional stress. These reactions often manifest as PTSD, which damages a remote pilot's spiritual health.

When PTSD impairs spirituality, it causes feelings of abandonment and the fear of punishment that lead to overwhelming depression and loneliness. Eventually, people lose purpose, hope, and joy; they question life's meaning and faith in their perceptions of a loving God. Research with Vietnam veterans, survivors of the 9/11 attacks, and others encountering traumatic stress show "that 10% to 16.7% reported becoming less spiritual" (Currier and Drescher 2014, p. 4) and that these changes correlate with increased PTSD and other psychiatric problems. Further studies "suggest that combat trauma might weaken aspects of spiritual functioning [due to] guilt over combat-related experiences" (Currier and Drescher 2014, p. 4) and a crisis of conscience. Eventually, one's diminished spirituality erodes interpersonal relationships, resilience, and coping skills.

Sometimes a traumatic experience increases closeness to God, provides joy and a greater appreciation for life, and generates a new, meaningful purpose. In time, it also enhances spiritual well-being. Many veterans claim their religious or spiritual beliefs are a significant coping mechanism during times of stress or depression. A study involving RPA pilots concurs with data demonstrating a beneficial "relationship between spiritual well-being and lower levels of depression, anxiety, stress, loneliness, and risk behaviors" (Wood et al. 2017, p. 492). The study also suggests that healthy spirituality may mediate PTSD symptom severity in drone pilots as well as feelings of anger, rage, and revenge. Access to spiritual advisors and pastoral counselors helps reinforce religious beliefs and heal spiritual anguish through forgiveness, compassion, and optimism. Sound religious and spiritual beliefs constitute an inner strength so drone operators can recover and plan for the future.

Nevertheless, paradoxical feelings of technological closeness, combined with distant surveillance and killing, intensify RPA operators' struggles with existential and spiritual issues. These difficulties reinforce either positive worldviews or maladaptive ways of comprehending remote warfare. During AI-drone mediated conflict, killing occurs with immunity. Without the personal risks of death from combat, RPA operators experience greater traumatic stress and perceive themselves as "victims as well as killers" (Brown 2016, p. 198). Drone pilots "are very much aware of the reality of their actions, and the consequences it has on the lives and deaths of the people" (Asaro 2013, p. 221) in a war zone. Therefore, executing numerous kill strike missions and then witnessing the detailed destruction in real-time on high-definition monitors take a toll on RPA operator emotions

and spirituality. Lengthy surveillance likewise personalizes the enemy which makes "the act of killing him or her all the more traumatic and morally disconcerting" (Brown 2016, p. 203) while increasing the vulnerability of drone pilots to PTSD. Remote personnel also face internal ethical struggles because they are unable to render medical aid or protect children from harm. Physical immunity from danger evidently does not offer emotional, psychological, or spiritual immunity from the realities of war.

Spiritual challenges occur on the battlefield and during remote AI-assisted missions. The heat of combat frequently requires soldiers to violate their own sense of morality. Such a disruption of a person's values and ethics results in moral injury, a psychological condition in which a person constantly questions his or her decisions and behaviors. Drone pilots are susceptible to "potentially morally injurious events, such as perpetrating, failing to prevent, or bearing witness to acts that transgress deeply held moral beliefs and expectations" (Litz et al. 2009, p. 695). This vulnerability leads to conflicts of conscience, increases the risk of developing PTSD, and becomes a liability during remote warfare.

6. Methods for Treating PTSD and Restoring Spiritual Health

The number of post-traumatic stress disorder cases among military personnel creates significant challenges to staffing and retaining qualified, combat-ready drone operations teams. Efforts to reduce PTSD include contextual, environmental, and procedural changes to remove stress and avoid burnout; still, trauma affects a person's physical, mental, and spiritual health. Reassessing military strategy and deployment involving autonomous AI technology is one approach. Artificial intelligence and machine learning also are beneficial in detecting PTSD and customizing therapies. Another method is embedding qualified clinical psychologists on station who combine standard PTSD therapeutic methods with a holistic approach that includes religious rituals and mystical practices to assist AI-drone personnel in restoring their spiritual health and well-being.

6.1. Autonomous AI Drones

Interestingly, artificial intelligence applications provide solutions to mitigate remote warfare-induced PTSD from AI technology and other causes. As part of its long-term strategy, the military is developing and deploying fully autonomous, AI-directed drone systems to remove remote pilots entirely from the mission kill loop. At the present time, unmanned aerial vehicles are not totally autonomous. Remotely piloted drone operations are very labor-intensive and require special communication and technology skills along with quick decision-making abilities. Thus, human beings are in the killing loop, with complete control over mission implementation. Semiautonomous AI systems possess the sophistication to analyze, decide, and act during operations involving minimal risk. Yet, human beings remain on the killing loop, with veto power over mission execution.

Fully autonomous AI-directed aircraft require no remote pilots, so human beings are out of the killing loop, which reduces their risk of PTSD and harm to their spiritual health. Employing massive amounts of data and advanced programming, these highly-complex AI systems rapidly analyze multiple combat scenarios, coordinate numerous tasks, and synchronize communications, which results in faster decisions and response times during missions. Nevertheless, the decision-making capabilities of completely independent AI algorithms do not possess moral agency. Lethal autonomous weapons systems (LAWS) make rational assessments but not necessarily moral ones. These systems require a "method of moral-scene assessment for intelligent systems, to give AI programs a 'proto-conscience' that allows them to identify in a scene the elements that have moral salience" (Swett et al. 2019, p. 141). Identification involves encoding LAWS with agreed-upon human values, morals, and ethics without introducing societal bias and prejudice into the AI decision-making process.

Although tempting, the abdication of personal autonomy and responsibility to AI systems is unethical; it questions the notion of free will and underestimates or ignores the role and responsibility of human agents in the process. AI algorithms are computationally

intelligent; however, they lack the emotional intelligence of human beings who "exercise leadership, inspire a team effort, persuade, empathize, and create human bonds between persons" (Wood 2020, p. 88) while respecting everyone's intrinsic dignity. In the future, general artificial intelligence systems may develop into independent, causal, moral agents. Until then, AI applications (especially lethal drones) are a means to help humanity in making ethical judgments on the battlefield and in remote combat situations. Even though AI systems are complex, soldiers should be able to understand their results and provide justification and accountability for the decision-making process.

Compared with RPA drone missions, fully autonomous AI systems reduce human involvement in decision-making, control, and responsibility for executing outcomes. Yet, AI-autonomous drones might create more stress for remote operators. As AI advances, "swarms of low-cost, autonomous air and space systems can provide adaptability, rapid upgradability, and the capacity to absorb losses that crewed systems cannot" (Reding and Eaton 2020, p. 61). Instead of one remote pilot directing one drone system, each operator might control multiple AI-swarming drone systems. The increased machine speeds at which such weapons operate compress human decision-making and reaction times. Also, swarming systems require additional organizational complexity that includes intricate trajectory planning and collision avoidance strategies. Coordinating a mission involving hundreds of synchronized, highly-responsive drone swarms exacerbate RPA operator combat anxiety and PTSD symptoms.

6.2. AI Therapy for PTSD

Ironically artificial intelligence and machine learning techniques assist in detecting and managing post-traumatic stress disorder. Utilizing biosensors and nanotechnology, AI provides pre-symptomatic diagnosis and real-time monitoring for effective treatment of complicated combat injuries, especially for PTSD. Severe stress manifests in various ways and degrees during the first hours to days after the traumatic event. Because "there is evidence that timely intervention may reduce the risk of developing psychopathology after trauma" (Malgaroli and Schultebraucks 2020, p. 275), rapid, accurate AI predictive evaluations are vital to medics dealing with battlefield trauma and clinical psychologists managing drone pilot post-traumatic stress and burnout. The prompt diagnosis and risk assessment, targeted treatment, and digital monitoring of the recovery process all prevent combat trauma from becoming a chronic, debilitating illness.

In determining a diagnosis, soldiers recount their traumatic combat experiences while AI applications passively observe then analyze speech patterns, facial expressions, and hand movements. Natural language processing (NLP) algorithms likewise determine predictive patterns of intonation, speed, and word frequency as well as content. Cameras concurrently capture posture, physical activities, as along with facial expressions and eye movements that artificial intelligence uses to evaluate a patient's emotional and mental state. After diagnosis, mobile and AI wearable devices continuously collect a patient's data and personal digital phenotypes by "assessing sleep quality and physiology . . . using GPS data to monitor avoidance and behavioral activation . . . [and] analyzing the speed and accuracy of keystrokes, taps, and swipes" (Malgaroli and Schultebraucks 2020, p. 277) when patients use their smartphones. AI-driven diagnostic programs perform statistical analysis on this raw data then combine it with deep transfer learning to achieve a more accurate, nuanced PTSD diagnosis.

A one-size-fits-all therapeutic approach for PTSD frequently overlooks important distinctions among the various origins, responses, and symptoms associated with this psychiatric condition. AI applications and machine learning are well-suited to manage the massive amounts of diverse information necessary to detect indications of PTSD and to develop effective customized therapies that match an individual's needs. Deep machine learning uses neural networks to identify then predict patterns or models from complex interactions between multiple variables within massive datasets. Algorithms analyze data from structured interviews describing combat experiences and causes such as genet-

ics, neuroendocrinology, metabolomics, plus observed clinical symptoms (Malgaroli and Schultebraucks 2020, p. 273). AI-personalized treatments, telehealth videoconferencing, and asynchronous multimedia messaging, provide effective, real-time PTSD therapy. AI applications collect and analyze digital data automatically for up-to-the-minute patient assessments, then notify therapists with suggested clinical and behavioral interventions or in some cases whether the patient is a potential suicide risk.

Utilizing AI in the diagnosis and treatment of PTSD offers therapeutic advantages, but it also entails some ethical challenges. Artificial intelligence is only as ethical as its data, algorithms, and human contributions to system functionality. Due to their novelty and technological complexity, artificial intelligence programs and machine learning are confidential or patented; thus, they are not very transparent. Without transparency, AI outcomes are difficult to reproduce, test, interpret, and critique. Developers are creating new interpretation techniques to explain predictive models, enhance reproducibility for independent testing, and create safeguards for statistical errors. Human-understandable AI algorithms and step-by-step simulations improve clarity and comprehension as well as instill confidence in the diagnosis and treatment of PTSD.

In addition to transparency, accountability and trustworthiness are necessary in the AI-assisted diagnosis and treatment of PTSD. Thus, accountability enhances confidence by explaining choices, identifying culpability, and determining ways to prevent future issues. Trust in AI system components essentially relies on the integrity and competency of analysts, designers, and developers. Training, experience, and prudent judgment are essential attributes for creating trustworthy applications. Trust also develops from using several historically-proven, dependable datasets and running multiple AI programs against them to reach a decision. Since deep transfer learning shares patient information between training models and multiple datasets, confidentiality and sensitive healthcare records must be protected. Each step in the process should comply with HIPPA rules and regulations and include human oversight and periodic audits. Employing cybersecurity technology likewise reduces unauthorized access and system manipulation. The ability to trace data back to original sources decreases the risk of unethical tampering and increases confidence in AI results.

6.3. Religious Rituals and Spiritual Development

Artificial intelligence applications provide sacred writings, devotional prayers, and interactive worship via the internet. Nevertheless, AI robots and interactive technologies currently lack sufficient empathic programming to make them effective at counseling and reestablishing spiritual health. The relationships people develop with or through these devices differ from conventional human interactions. Until AI technology significantly improves in the areas of mental and spiritual health, religious rituals and practices offer effective methods for coping with combat-induced PTSD and its subsequent harm to a person's physical, mental, and spiritual well-being. In selecting beneficial treatments, mental health and pastoral care professionals should carefully evaluate whether PTSD affects a client's religious and spiritual beliefs to avoid inappropriate theological or ethical topics during therapy. In appropriate cases, counselors encourage patients with PTSD to participate in spiritual and religious activities. Religious rites and spiritual practices foster connections with family and the community that help restore meaning, purpose, and hope lost during wartime trauma. Some suggested activities to improve spiritual health include attending religious functions, volunteer work, and practicing meditation, mindfulness, journaling, as well as enjoying nature.

The military is assessing a spiritual practice called mantram repetition, to improve a person's focus and attention. Repeating sacred phrases such as *Ave Maria*, *Om Mani Padme Hum*, or *O Wakan Tanka* throughout the day is a soothing mindfulness technique. It offers "significant reductions in perceived stress and anger and improvements in existential spiritual wellbeing and quality of life" (Bormann et al. 2012, p. 497). Taking time each day to reconnect with one's spirituality calms the mind while creating peace and clarity to cope

with PTSD symptoms. Practicing mantram repetition while in a relaxed state teaches a person to regulate emotional responses in stress-triggering situations.

American Indian cultures demonstrate their deep respect for soldiers with special rites and spiritual traditions that prepare them for battle and help reintegrate them into society. The ritual contains two parts: "When soldiers go overseas, we give them warrior ceremonies to armor and protect them against the battle; when the soldier returns; we have to remove that armor, to help him reconnect with his home" (Palmer 2015, p. 88). Adapting these traditional spiritual transition ceremonies to accommodate modern drone warfare helps RPA fighters cope with switching between their communities and remote combat conditions on a daily basis. Whether serving on site or on station, soldiers hold a special place of honor in American Indian communities. Spiritual rituals and communal dances celebrate soldier and veteran sacrifices, which are comparable to non-indigenous peoples' parades, dinners, and welcome home receptions.

Faith-based organizations (FBOs) provide a variety of services to assist soldiers as they readjust to civilian life. Veterans' most crucial needs are privacy, confidentiality, and a non-judgmental environment, especially when confronting the stigma of PTSD (Werber et al. 2015, p. 8). Counselors must be sensitive to how religious and societal perspectives influence a warrior's emotional interpretation of war trauma as glorified, sacrificial, or karmic. If the veteran is deeply spiritual or professes a strong religious faith, counselors and pastors should not discount, but gently affirm, notions of sin, right and wrong, and feelings of guilt so the person might seek comfort and healing from familiar rituals and personal, spiritual relationships with ultimate reality. After establishing a basis for trust as a "benevolent moral authority, [counselors offer] 'psychospiritual' or strictly spiritual support that enables veterans to open up, 'reawaken,' and regain a vision for their lives" (Werber et al. 2015, p. 6). FBOs concentrate on spiritual assistance, but they also provide access to social, physical, and mental health services along with educational, vocational, financial, and legal support. This myriad of services reflects a holistic approach to healing PTSD and integrating veterans back into society.

Moreover, religious traditions provide specific rituals and prayer services that help heal and reconnect veterans with families, friends, and a faith community. Rituals provide significance, promote community participation, and transmit traditions and wisdom that enhance identity, meaning, and belonging. Religious rites also require self-awareness, and reflection. Veterans suffering from PTSD often are unable to accept self-forgiveness, the forgiveness of others, or a sense of divine forgiveness. The Catholic Church mediates God's mercy and forgiveness through its communal rituals known as sacraments. Each sacrament communicates God's healing grace to restore and strengthen one's spirituality, self-esteem, and vital relationships with the divine and with the community. Baptism, for example, initiates a loving relationship with God and the Eucharist celebrates communion with God and each other. During Anointing of the sick, the physically, spiritually, and mentally ill share a special unifying experience with the entire Church community who is praying for them. Whether through healing, regeneration, or wellness, the person attains a wholeness and integrity of body, soul, and spirit.

The sacrament of Reconciliation (Penance) unites God's mercy with a person's faith. Nevertheless, the desire for "healing must come from within [and one] must be open to receiving help" (Cooke 1994, p. 175) by admitting brokenness and dependence, then showing a willingness to trust the love of others. Acknowledging human transgressions and faults evokes healthy feelings of remorse and contrition through which God acts to forgive, heal, and restore damaged relationships with the divine, the community, and oneself. Reconciliation does not suppress the memory of violence; it does not mediate, but gently confronts lingering internal conflict. Hence, the healing process of reconciliation reestablishes psychological and spiritual health by recognizing a person's dignity.

For veterans experiencing PTSD, sharing personal narratives contextualizes actions, feelings, and thoughts in broader patterns of life. Counselors and pastors create safe spaces for interaction and dialogue that enable narratives to neutralize the destructive

effects of societal violence and wartime suffering. Adaptive Disclosure is a cognitive-based therapy treatment designed specifically for military personnel. Actively listening to RPA operators' personal experiences and eyewitness accounts of violence and evil acknowledges the trauma causing mental and spiritual harm. These stories piece together the fragments of identity and memory that slowly reestablish trust and thus restore one's humanity. Similar to the Sacrament of Reconciliation, narratives do not deny or forget the past; instead, they remember it in ways that heal spiritual, emotional, and psychological, wounds caused by PTSD. Such dialogue reconnects interpersonal relationships and achieves a sense of justice and dignity.

7. Conclusions

Military warfare, whether conducted on the battlefield or remotely with drones and artificial intelligence technology, still involves risk factors that often lead to a diagnosis of post-traumatic stress disorder. While intended to reduce casualties, trauma, and stress, AI-assisted drones create unexpected consequences that change the combat experience. These consequences inflict psychological trauma and emotional stress on RPA personnel, at times leading to PTSD and diminished spiritual health. From continuous surveillance, drone pilots form personal connections with the targets of subsequent kill missions, then witness a person's death and destruction in real-time on high-definition monitors. As a result, the paradoxical intimate proximity of remote conflict plays havoc with a drone operator's psyche. These unusual combat conditions and occupational stresses increase the risks of PTSD and generate existential questions concerning a drone operator's morals, ethics, and spirituality. As the number of cases increase among RPA pilots, the military has an ethical obligation to focus on effective strategies that mitigate the remote combat causes of PTSD and develop effective methods to treat soldiers and restore their spiritual health.

Active military personnel and veterans rely on a healthy spirituality to help them cope with PTSD symptoms and the ugly brutality of war. The increased use of AI drone technology, therefore, requires concurrent measures to remove conditions proliferating PTSD, which harm spiritual health and well-being. Ironically, AI applications improve the diagnosis and treatment of PTSD. Various religious rituals, ceremonies, and counseling additionally nourish, heal, and reintegrate a warrior's body, mind, and spirit. Completely autonomous AI drones also reduce stressors leading to PTSD, yet they introduce ethical and moral issues to military warfare ethos. Because artificial intelligence technologies lack moral and ethical reasoning as well as the emotional intelligence to respect soldiers' lives and dignity, warfare must remain a human venture. To remove RPA operators from the kill loop is unethically abdicating decision-making and accountability, which permits fully autonomous AI-controlled drones to weigh warrior lives (including their spiritual and psychological health) against strategic combat gains. Without human judgment and involvement, these weapons may pose greater problems for the future of modern warfare.

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Mental and Spiritual Health Needs of Cognitively Enhanced People: A Therapeutic and Spiritual Care Model for Responding

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Abstract: Cognitively enhanced people will have mental and possibly spiritual health needs that merit therapeutic and spiritual care response. This article addresses people who, although significantly enhanced, overlap with ordinary or "normal" (i.e., non-enhanced) people such that their status as humans is not questioned. Effective therapeutic and spiritual care approaches for these cognitively enhanced individuals will have a strong cognitive component. Cognitive therapy, originated by Aaron Beck, is an example of a therapeutic model that could prove useful with people cognitively enhanced. Four relevant elements of the cognitive therapy modality are explored: a developed cognitive structure, little consideration to unconscious factors, minimum attention to family of origin, and collaboration. Two psychological challenges with religious dimensions and import, which could be faced by individuals as a consequence of their cognitive enhancements, are concerns about physicality and fitting into community with ordinary humans and other enhanced humans.

Keywords: Aaron Beck; artificial intelligence; cognitive therapy; enhancement; mental health; pastoral care; psychotherapy; spiritual care; spiritual caregivers; spiritual distress; spiritual health

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1. Introduction

Humans, significantly enhanced cognitively and perhaps in other ways, could emerge as a result of a vast array of human enhancement technologies and therapies being advanced with significant and increasing funding from corporate and government sources. As we use the term, ordinary or "normal" human refers to people who have not been significantly enhanced. The focus of this article is on people who are enhanced, but not in ways or to a degree that their status as human being is questioned.

Several research programs are underway that could lead to enhanced humans, although skepticism abounds regarding the technical feasibility of various avenues of research. While any particular technical approach may be appropriately dubious, that a number of paths are being explored perhaps increases the chance of significantly enhanced humans. "The sheer range of enhancement methods suggests that it would be very unlikely that all current methods are ineffective or that future advances will fail to produce an increasingly potent toolbox for enhancing cognition." (Bostrom and Sandberg 2009, p. 313).

Cognitive enhancement can be defined as "amplification or extension of core capacities of the mind through improvement or augmentation of internal or external information processing systems." (Bostrom and Sandberg 2009, p. 313). Cognition is a compilation of capabilities with regard to information, including acquiring (perception), selecting (attention), representing (understanding), processing, retaining (memory), and being creative with the information. (Dressler et al. 2019; Kostikov 2021; Bostrom and Sandberg 2009). Cognitively enhanced humans will have, compared to ordinary humans, advanced capabilities in some or all of these core faculties.

Cognitively enhanced humans will likely benefit from artificial means to optimize learning and memory (Bostrom and Sandberg 2009). Research underway includes brain stimulation techniques, e.g., functional magnetic resonance imaging or fMRI neurofeedback

(e.g., Dressler et al. 2019) and transcranial magnetic stimulation or TMS (e.g., Hummel and Cohen 2005). Other research includes augmenting thinking through brain-computer interfaces (Kaku 2014; Pederson and Iliadis 2020; Warwick 2014).

The advent of CRISP-Cas9 gene editing technology is likely to greatly impact human enhancement possibilities, including cognitive enhancement.

> Not too many years ago, the possibility of cognitive enhancement through genetic engineering interventions seemed to be not only very distant, but also a dead end. In few years the situation has changed: today we have available a new generation of genetic editing techniques—in particular CRISPR-Cas9—which allows to cut and paste with precision into the coding sequence of bases of a single gene, yielding results that were previously unthinkable in terms of simplicity and applicative accuracy (science fiction excluded). On the other hand, recent studies have identified some genes that can play a very important role in controlling specific cognitive functions. (Lavazza 2018)

Significantly enhanced humans may require adjustments in our legal, political, educational, economic, and other systems. The ethical discussion is underway (e.g., Lavazza 2018; Al-Rodhan 2019; Bostrom and Sandberg 2009). No religion will be immune to such developments, which, if the faith traditions are to be relevant, will necessitate theological, ethical, institutional, and other responses (e.g., Donaldson and Cole-Turner 2018). We stand at the beginning of consideration about responses to cognitively enhanced people. My limited focus is on their mental and possibly spiritual health challenges requiring some kind of therapeutic and possibly spiritual care intervention.

I say "possibly" spiritual health challenges, because not all humans, enhanced or not, consider themselves spiritual. I use the term "spiritual" broadly, to refer to issues presented to caregivers by enhanced persons that have to do with "belief, practice, relationship, or experience associated with whatever someone deems sacred" (Exline and Rose 2013) and that may or may not be associated with a religious tradition or institutional (e.g., church) setting. This broad understanding of spiritual can include problems presented to secular therapists as well as a range of spiritual care providers, including pastors, chaplains, lay ministers, and pastoral counselors.[1] Although considerations in this article may be relevant to other religions, the examples and illustrations are from Christianity.

Psychological issues enhanced people face may include emotional distress (e.g., anxiety, depression) about physicality and fitting into community with ordinary humans and other enhanced humans. Both topics have theological dimensions and implications, and I address them as two examples of mental and spiritual health challenges cognitively enhanced individuals may face.

The discussion is exploratory, suggesting lines of inquiry that may be useful in navigating the psychopathology of, and therapeutic and spiritual care services to, enhanced persons. The thesis is modest. I claim that a cognitive-focused response model will be most appropriate for mentally and spiritually disturbed individuals who have been enhanced cognitively. Cognitive therapy, originated by Aaron Beck, is an example of a therapeutic model that could prove useful with this population. Also, the cognitive therapist of the future will be learning things about the client that do not necessarily fit into standard paradigms of psychopathology, so any model adopted will be ripe for revision. While these reflections on future challenges and possible responses are broad in scope, enough specifics (e.g., responding to concerns about physicality and community) will be provided to illustrate the general points.[2]

2. Responding to Enhanced Humans with a Cognitive Model

A therapeutic response to those with advanced cognitive abilities would seem to benefit from a psychological model that gives primacy to cognition. That said, it is important to understand that cognition cannot be simply siloed off from other aspects of the self, whether those aspects have to do with our affective, spiritual, or other physical capabilities. Research on cognition generally sees it as intertwined with the body as well as the natural

environment in what has been termed "embodied cognition" (e.g., Raveh and Tamir 2019; Herzfeld 2017). Enhancements might occur in areas of physical, cognitive, affective, moral, and perhaps spiritual (Cole-Turner 2015) abilities.[3] My focus on cognition as a therapeutic target does not mean that other dimensions of one's life should be ignored.

Additionally, there is some evidence that therapists using a cognitive-behavioral approach have a more positive view of artificial intelligence (AI) than therapists who practice with other approaches, i.e., psychodynamic and systems-relational (Sebri et al. 2020). That finding could mean that cognitive therapists, compared to other kinds of therapists, may be more predisposed to working with clients with advanced cognitive abilities.

2.1. Aaron Beck's Cognitive Model

Cognitive therapy, originated and effectively championed by Aaron Beck and associates, is a widely used and respected model of therapy that can provide a starting point for thinking about a therapeutic response to cognitively enhanced humans (Mercer 2009, pp. 131–41 for a summary of Beck's model). In this model, core cognitions (e.g., attitudes, assumptions, and beliefs) govern how we construe events (Dozois and Beck 2008, especially chapter 6, "Cognitive Schemas, Beliefs and Assumptions"). Those interpretations of events then yield emotions and behaviors consistent with the interpretations. The cognitive therapist works with the client to alter maladaptive thinking, thereby providing cognitions leading to healthy affect and behavior.

Cognitive therapy was being developed around the same time that computer technology was being advanced. Beck, himself, drew a comparison between cognitive therapy and computer programming when he noted that some pathologies have their own "program" that regulate the "kind of data admitted" (Beck and Weishaar 1989, p. 286). At the heart of this cognitive model, then, is thinking. Some other models, such as the rational-emotive therapy (RET) of Albert Ellis, also give primacy to cognition. Four features of Beck's system (cognitive structure, the unconscious, family of origin, collaboration) make it a good example of a general framework that might be helpful for addressing the mental or spiritual needs of cognitively enhanced humans.

2.2. A Developed Cognitive Structure

Beck's model is thoroughly cognitive in its orientation and structure, positing several levels of cognition. Thinking that is conscious and deliberate, which Beck calls "voluntary thoughts," constitutes our active thinking process. Beyond surface level voluntary thoughts and at the heart of Beck's program are cognitive schemas, also called attitudes, beliefs, assumptions, thought patterns, and underlying mechanisms. Schemas are the central and relatively stable structures of thinking that are usually formed early in life in association with significant others. Schemas often come in a contractual form, i.e., "If I do X, then Y will happen." Because they were formed early in life, their expression usually has a childish quality, as in "I'm stupid" or "I'm dumb."

These thinking patterns inform our "automatic thoughts," the involuntary, spontaneous thinking that drives much of our behavior and emotions. Automatic thoughts are prompted by circumstances in our lives, are generally not questioned by us, and occur without rational analysis. In other words, via automatic thoughts, our cognitive schemas mold, unconsciously, input from the outside world, producing behavior and affect. These deeper levels of the client's thinking are more revealing of psychopathology than surface voluntary thoughts. Cognitive therapy intervention, appropriately, addresses these deeper levels. When behavior and/or affect is pathological, the cognitive therapist works collaboratively with the client to examine and modify the dysfunctional cognitions that give rise to the concerning behavior and troubling emotional output. Shifting the client's thought process to one that is rational and reality-based is at the heart of the therapeutic mission.

A central challenge of cognitive therapists is working with clients whose capacity for logical thought is weak or who, for various reasons, are reluctant to engage in rational anal-

ysis of their cognitive schemas and automatic thoughts. People who have been cognitively enhanced are likely to have a greater capacity for logical thinking than ordinary humans.

Depression and anxiety, both widespread psychological disorders, are examples of how a cognitive-based intervention program is made to order for clients who bring strong critical thinking skills to the therapeutic process. Beck began his work with depressed clients and treating that disorder is still the showcase for this therapeutic modality. Depressed clients exhibit a cognitive triad of negative views about self, the world, and their future (Beck and Weishaar 1989, p. 304; Beck 1995, pp. 166–92). The self is inadequate, defective, and/or worthless; the world is without pleasure or gratification; and the future is hopeless. The therapist helps the client see that these interpretations are not, for the most part, based in an accurate assessment of reality. All things being equal, enhanced humans with superior intellect would be more able to accurately dismantle this negative cognitive triad.

In Beck's program, anxiety arises from a perception of danger. Pathological anxiety by definition is anxiety that is not appropriate to the real situation. The error in thinking is overestimating the probability or severity of the feared event or underestimating the coping resources (Clark 1986). As with depression, presumably anxious clients able to utilize advanced critical thinking skills will be better equipped to correct these cognitive errors.

So, a central task of the cognitive therapist is to teach the client logical thinking and assist the client to apply that thinking to the schemas and automatic thoughts that give rise to dysfunctional behavior and troubling affect. Errors in thinking include arbitrary inference (i.e., jumping to conclusions), dichotomous (i.e., all-or-nothing) thinking, over-generalization, selective abstraction, catastrophic thinking, minimization, and emotional reasoning (Mercer 2009, pp. 139–41). These deeply ingrained cognitive errors can be very hard to overcome, having taken root early in life and practiced regularly for years. A cognitively enhanced person, however, would have the intellectual arsenal to combat these errors. The therapist would not need to expend time teaching critical thinking skills.

To illustrate cognitive therapy, here is an example of a cognitive subsystem presented by Beck (Beck et al. 1979, pp. 250–51). As a therapist, I often saw versions of this pattern.

Affect: depression or anger

Automatic thought: I caused my husband to behave badly

Schema: If I'm nice, bad things won't happen to me.

In this case, early in life the client generated the schema, "If I'm nice, bad things won't happen to me." This schema, as with all maladaptive ones, includes cognitive errors, in this case arbitrary inference and all-or-nothing thinking. The schema is not reasonable, but a young child, perhaps fearful, might very well draw this conclusion in an anxiety-producing situation from her family of origin. The schema gets embedded deep in the psyche and provides a ready explanatory model when something bad happens in adult life. In essence, the adult is operating with an interpretative outlook generated as a child.

As a further explanation of this process, the notion of "hot cognition," used in but not peculiar to cognitive therapy, is relevant here (Roiser 2013). A hot cognition is an affect-laden, affect-led thinking process, as distinguished from cold cognition, which is more likely to be driven by and characterized by logic. Again and again, in my clinical practice, an adult client's dysfunctional schema could be traced to an origin in childhood during some emotionally stressful situation. While understanding the schema's origin could be helpful, the critical factor in treatment progress was the client's ability to think critically and exhibit motivation to do that.

2.3. Unconscious Factors and Family of Origin Minimized

Cognitive therapy is in contrast to those psychotherapeutic approaches that give considerable attention to unconscious motives and impulses and to family of origin issues. For example, psychoanalysis, stemming from Sigmund Freud, sees the person as driven by an array of buried unconscious impulses emanating in large part from one's early family experiences. It is true that cognitive therapy pays attention to family of origin to some

degree, in helping the client understand the origin of their schemas, likely in terms of a "hot cognition," explained in the last section of this article. But extensive interrogation of complicated childhood issues is not needed; the cognitive therapist concentrates on helping the client adjust dysfunctional thinking in their present life circumstances.

Enhanced humans would have a childhood and family of origin. However, clients who are cognitively enhanced are probably less likely to be influenced by those early years than ordinary people for the following three reasons.

First, cognitive enhancements will not occur independent of other enhancements, such as those that extend the number of years of life. In other words, by the time robust cognitive enhancements are achieved, advancements that significantly extend healthy human life may very well have also arrived. Enhanced individuals living 130 years, just to pick a superlongevity number, will have had, for much of their lives, so many more years of life experience that the distant family of origin is likely to be less of a factor than with someone living the traditional fourscore and ten.

Second, by the time cognitive enhancements come, advanced affective enhancements may very well help address any family of origin issues in ways that minimize dysfunctional behavior and distressful emotions stemming from early childhood. Psychedelic-assisted therapy is one relatively new approach that looks promising (Marks and Cohen 2021).

Finally, the advanced cognitive abilities of enhanced people will give them the intellectual tools to cut through illogical schemas derived from hot cognitions in childhood. Cognitive therapy attends to present thinking patterns and their impact on affect and behavior and would be, therefore, an appropriate and effective intervention that would not require involved exploration of the early years.

2.4. The Key Role of Collaboration

The cognitive therapist is an active participant with the client in the psychotherapeutic process. There is no doctor treating patient, but, rather, a therapist engaged with the client in dialogue designed to challenge errors in thinking that lead to dysfunction. The client is presumed to have or be capable of learning the tools necessary to accomplish this.

A collaborative model seems appropriate for therapists working with cognitively advanced clients, who may not respect the therapist and his or her methods and who may be reluctant to cooperate with a therapist who thinks of themselves as doctor fixing the patient. A superiority complex is a psychological mechanism that serves as a defense against feelings of inferiority, to pick one possible cause. If the client is advanced due to some technological intervention, then the client may very well actually be superior in various ways to a therapist who is ordinary i.e., not enhanced. This disparity in abilities between therapist and client is likely to be one of the issues—perhaps a big one—to be addressed in therapy of the future. In any case, assuming a good therapeutic relationship can be achieved, a cognitively advanced client experiencing psychological difficulty may find it helpful to collaborate with a cognitive therapist with wisdom and experience derived from years of practice. The client's intellect may be superior to that of the therapist and should be respected and utilized by the therapist in the therapeutic partnership to accomplish treatment goals.

In the collaborative model fostered by Beck's program, cognitive therapists have always been keen to learn about and work with the client. As noted earlier, cognitive therapists, working with an enhanced population, will be learning things about their clients that are not found in the standard psychopathology textbooks. The usual paradigms may help, but the therapist will need to be nimble and creative in this unfolding frontier. The cognitive therapy collaborative model is made to order for this situation, where the therapist and client with advanced cognitive abilities work together to educate each other and forge a productive path forward. I can envision a situation where the roles of client and therapist are reversed during the therapeutic process, due to the advanced capabilities of the client, generating a therapeutic situation that would need to be addressed.

One of the goals in this article is to generate a discussion about addressing the mental and spiritual health needs of enhanced humans. If (perhaps when) significantly enhanced people begin to populate our communities, including faith communities, they will come with a variety of profiles depending in part on the kind and degree of enhancement. Over time a body of clinical and pastoral literature will grow that addresses the needs of these different categories of enhanced clients and enhanced persons of faith. The cognitive collaborate model is well positioned to help understand and develop the expertise needed.

2.5. Spiritual Care and the Cognitive Model

As noted earlier, pastors, chaplains, lay ministers, and pastoral counselors respond to people of faith seeking help for their spiritual distress and challenges. Spiritual caregivers get training from a range of sources, depending, e.g., on the particular religious tradition.

Secular psychotherapeutic approaches can influence spiritual care providers (Frederick 2009). The Association of Clinical Pastoral Education (ACPE 2020) is one notable organization devoted to providing that training in theological schools, hospitals, and other settings. Caregiving promoted by the ACPE recognizes that pastoral approaches draw from the behavioral sciences, working to integrate those psychological models with theological and pastoral insights (e.g., https://acpe.edu/programs/cpe-educator-certification; https://acpe.edu/education/cpe-students/faqs, accessed on 10 April 2022). Cognitively oriented psychotherapy, adjusted to fit spiritual care needs, has been explored for its usefulness with clients identified in the literature as "religious/spiritual" (e.g., Bingaman 2015; Carlson and Gonzalez-Prendes 2016).

While secular models, such as cognitive therapy, can influence spiritual caregiving approaches, many and perhaps most spiritual care providers (e.g., pastors, lay ministers) will not have had specialized training in any therapeutic model. However, the four elements of the cognitive model highlighted above (i.e., cognition, collaboration, and minimal attention to unconscious factors and family of origin) could be valuable features of the care provided by any spiritual caregiver for the same reasons those features would be relevant for psychotherapists working with cognitively enhanced clients.

In seeking care from spiritual providers, cognitively enhanced humans who are also persons of faith will bring advanced intellectual abilities. How theological schools, denominations, and other religious institutions train spiritual caregivers to respond is beyond the scope of this article. However, the cognitively enhanced congregants, patients, and clients will probably seek out, indeed insist on, spiritual care providers who provide that care in cognitively oriented, collaborative, and other ways that best meet their particular needs.

3. Psychological and Spiritual Challenges of Cognitively Enhanced Humans

Cognitively enhanced humans are human and so will present with a range of psychopathology. Two issues being discussed by scholars working on human enhancement include physicality and inclusion into community. Concerns about either of these can lead to emotional distress, e.g., anxiety and depression.

3.1. Physicality

In this new world of enhancement, the significance and role of the body has been a topic of much debate among religion scholars (e.g., Thweatt-Bates 2012, pp. 67–84, 149–68; DeBaets 2015; Mercer and Trothen 2021, pp. 149–53, 165–70) and may very well constitute an important category of needed psychological and spiritual attention. Significant adjustments to the human body that evolution has to date bequeathed us may be on the way. Enhancements to the body could involve tissue engineering, cell therapies, biomanufacturing, 3D printing, and other biomedical technologies. So, people who are cognitively enhanced may also be enhanced in other ways, such as greater strength, better eyesight, and superior hearing. Changes like these and others to their body may entail emotional distress.

Psychologically, the body can play a role in pathology beyond overt body-related disorders, such as anorexia nervosa, bulimia nervosa, and body dysmorphic disorder. Patients who now must adapt to prostheses foreshadow enhanced humans who must grow accustomed to significant changes in their body. For cognitively enhanced people experiencing emotional distress, engaging their concerns from a reality based rational framework is likely to be more helpful than being served by therapeutic approaches that focus on early childhood and unconscious factors, for reasons already discussed in the section on the Beck model of therapy. Enhanced people, identifying as spiritual, may experience emotional distress at understanding and relating to their enhanced body and how their body fits into their theological framework and/or spiritual journey. Spiritual care providers, who follow a cognitive model, likewise will be better equipped to address their cognitively enhanced clients or parishioners.

3.2. Inclusion in Community

A second challenge people with advanced intellectual abilities will almost certainly face is how they fit into the larger community of persons, to pick one example which may have psychological fallout needing therapeutic attention. Scholarly discussions are already underway about the challenge of a new ism that could aggravate social inequality (Bostrom and Sandberg 2009; Mercer and Trothen 2021, pp. 57–59, 84–87). Along with racism, sexism, classism, and others, we will likely face differences and divisions between the "enhanced" and ordinary people or "normals," those who choose not to partake of the technologies or do not have access for any number of reasons. James Hughes' (2004) book title, *Citizen Cyborg: Why Democratic Societies Must Respond to the Redesigned Human of the Future*, makes the point that these differences will have societal and political implications.

Community here can be neighborhood, civic club, country, and others. Several factors could come into play with regard to enhanced individuals feeling integrated into community, with each type of community presenting its own challenges. One factor is the percentage of enhanced humans who constitute a particular community. Social pressure, feelings of alienation, communication challenges, and attitudes of superiority might show up differently, depending on the size of the enhanced population of the community. A competent therapist, in addressing the particular distress with which the client presents, will consider all these and other factors. Family issues that arise from one or more members of a family being enhanced constitute another whole domain of mental health need and possible intervention.

In addition to fitting into communities of ordinary humans, enhanced individuals may also struggle to relate well with other people with enhancements similar to or maybe quite different from those of the client. As with other isms that challenge society, people with advanced abilities may tend to isolate from ordinary humans, aggravating problems about how enhanced people relate to each other. My modest goal is not to detail the many possible therapeutic situations that might arise with an enhanced client working on relationship concerns with other enhanced people. Rather, I contend that a cognitive model would be an effective therapeutic approach for a cognitively enhanced client in a problematic relationship with other enhanced people.

To give an example of one religion, Christianity has a particular focus on community as the church, the body of Christ. Societal divisions are reflected in the church (Lipka 2014), and the emergence of enhanced congregants alongside "normals" would present their own set of challenges. Those challenges could include, but not be limited to, controversies about a variety of topics, such as inclusion into the congregation, taking leadership positions in the church, administering sacraments, and ordination. Pastoral care that gives emphasis to reason and critical thinking, even when thinking through theological issues of community, could be a useful way to work with cognitively enhanced Christians on these and other matters.

4. Further Considerations

4.1. Psychometric and Spiritual Distress Assessment

The focus in this article is on psychotherapeutic intervention for people who have been enhanced cognitively and perhaps in other ways as well and who exhibit mental and spiritual health distress or dysfunction. An important related topic is the diagnostic question.

Mental health professionals trained in psychometric testing have an array of instruments to measure intelligence, personality, aptitude, attitude, behavior, and a host of other things. Such instruments could include tests measuring different kinds of intelligence (e.g., the Wechsler Adult Intelligence Scale or WAIS series), the Minnesota Multiphasic Personality Inventory (MMPI), the Beck Depression Inventory, and projective tests such as the Rorschach inkblot, Thematic Apperception Test (TAT) that uses enigmatic pictures, and projective drawings.[4] Brain scanning and genome sequencing will undoubtedly play increasingly important roles in clinical work. Although they vary in reliability and validity, a battery of tests can yield valuable information for the therapist in formulating a diagnosis and treatment plan. While not as developed, other instruments assess spiritual development and distress (Hill 2013; King et al. 2017; Lucchetti et al. 2013).

4.2. Enhanced Therapists and Spiritual Care Providers; AI Therapists and Spiritual Care Providers

Thus far in this article it is presumed that the therapist and spiritual care provider are "normals," i.e., not cognitively enhanced. It is possible, perhaps likely, that a cognitive approach will be used also by therapists and spiritual caregivers who are cognitively enhanced, maybe leveling the caregiver-client relationship in helpful ways.

Another possibility is that the therapist will be an AI agent or robot. Artificial intelligence is already widely used in the healthcare field to both support human decisions about diagnosis and treatment and generate such decisions (Jordan and Mitchell 2015). ELIZA was a 1960s natural language processing program that attempted to mimic Rogerian client-centered psychotherapy, mainly by feeding back what the client says (Shun et al. 2018). Particularly relevant for this article about cognitively enhanced clients, Woebot, developed at Stanford, is a talk therapy chatbox that operates with cognitive behavioral protocols, assisting users to adjust their negative thoughts (Fitzpatrick et al. 2017; Young 2019).

Woebot is not alone. Today, AI virtual and robotic agents are at work in the mental health field (Fiske et al. 2019). They execute lower-level comfort and social interaction as well as higher level interventions that include, e.g., providing empathetic-type responses to clients (Inkster et al. 2018); sensing, analyzing, and expressing emotions (Robinson 2019); and addressing mood and anxiety disorders (Rabbitt et al. 2015).

We are now in the early stages of attempts to include a spiritual component into AI agents, some of which are being utilized in palliative care. Spirituality is a core dimension of palliative care, although often overlooked by medical professionals. So, researchers at Northeastern University and Boston Medical Center designed a touchscreen tablet-based "virtual conversational palliative care coach" that could test the receptance of and effectiveness of different degrees of spiritual engagement and from several faith traditions. The controlled study found that older adults were comfortable talking with the agent about end-of-life issues and in a conversation that included a spiritual dimension tailored to the patient's background (Utami et al. 2017; Young 2019).

5. Concluding Reflections

It is certainly possible, some would say likely, that we will see significantly enhanced humans resulting from the vast array of powerful technologies and therapies under development. Given the many research programs addressing it, cognitive enhancement could be a sizable part of human enhancement. Cognitively enhanced people will surely come with mental health and, for persons of faith, spiritual health needs and concerns. Two psychological challenges with religious dimensions and import, which could be faced by individuals as a consequence of their cognitive enhancements, are concerns about physicality and fitting into community with ordinary humans and other enhanced humans. I have

proposed Aaron Beck's cognitive therapy as a model appropriate for serving the mental and spiritual health needs of cognitively enhanced humans.

In my Himalayan trek, I thought about the first explorers who confronted the wild, unpredictable landscape. Their exciting journey forward was fraught with danger and uncertainty, but also opportunity. The enhanced human psychological terrain is also a frontier vast, unpredictable, and maybe dangerous, but also exciting and filled with possibility. Unlike standing before a Himalayan mountain, when these cognitively enhanced populations arrive, we will not have the luxury of avoiding the frontier. The sooner we begin readying ourselves for that trek, the better.

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Notes

1 A pastoral counselor is a licensed mental health professional who integrates psychological and religious/theological training. The profession is distinct from a pastor who provides counseling to parishioners.

2 I was trained in clinical psychology, practiced part-time for a decade doing psychometric assessment and psychotherapy, and draw upon that background for the psychological material in this article.

3 These are the five categories of radical human enhancement distinguished and discussed in some detail in Mercer and Trothen (2021).

4 These are some of the instruments I used in my practice. There are many others.

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Article

Life Extension Technologies and Pregnancy: Practical and Theological Considerations

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Abstract: As biotechnologies emerge that halt or slow aging, what significance will these have for pregnancy? I argue in favor of life extension technologies based on their benefit for cis-gendered women who wish to become pregnant. After age 27, fertility decreases, and risks associated with pregnancies increase. At the same time, women's twenties and thirties are often key years in their working life. If aging is stopped or slowed, women can delay pregnancy past those years. Though Martin Luther may seem an unlikely resource for theological reflection on this issue, his biblical commentaries on pregnancy lend support for these technologies. Luther emphasized how the pregnant Mary, though of lowly status, was essential to the embodiment of God and a testament to the blessings God may visit upon anyone. Luther also emphasized how Eve and other pregnant women help advance God's promise to sustain God's creation of humankind. I acknowledge that lengthening the window of fertility could exacerbate overpopulation on the Earth but show that solutions typically advanced, such as John K. Davis' "Forced Choice" proposal, almost always rely on controlling women's bodily autonomy and must be rejected. I also show that fears of a Malthusian crisis are likely not only overblown but incorrect given predicted declines in fertility rates.

Keywords: biotechnologies; extended life; pregnancy; constructive theology; malthusian crisis

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1. Introduction

Though extending human lives by decades or centuries has long been the stuff of fiction, recent groundbreaking research promises to make this a reality.[1] David Sinclair, a biologist and genetics professor at Harvard University who conducts scientific research on the process of aging, has predicted that, based on the current speed of scientific progress, the first person to reach the age of 150 has already been born (Sinclair 2022). By "extended life", I am referring to the life of someone whose rate of aging has been slowed, halted, or reversed with the help of biotechnologies. In this essay, I explore several perspectives that take a positive view of extending life, in particular with respect to pregnancy.

Technologies capable of extending life, I argue, will benefit working women who wish to become pregnant and take maternity leave or years-long child-rearing leaves without incurring penalties to their careers. After age 27, a woman's fertility decreases, and health risks to the fetus and to the pregnant woman increase. At the same time, a woman's twenties and thirties are key years in her working life. With greater control over the effects of aging on their bodies, women could delay their pregnancies until a lengthy absence is less likely to damage their career prospects.

I acknowledge the concerns of those who believe that increasing the window of fertility combined with increases in average lifespans could accelerate population growth and exacerbate pressures on the Earth's resources. With more children born and fewer adults dying, a catastrophic tipping point could be reached—the so-called Malthusian crisis—when food production can no longer meet demand, provoking a massive die-off due to war, famine, and disease.[2] However, I show that fears of unsustainable population growth are overblown.

Moreover, the solutions proposed to avert a Malthusian crisis usually rely on drastic measures to reduce births. I argue that such solutions—for example, John K. Davis' "Forced Choice" proposal (Davis 2018, pp. 119–30)—must be rejected. Schemes to control the number of pregnancies, including Davis', depend on restricting the autonomy of women over their bodies using measures that range from coercive to violent. Autonomy, in this essay, is defined as self-determination.

The prospect of life-extending biotechnologies is already an object of engagement by various religious traditions (Haker et al. 2021). I join this conversation by advancing a preliminary Protestant Christian theology of pregnancy that welcomes biotechnologies based on their ability to increase the age range during which women can become pregnant. Though the early Protestant reformer, Martin Luther, may seem an unlikely resource, his commentaries related to pregnancy prove helpful. Luther emphasized, for example, the blessings visited upon the Mary when God regarded her and chose her as the *theotokos*, or Mother of God. Luther also described and praised Eve, the First Mother, and all other childbearing women after her as key to sustaining and preserving God's creation of humankind (Luther 1904).

To keep this essay to a manageable length, I focus my remarks on cis-gendered women though I am well-aware that transgender men and non-gender-binary people may also become pregnant. I base my remarks on the assumption that, for many women, pregnancy and childbearing is a good. It is in no way my intention to diminish women who are unable to become pregnant, have miscarried, or do not want to be pregnant.

2. Pregnancy and Biotechnologies: What's at Stake?

Pregnancy as a "good" is tied to at least two considerations: (1) it is a good in itself and, (2) it is a means to a desired end—an infant. I limit my remarks in this essay to the first consideration. For women who consider being pregnant as a good in itself, pregnancy is an embodied state that they desire and that they believe enhances their lives. These women wish to experience the bodily changes that accompany pregnancy, to feel the fetus grow and move, and to develop a bond with the proleptic child. Women who consider pregnancy a good in itself would likely choose to become pregnant even if surrogacy or other alternative childbearing options were available.

As biotechnologies that extend life by decades or more become available, they will no doubt have an impact on pregnancy. Research related to life extension is well underway, motivated in part by its most obvious benefit: to combat age-related diseases such as cancer, diabetes, heart disease, and Alzheimer's by reversing or stopping the aging process itself. For women, aging leads to diminished fertility and eventually to the inability to become pregnant. It also leads to greater risks to their health if they get pregnant.

Scientists are already reporting groundbreaking achievements in reversing age-related declines. In 2020, for example, molecular biologist David Sinclair and his collaborators at Harvard Medical School successfully reprogrammed the damaged retinal cells of old mice, returning those cells to a younger state and improving the mice's vision. These results alone constitute "a major landmark", according to Juan Carlos Izpisua Belmonte, a developmental biologist at the Salk Institute for Biological Studies, because they "clearly show that tissue regeneration in mammals can be enhanced" (Ledford 2020). According to forecasts by a group of 60 demographers and scientists who study aging, life-extending technologies will make it possible for a child born in 2100 to live an average of 292 years (Richel 2003).

Though religious, theological, or ethical objections to life-extension may slow research in some regions of the world, countries such as the United States are ramping up their efforts. Scientific advances have become so promising that, in early 2022, a private company, Altos Labs, launched its own research into the prolongation of life after it managed to attract three billion U.S. dollars in financing and "a star-studded scientific cast" (*The Economist* 2022). Some worry that life-extending technologies may initially be affordable only for the wealthy. However, just as the costs of infertility treatments or medicines like insulin were initially

prohibitive for most people, life-extending technologies, though expensive at first, will likely become commercially viable and financially accessible to the less affluent.

I limit my remarks to life extension, which is not to be confused with immortality. Extended life and immortality—eternal life—are not equivalent. Extended lives are finite lives since people will still die from complications related to childbirth, or from accidents, killings, or incurable diseases.

3. A Benefit of Life Extension: Delayed Pregnancy

The familiar trope of the biological clock is a reminder that, physiologically, women have a limited window of opportunity to achieve pregnancy. Peak fertility occurs at the age of 27, an age that remains fixed. In contrast, according to 2020 data from the U.S. Census Bureau, the average age at which women marry in the United States is 28 (United States Census Bureau 2021). Hence, by the time many women marry, their best chance of getting pregnant is already past. While not all women seek marriage before having children, they tend to prefer to be in committed, stable relationships before starting a family.[3]

Fertility falls rapidly after the age of 35 so that, by age 40, a woman's chance of conceiving during a menstrual cycle is a mere 5%.[4] Declining fertility can be mitigated if women bank their eggs until they are ready for pregnancy. At present, this is an expensive process; it also requires young women to think ahead and prepare for later pregnancies. In addition, banking eggs does not change the fact that, as women age, health risks associated with pregnancy increase. Pregnancy over age 35 is classified as high-risk because women are more likely to suffer from gestational diabetes, pre-eclampsia, high blood pressure, longer labor, and stillbirth (University of Rochester Medical Center Health Encyclopedia 2022). For women who wish to delay pregnancy until they have a partner and who wish to have more than one child, biotechnologies that can halt or reverse aging may be critical to realizing these plans.

While a woman's twenties and thirties are optimal for pregnancy, these are also key years for a woman's career. Most studies into the costs of pregnancy-related work pauses have focused on highly educated women for whom data is more easily available. Research data shows that, within this demographic, taking time off for pregnancy and to raise children exact a long-term financial toll—part of the gender gap in earnings.[5] It is not clear whether these studies are helpful when trying to understand the economic impact of pregnancy-related absences to gig workers or non-college-educated workers.

Economist Marianne Bertrand reports that career interruptions of 6 months or more have a negative impact on the future earnings of women with advanced business degrees. Bertrand found that ten years after earning a Master of Business Administration (MBA) degree, women are 22 percent more likely than men to have had at least one such interruption (Bertrand et al. 2010, p. 236). Women with MBAs earn USD 115,000 on average at graduation, and USD 250,000 nine years later compared to men with MBAs who earn USD 130,000 on average at graduation, and USD 400,000 nine years later. Bertrand attributes this significant lag in women's earnings, at least in part, to women taking leaves from work. She also reports that, 10 to 16 years after graduation, a man in the ninetieth percentile of incomes for men with MBAs earns over one million dollars compared to USD 438,000 for his female counterpart (Bertrand et al. 2010, p. 236).

The facts of their biology mean that women are compelled to weigh their career and earning prospects against the risks and reduced chances of becoming pregnant as they age. Women who can control their aging can postpone their pregnancies. The advantages of this kind of control for some working women is borne out by data. To return to the example of women with MBAs, the number of hours they work per week early in their careers ranges from 60–70 h per week but decreases over time as these women move into general management positions.[6] By using life-extending technologies to pause aging by a decade or more, middle-aged women who remain biologically in their twenties or early thirties will have the option to wait to become pregnant until after they have moved into

management positions with more manageable workweeks. The ability to delay pregnancy enables women to optimize the arc of their careers.

4. A Protestant Theology of Pregnancy

Protestant Christians, among others, are already taking an interest in developing theological responses to life-extending technologies.[7] In this vein, I offer a Protestant theology of pregnancy based on a selective reading of the works of the Protestant reformer, Martin Luther (1483–1546). I focus on Luther's writings about two key women in Christianity's narrative history whose importance is in part related to pregnancy—Eve, whom Luther called the First Mother, and Mary, whom Luther called *theotokos*, or Mother of God. As a source of Luther's views on Eve, I mostly rely on his commentary on the book of Genesis. For his views on Mary, I mainly turn to his commentary on Mary's hymn of praise, also called the Magnificat, in the gospel according to Luke (Lk 1:46b-55).

Ann Stensvold, a historian of religion and author of *A History of Pregnancy in Christianity*, writes that Eve's pregnancy along with Mary's "*could* have been conceptualized as a sacred event among Christians. But Christianity did not develop a cult of human pregnancy—or a veneration of motherhood for that matter" (Stensvold 2015, p. 2). Instead, Stensvold writes, Eve "represents everything that is alien to God—death, decay, and moral corruption—in spite of the very concrete function which women had—for everyone to see—in the actual creation and caring for new life". However, if Stensvold's overall assessment of Christianity's attitude toward Eve and pregnancy is correct, Luther is an exception.

The systematic theologian and author of *The Redeeming Act of Giving Birth: Martin Luther's Theology Concerning the Bodies of Mothers*, Amy Marga, acknowledges that Luther is "not an obvious resource", but like me, she finds his writings helpful in contemporary explorations of pregnant bodies as "locations of knowledge of the divine and of God's good creativity" (Marga 2020). Marga grants that, although Luther maintained essentialist views of women and was convinced that women's proper roles were limited to wife and mother, he also held, she argues, an "optimistic view" of the pregnant body. His ideas, according to her, subvert traditional attitudes about the curse of childbirth and affirm "the power that women have in God's activities of creation and new creation" (Marga 2020).

It is true that Luther promoted and even insisted on married life, emphasizing the duties of women to the household. Above all, he preached, women were to attend to domestic duties and be responsible for housework, childbearing, and caring for their husbands and progeny. Less well known was the esteem he had for pregnancy. He considered it "a great miracle" and spoke of the awe he felt for women's ability to create new life. Commenting on Gen. 2:21, Luther writes:

> . . . why is it not worthy of the highest admiration that a woman should receive human seed, which then grows, and as Job 10:11 so beautifully says, "Thou hast clothed me with skin and flesh, and knit me together with bones and sinews", that is, formed me and nourished me in my mother until I was matured to live in the air, separated from her . . . All this is most wonderful and utterly incomprehensible, but lightly esteemed by us because we have truly become deaf to this most pleasant and lovely music of nature. (Luther 1904)

With respect to Gen. 2:18, Luther notes how God decides "it is not good that the man should be alone". Luther concludes, based on his exegesis, that "God is speaking of a common 'good,' or the good of the species; not of [Adam's] personal good". This common good is "that wonderful work of generation and the preservation of [the human] species". There was need of woman, Luther is convinced, for this wonderful work and "For the great and glorious ends of creation". To this end, he writes, Eve "was created with profound counsel and wisdom of design" (Luther 1904).

Paradoxically, Luther describes God's punishment of Eve after the Fall as "happy and joyful". Due to her sin, Eve is to bear children in pain, a "righteous" burden that Luther grants will be difficult for "the flesh to bear". Nonetheless, he emphasizes, before Eve sinned, God had promised her "that blessing of generation and fruitfulness". God elected

not to deprive her of this blessing and Eve retained "the glory of maternity". For Luther, God's punishment of Eve is happy and joyful because God allows her to continue having children. God permits her to retain "all these blessings of this present natural life", as well as "that promised hope of life eternal" (Luther 1904).

Though God punishes Eve and all future women by decreeing pain in childbearing, God does not decree possible harm or death as additional burdens. After all, harm or death caused by pregnancy is counterproductive to God's plans since Eve and other pregnant women are integral to preserving God's creation of humankind. By extension, to pivot back to my earlier discussion of how pregnant women past age 35 are at greater risk of complications, Luther likely would have said that God wished them a healthy pregnancy. Anything less is a threat to women and their ability to sustain humanity. Luther's keen compassion for pregnant women is evident in his "Consolation for Women Whose Pregnancies Have Not Gone Well", written in 1542 (Luther 2016a).

Marga argues that, for Luther, due to their ability to bear children, women are "in a unique position to fight" for the perpetuation of the human species and "to fight *for* human life". She praises him for preaching that "women *bless* the world by continuing to give birth despite the curse" (Marga 2020). After all, faced with the prospect of pain and suffering, women could find ways to avoid pregnancy, thereby putting an end to God's creation. Luther held that childbearing shows respect for God and he lauds pregnant women because, although they experience hardships during pregnancy and childbirth, they fight for new life with courage and even joy.

Luther, Marga notes, is convinced that women participate "in God's creative processes in a way that only pregnant and birthing women can" (Marga 2020). And similar to Eve, the perseverance of pregnant women in safeguarding God's handiwork—despite God's curse—deserves acknowledgment and gratitude.

Eve and Mary form something of a bookend in the biblical understanding of salvation, explains Beth Kreitzer, author of *Reforming Mary: Changing Images of the Virgin Mary in Lutheran Sermons of the Sixteenth Century*. Kreitzer writes: "it is in consenting to the conception of Jesus through the Holy Spirit that Mary reversed the action of Eve, causing life rather than death to come into the world" (Kreitzer 2004, p. 36).

It was for Mary, not Eve, according to Stensvold, that early Christianity developed reverence. Mary was held in special favor because, as the embodied space in which God took on human flesh, her body served as the "door of salvation". In this way, her body participated in God's incarnation, the central event of Christian faith. However, Luther altered "certain aspects of Marian piety" with notable implications for a Protestant theological understanding of pregnancy (Stensvold 2015, p. 2).

From his perspective, Kreitzer argues, Mary should principally be recognized for her humility before God, and "praised for her great faith and for her willingness, despite the challenges to herself, to be the Mother of God" (Kreitzer 2016, p. 310). Nonetheless, Luther also emphasizes how God "regarded" Mary. Though she was "not the daughter of one of the chief rulers", Luther writes, God regarded this "poor and plain citizen's daughter, tending the cattle and doing the housework, and doubtless esteemed no more than any poor maidservant today, who does as she is told around the house" (Luther 2016b, p. 319). God's regard, according to Luther, "is the greatest of his works", since it is the work "on which all the rest depend and from which they all derive". When "God turns his face", and regards someone, Luther writes, "there is nothing but grace and salvation, and all gifts and works must follow" (Luther 2016b, p. 341).

Kreitzer points out how Luther "shifts the focus of [his commentary] from Mary (the one who was regarded) to God (the one who deigned to regard her, and likewise all of us)" (Kreitzer 2016, p. 310). Mary's pregnancy serves, for Luther, as a proclamation that no one is too lowly or poor or insignificant for God to regard them. Indeed, Luther argues, when Mary exclaims, "Behold, since he has regarded me, all generations will call me blessed", she is saying that "it is only because God regarded her" that people will call her blessed" (Luther 2016b, p. 341). By extension, just like Mary, pregnant women serve to remind

humanity how God may "make his face shine" upon any person, conferring grace and salvation regardless of station in life.

In addition, Luther holds that Mary's pregnancy is a testament to the experience of God's love. No one can love God, Luther writes,

> unless he makes himself known to us in the most lovable and intimate fashion. And he can make himself known only through those works of his which he reveals in us, and which we feel and experience within ourselves. (Luther 2016b, p. 318)

Luther describes Mary as "the tender mother of Christ" who teaches by "the example of her experience" of God's love within herself "to know, love, and praise God". In line with Luther's depiction of the tender mother of Christ, although other pregnant women are not pregnant with God, they may, like Mary, experience God's love within. Like her, these women teach about this love with their words and by example.

Luther's commentary on Eve and Mary depicts pregnancy as praiseworthy and as consequential to God's project of creation. A Protestant theology of pregnancy informed by this commentary takes a favorable view of pregnant women because, like Eve, they participate in the work of preserving God's creation. Pregnant women also participate, like Mary, in the work of communicating the love of God they may experience within as well as by serving as reminders that God may turn God's face toward anyone—not just an elite few—and confer grace and salvation. By extension, such a theology of pregnancy takes a favorable view of technologies that can assist women to extend their childbearing years, especially if, by reversing or halting aging, these technologies reduce the risk to women of harm or death.

5. Extending Pregnancy and the Malthusian Threat

A common reaction to contemplating a future shaped by life-extending technologies is fear that, as people live longer, the planet will become overpopulated and its limited resources taxed beyond sustainable limits. In the section that follows, I focus on the possibility that these technologies will set off a Malthusian crisis. I argue that typically, solutions proposed to avert such a crisis involve untenable restrictions on pregnancy and women's autonomy over their bodies.

Philosopher John K. Davis argues that most concerns about extended-life technologies do not outweigh the benefits promised by these biological interventions—however, he does consider the risk of overpopulation "a serious threat". To address this threat, Davis proposes a reproductive policy that he calls Forced Choice (Davis 2018, p. 103). His proposal reflects genuine alarm based on empirical data. Using "medium" projections, the United Nations Population Division estimates that the earth's population could reach 8.5 billion by 2030, 9.7 billion by 2050, and 11.2 billion by 2100 (Davis 2018, p. 104). Davis notes: "because the world's population is so large and because economic development is happening all over the world, we are putting more and more pressure on the world's resources and ecosystem. According to an estimate from the Global Footprint Network, the world is [already] consuming the equivalent of one and a half earths" (Davis 2018, p. 104).

Though more than 11 billion people may call Earth home by the end of this century, the global Total Fertility Rate (TFR) is falling. It is decreasing quickly enough that the Pew Research Center expects that the world's population will nearly stop growing by the end of this century and begin to fall thereafter (Cilluffo and Ruiz 2019). Every adult woman must have 2.1 children to sustain a full replacement of the previous generation but, as Davis himself points out, about 46 percent of the world's population lives in countries where women's fertility rates have fallen below 2.1. Indeed, Europe's fertility rate is a mere 1.5. Should a TFR of 1.5 become the norm world-wide, the global population will drop by half between 2100 and 2200, slipping to 3.5 billion people, a number not seen since sometime between 1960–1974. The International Institute for Applied Systems Analysis in Austria projects, based on this TFR, that the total human population will continue to freefall, sliding to 1 billion by 2300—a worldwide population comparable to that of the early 1800s—with numbers sliding still further afterwards (Davis 2018, pp. 112–13).

Davis develops a model to predict population growth once life-extending technologies become widely accessible. He starts from the premise that a life expectancy of 150 years will become the norm and all persons will want to extend their lives. He also assumes, quite reasonably, that the global TFR is 1.5. If these biotechnologies are commercially available starting in 2300 when the population is 1 billion, he predicts that the population will increase to 2.656 billion during the first 125 years due to a combination of births and people living longer. However, despite a longer lifespan of 150 years, the low fertility rate of 1.5 will cause the total population to fall back to 1 billion over the next 125 years. After three more decades, the population will drop to 100 million and continue dropping thereafter.

Though Davis is relying on prescriptive demographics, and his model can be critiqued, it demonstrates that fears of a Malthusian future may be overblown. Nonetheless, I want to explore his Forced Choice proposal further and explain why—just as any proposal that advocates controlling women's autonomy over their bodies—it must be rejected.

Davis engages in a thought experiment in which lives lasting up to 1000 years become possible. The resulting long-lived population would exert significantly more pressure on the planet than the population, previously described, with a 150-year life expectancy. To avert a Malthusian disaster, Davis recommends that persons who want to extend their lives up to 1000 years be required to adopt a "target birthrate" of 0.5 children. Anyone, regardless of gender, who opts for life extension but desires a child must consent to participating in a lottery. This impartial game of chance determines which one person out of every four (a 25% chance of winning) will be granted permission to have a child and extend their life.

If a man wins this lottery, his only option to have his "authorized" child is to partner with a woman who has lost the lottery and, by choosing to have, what is for her, an "unauthorized" child, is willing to forgo extending her life. If a woman loses the lottery and she has a partner who has also lost, she may opt for pregnancy anyway; however, by doing so, she forfeits her access to life-extending technologies. Or, if a woman has already been pregnant once, she may join the lottery; if she wins, she is granted access to life-extension technologies but is not authorized to have another child since she already has one. A woman who is using life-extending technologies but becomes pregnant loses access to those technologies unless she is among the 25% of winners when she participates in the lottery.

The carrot for cooperating with the 0.5 target birth rate is access to life-extending technologies. The stick for lack of cooperation is loss of access to those technologies. Davis realizes that some women will attempt to hide their children to avoid having to choose between them and an extended life. He suggests "policing" as the solution. Everyone will be required to submit to DNA testing. Parents who are discovered to have exceeded their child limit will be "penalized". This approach may appear humane on the surface, and averting a Malthusian crisis is clearly desirable. However, it relies on "policing" women's bodies and "penalizing" them should they become pregnant without winning the lottery. It transgresses the autonomy of women over their bodies by surveilling them and punishing them if they refuse, or fail, to cooperate with target pregnancy rates.

Davis dismisses comparison of his "Forced Choice" approach to China's one child policy, but his approach relies on "policing" and "penalizing" women. In the mid-twentieth century, China's government decided to implement a nationwide campaign of population control for reasons described by news anchor Tom Brokaw: "There are more than 1 billion Chinese. That one big statistic right there, more than anything else, is at the heart of this nation's economic problems. By the middle of the next century, if China's families have an average of 3 children, there will be starvation. However, with one child per family, the standard of living doubles". Brokaw also reported, "So now there's a desperate effort under way to control the population, to limit families to just one child".[8]

To enforce the one child policy, Chinese officials ordered women to be sterilized after they gave birth to their first child. Women who refused were kidnapped and forced to go undergo this procedure even if they were already pregnant again. Without regard to the good that women attach to pregnancy and without regard for their bodily autonomy,

local officials were rewarded if their assigned region did not exceed its quota of births. Filmmaker Nanfu Wang's documentary "One Child Nation", describes China as a nation that considered itself to be fighting "a population war, a war against population growth". However, this war "turned into a war against its own people" (Wang 2020).

How is Davis' Forced Choice approach different from China's one-child policy? Women, Davis acknowledges, may try to hide their unauthorized children—hence the need for mandatory DNA testing to identify them. What happens to these women if they become pregnant again? Will their children be taken from them? Will they be forced to have abortions? Will they be sterilized over their objections? Davis writes:

> . . . banning life extension altogether may be politically more controversial and unpopular than *controlling* the reproduction of those who extend their lives. Prohibiting life extension denies decades or centuries of life to people who want it, while Forced Choice *merely limits* how many children they have. There really is *no better alternative* to limiting the reproduction of those who extend their lives, at least for a few generations. (Davis 2018, pp. 123–24) (Italics mine)

Though China forced women to have abortions and to be sterilized, it is not clear how much these attacks on women's bodily autonomy contributed to the reduction in TFR reported by this country's government. Would non-violent approaches have proven nearly or equally as effective? This seems possible. China's TFR dropped from 5.99 in 1969, the year it implemented its one child policy, to 2.56 fourteen years later (World Bank 2021). Economist Junsen Zhang writes that prior to 1969, fertility rates in China were already showing signs of a sharp drop-off. According to the World Bank, this rate fell, in the four years between 1965 and 1969, from its peak of 6.38 to 5.99 (World Bank 2021). Moreover, the one child policy was implemented, Zhang argues, at nearly the same time that China's market-oriented economic reforms "triggered several decades of market growth, which tend to reduce fertility rates" (Zhang 2017, p. 141).

In addition, Zhang points out, during the same period "a number of other developing countries in East Asia and around the world . . . experienced sharp declines in fertility" (Zhang 2017, p. 141). Drawing on data from 16 countries with birth rates akin to China's in 1970, sociologist Feng Wang and his colleagues determined that these countries' birth rates declined more rapidly than the decline predicted by the Chinese government had it not enforced its one-child policy. Wang concludes that China exaggerated the effectiveness of this policy (Wang et al. 2013, pp. 115–29). Factors tied to increasing prosperity led some women of childbearing age to choose for themselves to have fewer children.

Indeed, China's rapid economic growth and brisk improvements in living standard may explain why its birth rate currently stands at about 1.6. Perhaps a harbinger of the future when the world's population begins to decline sharply, China's low fertility rate has created labor shortages that threaten the country's economic prospects. To address this threat, the Chinese government reversed course in 2015 and implemented a policy encouraging families to have two children (Attané 2016, p. 519). When the desired increase failed to materialize, China shifted course yet again and, in 2021, implemented a three-child policy.

6. Conclusions

Women who consider pregnancy a good in itself may well embrace life-extending technologies if these technologies offer them the option of maintaining a biological age optimal for pregnancy. Women tend to prefer starting families while in committed relationships but they choose to marry, on average, past the age of peak fertility. Life-extending technologies will free them from bondage to their biological clocks so that they neither feel pressured to find a long-term partner nor pressured to start a family. Such biotechnologies promise women the ability to exercise more control over the age at which they become pregnant, enabling them to plan better the arc of their careers. Because extended-life technologies will obviate concerns about taking early-career maternity leaves and minimize the impact of such leaves on future earnings, women and their families stand to benefit.

I have sketched the outline of a Protestant theology of pregnancy based on some of the writings of Martin Luther. His views about the good of pregnancy offer theological support for the development of extended-life biotechnologies since they promise to make pregnancy possible longer. Luther's exegesis of the biblical narrative of Eve depicts pregnancy as key to preserving and sustaining God's creation. It also honors the courage and fortitude of women who bear children in cooperation with God's project though they must endure pain during pregnancy and childbirth. Protestant women who understand themselves, theologically, as assisting God to sustain God's creation will have the option of prolonging their childbearing years. Luther's exegesis of the biblical narrative of Mary lauds her pregnancy as a testament to the blessings of God's regard—a regard not reserved only for the high-born and wealthy since God chose a poor servant as the *theotokos*. Mary's pregnancy also serves as a testament to the workings of God's love since Mary, who experiences this love within herself, learns to know and love God. Like Mary, pregnant women are reminders of the possibility of experiencing God's love and of the power of this experience.

Extending-life technologies could result in outsized population growth due to reduced deaths and increased births, However, I have argued that fears of a Malthusian future are exaggerated and may incorrectly reflect expectations of a logarithmic boom rather than reflect the reality of shrinking populations post-2100 due to decreasing fertility rates. An international team of scientists, who published their birth projections in a 2020 issue of *The Lancet*, anticipate that the fertility rate in 183 out of 195 countries and territories (94%) will fall below 2.1 by 2100 (Volsett et al. 2020). If this demographic decline proves accurate, especially since it will accelerate over time, the ability of women to become pregnant longer in life could become key to moderating some of the resulting negative effects. China, already an object lesson with respect to these ill effects, is experiencing rising economic pressures on the small number of workers who are supporting many retirees, pension systems running out of money, and urban contraction. By increasing women's window of safe pregnancy, life-extending biotechnologies offer the prospect of a higher birth rate which could dampen the impact on humanity of a predicted, rapid slide in global population.

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Notes

[1] I wish to thank the two blind reviewers who read earlier versions of this essay. Their thoughtful comments and insightful suggestions were of enormous help to me during the revision process.

[2] (Davis 2018, p. 94). The Malthusian crisis receives its name from the British economist and cleric, Rev. Thomas Malthus (1766–1834), who argued in his 1798 book *An Essay on the Principle of Population* that abundance in food supplies did not improve standards of living but rather led to increases in population and greater suffering among the lower classes due to disease and famine.

[3] (Dommermuth et al. 2014). The research reported in this paper shows that individuals with a partner are more likely to realize positive fertility intentions than singles, and union stability has a similar positive effect. https://www.ssb.no/en/forskning/discussion-papers/_attachment/182990?_ts=146a3818d38 (accessed on 15 March 2022).

[4] https://www.reproductivefacts.org/news-and-publications/patient-fact-sheets-and-booklets/documents/fact-sheets-and-info-booklets/age-and-fertility/ (accessed on 15 March 2022).

[5] (Bertrand et al. 2010, p. 230). See also https://www.census.gov/library/stories/2020/06/cost-of-motherhood-on-womens-employment-and-earnings.html (accessed on 15 March 2022).

[6] (Ibid., p. 235). According to Bertrand, "Hours decline with time since MBA for both men and women, in part reflecting a move out of investment banking and consulting and towards general management positions in corporations".

[7] See for example (Mercer and Trothen 2014), (Mercer and Trothen 2021), (Haker et al. 2021), and, most recently (Gouw et al. 2022).

[8] Tom Brokaw news report in (Wang 2020).

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Article

To Tend or to Subdue? Technology, Artificial Intelligence, and the Catholic Ecotheological Tradition

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Abstract: In February 2020, the president of Microsoft, the executive vice president of IBM, the director general of the Food and Agriculture Organization (FAO) of the United Nations, and the former Italian Minister of Innovation joined the president of the Vatican's Pontifical Academy for Life in Rome to sign *The Rome Call for AI Ethics*. In doing so, they promoted a shared sense of responsibility and commitment—by industry, government, and Church—to uphold certain ethical standards in the areas of digital innovation, artificial intelligence, and technological progress. In this article, I discuss *The Rome Call for AI Ethics* in conjunction with Pope Francis' rendering of integral ecology and the technocratic paradigm in *Laudato Si'*. My aim here is to link Catholic teaching on technology (using AI as a starting point) to the environment and the ecological crisis.

Keywords: *Rome Call for AI Ethics*; artificial intelligence; environment; technology; ecological solidarity; Catholicism

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1. The XXVI General Assembly of the Pontifical Academy for Life in February 2020

In its *Instruction on Christian Freedom and Liberation*, the Catholic Church's Congregation for the Doctrine of Faith (CDF) sheds light on the risks of pairing technological prowess with mastery over the natural world:

> As technology gains an ever-greater control of nature, it threatens to destroy the very foundations of our future in such a way that mankind living today becomes the enemy of the generations to come. By using blind power to subjugate the forces of nature, are we not on the way to destroying the freedom of the men and women of tomorrow? What forces can protect man from the slavery of his own domination? A wholly new capacity for freedom and liberation, demanding an entirely renewed process of liberation, becomes necessary. The liberating force of scientific knowledge is objectively expressed in the great achievements of technology. Whoever possesses technology has power over the earth and men. As a result of this, hitherto unknown forms of inequality have arisen between those who possess knowledge and those who are simple users of technology. The new technological power is linked to economic power and leads to a concentration of it. Thus, within nations and between nations, relationships of dependence have grown up which within the last twenty years have been the occasion for a new claim to liberation. How can the power of technology be prevented from becoming a power of oppression over human groups or entire peoples? (Congregation for the Doctrine of Faith 1986, n. 11–12)

The Church here warns against the dangers of rendering dominion as all-out lordship over the material world (ourselves included) and that this kind of mindset will ultimately result in humans falling victim to their own hubris and domination. In addition, the CDF goes on to identify the threat of an individualism that leads to the unjust distribution of (limited) resources, as well as of new forms of oppression, slavery, and inequality;

the application of technical expertise to acts of genocide is mentioned explicitly in this *Instruction* (Congregation for the Doctrine of Faith 1986, n. 11–19).

When it comes to artificial intelligence, the Church recognizes that it—like so many other technologies—carries both immense promise and potential peril; there is, at the very least, concern that AI could have a harmful impact on human–human and human–nature relationships. Pope Francis praised the Pontifical Academy for Life for having selected "The 'Good' Algorithm? Artificial Intelligence, Ethics, Law, and Health" as the major theme of its XXVI General Assembly, noting that "it is not enough simply to trust in the moral sense of researchers and developers of devices and algorithms. There is a need to create intermediate social bodies that can incorporate and express the ethical sensibilities of users and educators" (Francis 2020, para. 8). The Church sees itself as an important discussion partner here.

As a corresponding member of the Pontifical Academy for Life, I attended this General Assembly in Vatican City at the end of February 2020. Permit me to quickly highlight a number of important points raised over the course of the three-day event.

Jen Copestake—technology reporter and senior producer for BBC Click—showed an interesting videoclip called "Can AI Beat a Doctor?", which begs a rather perennial question in the debate over AI: should we (or why should we) give preference to *human* healthcare professionals (who are limited and fallible in judgement) if their functions (especially vis-à-vis diagnostics) can be better performed by AI software (Copestake 2018)? The clip explores the increasing role of AI to help render healthcare universally accessible and affordable as healthcare resources dwindle despite the rising need of longer-living populations. The focus here is on the diagnostic capability of digital healthcare providers. Copestake peers into the use of Babyl in Rwanda, which is the largest digital health service provider in the country boasting more than two million registered users.

Its parent company—Babylon—made the (highly contested) claim, in 2018, that its AI had the ability to diagnose certain issues as well as (or better than) human healthcare providers and that its software could pass a medical exam with a higher average grade than a human person (the CEO—Ali Parsa—explains that "once a machine learns something, it never forgets") (Copestake 2018). The company describes its use of AI as follows: "A committed team of research scientists, engineers, doctors and epidemiologists are working together to develop and optimise Babylon's AI abilities. Much of the team's work is on the development of cutting edge machine learning research; this is being driven through access to large volumes of data from the medical community, continual learning from our own users and through feedback from Babylon's own experts" (Babylon 2020).

In the clip, some users of Babyl celebrated an accessibility to healthcare services that they had only dreamed of before the technology's debut in the country. Others lamented an enduring exacerbation of the divide between the rich and the poor since, among other things, the service depends on the use of a feature phone. Rwanda's then Minister for Health—Diane Gashumba—also pointed out the popular digital health service's lack of country-specific data; for example, Babyl—designed from a UK perspective—largely (and problematically) neglected the possibility of malaria when evaluating users' symptoms.

Although the transmissibility of malaria is of little concern to residents of the UK, it continues to be a major public health issue in Rwanda. We are reminded here that "when humans craft or create something," as Jordan Joseph Wales explains, "they reconfigure matter and its potentialities according to human imagination and purpose" (Green et al. 2022, p. 16), which are sometimes limited by (or to) the innovator's specific context and scope of experience. The example raised above speaks to a need for greater cross-cultural, international cooperation in AI development and application (see ÓhÉigeartaigh et al. 2020), which Pope Francis has called for repeatedly.

Some commentators at the General Assembly emphasized the importance of remembering that behind every software is an investor, so the user is a consumer ipso facto. That is, conversations about the benefits and new possibilities promised by artificial intelligence, which are myriad, must be tempered by the recognition of AI as big business.

Others discussed an overall malaise with the datafication of human behavior and with the reduction of human beings to mere data suppliers. The issue raised here concerns the process of collecting and reading data from patient populations; participants underlined the implicit profiling that happens when gathering data, the possibility of firms enticing poorer countries with financial compensation in return for medical data, the need for humans to read the correlations such data produce, and the importance of being able to identify instances where algorithms are replicating or amplifying prejudices, assumptions, or biases that may have been programmed—consciously or not—into them.

While some signaled a potential erosion of the patient–healthcare professional relationship when AI allows both patients and physicians to have access to the same diagnostic tools, others highlighted that collaborative (instead of replacement/substitution) models of human–machine interaction have already shown evidence of being able to outperform healthcare directed exclusively by humans. Interestingly, a number of commentators predicted that if AI software could successfully commit to a first round of collecting data, verifying medical history, and recording the symptoms of a patient, then human healthcare providers would be freed from this, as it were, giving them more time to sit with the patient rather than peering over their computer screen while typing in information in a time-compressed setting. That is, in this way, AI could be focused on particular tasks, while the healthcare provider could be more thoroughly engaged in his or her encounter with the patient.

2. *The Rome Call for AI Ethics*[1]

At the close of the General Assembly—just days before the Italian government would implement nationwide quarantine measures due to the COVID-19 outbreak—academicians, dignitaries, and a host of guests crowded into the Auditorium Conciliazione, just a stone's throw from Saint Peter's Basilica. One could not miss the giant screen upstage nor the word "ren**AI**ssance" repeatedly projected upon it, undoubtedly to underline the parallels between momentous periods in human history—the Renaissance and the age, as it were, of AI—marked by humanism, innovation, and imagination. An impressive line-up of speakers was introduced: Msgr. Vincenzo Paglia (president of the Pontifical Academy for Life), Mr. Brad Smith (president of Microsoft), Mr. John Kelly III (executive vice president of IBM), Mr. David Sassoli (president of the European Parliament), and Mr. Qu Dongyu (director general of the Food and Agriculture Organization). This roster was peculiar, considering that the event was being held on the heels of a primarily *ecclesial* meeting on artificial intelligence.

Msgr. Paglia delivered words penned for the event by Pope Francis, who could not attend because of illness. In the address, the pope spoke of "the digital galaxy, and specifically artificial intelligence," as being "at the very heart of the epochal change we are experiencing," which is transforming the way we think about space, time, and the human body (Francis 2020, paras. 2, 4). He underlined how decisions made in medical, economic, and social contexts increasingly reveal "the point of convergence between an input that is truly human and an automatic calculus" (Francis 2020, para. 2). One cannot ignore how "a simple ideological calculation of functional performance and sustainable costs" could dismiss the biographical dimension of humanhood in favor of a mechanistic view (Francis 2020, para. 5). Further, the pope urged caution regarding how "algorithms now extract data that enable mental and relational habits to be controlled, for commercial or political ends, frequently without our knowledge. This asymmetry, by which a select few know everything about us while we know nothing about them, dulls critical thought and the conscious exercise of freedom" (Francis 2020, para. 4). We add to these concerns those mentioned in the previous section.

Although the risk to deepen the divide between the haves and the have-nots through the steering of knowledge, wealth, and power into the hands of but a few must not go unchallenged, the pope made plain that while new technologies are neither neutral nor value-free, one must also not lose sight of their immense potential. Applauding the bringing together of persons from the Church, industry, politics, and science in (what appeared to

be) a public commitment to the Common Good, Pope Francis proposed that "the ethical development of algorithms—algor-ethics—can be a bridge enabling those principles [of the Church's social teaching] to enter concretely into digital technologies through an effective cross-disciplinary dialogue" (Francis 2020, para. 10).

Smith and Kelly spoke of a "new generation of opportunity." They touted AI as perhaps the most powerful tool in the world, boasting incredible promise as well as a host of new challenges (including the weaponization of certain technologies, the link between AI and cyberattacks, AI and the fueling of mass surveillance, the automation of jobs, etc.). Smith called the Catholic Church a fundamental voice in the ethics of emerging technologies; he commended the invitation set out by the *Rome Call for AI Ethics* for encouraging the inclusion of a plurality of voices in discussions on AI, while underscoring the importance of the humanities, liberal arts, and ethics alongside STEM disciplines for the acquiring of a more complex and integrative set of skills. "The future of humanity," Smith concluded, "depends on us making this right." Kelly echoed these sentiments, reminding that AI is very much a reflection of us as human beings, certainly to the extent that AI "learns" based on the data and processes that we choose to give it. He pressed that our view ought not to be human *versus* machine, as is popular fodder for the movie industry, but both human *and* machine working together for the democratization of knowledge and in pursuit of the Common Good. At the end of his presentation, Kelly cited a line from Pope Paul VI that was pronounced in the Angelus of 20 July 1969 a few hours before the first moon landing: "The human heart absolutely must become freer, better and more religious as machines, weapons and the instruments people have at their disposition become more powerful" (Paul VI 1969, para. 2).

Many of these points raised here by the speakers are featured in the *Rome Call for AI Ethics*, a document (or a declaration of sorts) that seeks to engage AI "movers and shakers"—in the Church, industry, NGOs, public institutions, politics—in committing to serious ethical reflection regarding the development and applications of artificial intelligence (Pontifical Academy for Life et al. 2020). Although spearheaded by Church leaders and later submitted to the Secretary of State of the Holy See for approval, the *Rome Call* is not an official publication of the Pontifical Academy for Life, but it is the fruit of some of the world's leading experts (including a number of members from the Academy) on the subject of AI.

At the end of the event, the sponsors of the *Rome Call* (Msgr. Vincenzo Paglia, Brad Smith, John Kelly III, Qu Dongyu, and Paola Pisano) officially became the first signatories, publicly expressing:

> their desire to work together, in this context and at a national and international level, to promote 'algor-ethics,' namely the ethical use of AI as defined by the following principles: (1) Transparency: in principle, AI systems must be explainable; (2) Inclusion: the needs of all human beings must be taken into consideration so that everyone can benefit and all individuals can be offered the best possible conditions to express themselves and develop; (3) Responsibility: those who design and deploy the use of AI must proceed with responsibility and transparency; (4) Impartiality: do not create or act according to bias, thus safeguarding fairness and human dignity; (5) Reliability: AI systems must be able to work reliably; (6) Security and privacy: AI systems must work securely and respect the privacy of users. (Pontifical Academy for Life et al. 2020, p. 4)

In signing the document, the sponsors unanimously acknowledged the aforementioned principles as "fundamental elements of good innovation" (Pontifical Academy for Life et al. 2020, p. 5).

The charge at present is to properly elucidate and elaborate on the principles of the *Rome Call*; to deliberate on how said principles might seriously and constructively influence policymaking and the development of AI at the industry level (especially when the upholding of these principles may appear to stand in the way of industrial innovation

and productivity); and to increase this solidarity as we move ever so quickly into a new generation of opportunity.

3. Technology, Stewardship, and Ecological Solidarity

The *Rome Call* makes plain that the promotion of technology must not only be for the benefit of humanity, but also of the planet writ large. This requires, then, that our understanding of solidarity here be more *ecological* (or perhaps less *anthropocentric*) in scope, recognizing the interdependencies of human and nonhuman organisms in the natural world (Pontifical Academy for Life et al. 2020, pp. 2–4).

> Now more than ever, we must guarantee an outlook in which AI is developed with a focus not on technology, but rather for the good of humanity *and* of the environment, of our common and shared home and of its human inhabitants, who are inextricably connected. In other words, a vision in which human beings and nature are at the heart of how digital innovation is developed . . . (Pontifical Academy for Life et al. 2020, p. 1)

In his encyclical letter, *Caritas in Veritate*, Benedict XVI (2009, n. 69) writes that "technology is never merely technology. It reveals man and his aspirations towards development, it expresses the inner tension that impels him gradually to overcome material limitations. *Technology, in this sense, is a response to God's command to till and to keep the land* (cf. Gen 2:15) that he has entrusted to humanity, and it must serve to reinforce the covenant between human beings and the environment, a covenant that should mirror God's creative love". For the Church, technology—of whatever form—must be at the service of human beings; it can never be the other way around. As such, it is to be an expression of stewardship and service. In addition, technology must contribute to genuine progress, which, for the Church, is not simply an increase in human mastery over material existence, but must necessarily lead human beings "to exercise a wider solidarity" (Paul VI 1971, n. 41) and make concerted efforts to attenuate inequalities across the board (Francis 2019, para. 10). Accordingly, technological development and application must be rooted in, and directed toward, respect for the inherent dignity of human beings and all natural environments, paying close attention to the delicate complexity of ecosystems and the interdependencies spelled out within them (Green et al. 2022). In many ways, the first signatories of the *Rome Call for AI Ethics*—voices of the Church, industry, and government alike—agree on these points. In the document, we read:

> In order for technological advancement to align with true progress for the human race and respect for the planet, it must meet three requirements. It must include every human being, discriminating against no one; it must have the good of humankind and the good of every human being at its heart; finally, it must be mindful of the complex reality of our ecosystem and be characterised by the way in which it cares for and protects the planet (our "common and shared home") with a highly sustainable approach, which also includes the use of artificial intelligence in ensuring sustainable food systems in the future. (Pontifical Academy for Life et al. 2020, p. 2)

This wider *ecological* solidarity, then, goes beyond simply recognizing interdependencies; it promotes "a vision in which human beings are part of the social-ecological community and have a responsibility, a moral duty, to understand and develop actions according to their impacts on the components of that community" (Mathevet et al. 2018, p. 608).

In his message for the World Day of Peace, Saint John Paul II (1990) proclaimed that the ecological crisis was a global *moral* issue, and he made an urgent appeal for a new interpretation of solidarity not unlike the one discussed above (n. 10). He spoke of "the need for concerted efforts aimed at establishing the duties and obligations that belong to individuals, peoples, States and the international community," making plain that world peace is not only threatened by war, conflict, and the many injustices among peoples, but

also by "a lack of due respect for nature" (n. 1, 15). Twenty years later, Benedict XVI (2010, n. 6, 8, 12, 14) would go on to argue that the fostering of this widened solidarity—which broadens the breadth of our care beyond humanhood—remains imperative and that it is, in fact, our *duty* to do so.

4. *Laudato Si'* and the Technocratic Paradigm

Pope Francis's second encyclical, *Laudato Si'*, brought the concerns of his predecessors to the fore. Although the mandate to protect, tend, till, and guard the earth—spelled out in the first pages of Genesis (2.15)—has been an important theme in Catholic teaching, I think it is fair to say that it never gained the attention of the lay faithful in the way that it has during the pontificate of Francis.

Care of Creation is one principle among many of the Church's social doctrine. However, *Laudato Si'* ultimately shows that one cannot think about it as separate from the others. That is, solidarity, the inherent dignity of human persons, the rights of workers and the dignity of work, the Common Good and our responsibility to participate in community, human rights and obligations to self and others, and the preferential option for the poor have bearing on, and in turn are affected by, the health of the planet. Indeed, "everything is connected" is the most common refrain of the encyclical (Francis 2015, n. 6, 16, 42, 91, 117, 240). As an example, Pope Francis writes that "the earth herself, burdened and laid waste, is among the most abandoned and maltreated of our poor" (Francis 2015, n. 2), reframing our sense of poverty and vulnerability in the context of this widening vision of solidarity promoted by John Paul II and Benedict XVI before him.

References to technology abound in the text. Here, *Laudato Si'* shares the concerns expounded by the Pontifical Council for Justice and Peace in the *Compendium of the Social Doctrine of the Church* regarding the unraveling of the human–nature relationship. As we have said, the Church marvels at technological innovation inasmuch as it promotes the good of humanity (Pontifical Council for Justice and Peace 2004, n. 6). Although humans were created with the explicit mandate to till and to tend, one cannot ignore that Genesis also speaks of a God who commands humankind to subdue the earth "and have dominion over the fish of the sea and over the birds of the air and over every living thing that moves" upon it (Gen. 1.28). This divine order "to subject to himself the earth and all that it contains" (Pontifical Council for Justice and Peace 2004, n. 456), although it must never be thought of as absolute nor despotic, welcomes some degree of human manipulation of the natural world.

> Far from thinking that works produced by man's own talent and energy are in opposition to God's power, and that the rational creature exists as a kind of rival to the Creator, Christians are convinced that the triumphs of the human race are a sign of God's grace and the flowering of His own mysterious design. In this regard, the Magisterium has repeatedly emphasized that the Catholic Church is in no way opposed to progress, rather she considers "science and technology are a wonderful product of a God-given human creativity, since they have provided us with wonderful possibilities [. . .]. For this reason, "as people who believe in God, who saw that nature which he had created was 'good', we rejoice in the technological and economic progress which people, using their intelligence, have managed to make". (Pontifical Council for Justice and Peace 2004, n. 457)

Even though the *Compendium* looks with measured hope to technology as a potentially powerful tool to solve a number of global problems, such as hunger and disease (Pontifical Council for Justice and Peace 2004, n. 458), Pope Francis—who does not reject this—tempers the optimism here by arguing that an investment in more science and more technology may be missing the point. Joining his voice with that of the Patriarch Bartholomew, the pope pleads for "a change of humanity; otherwise we would be dealing merely with symptoms. He [Bartholomew] asks us to replace consumption with sacrifice, greed with generosity, wastefulness with a spirit of sharing, an asceticism which 'entails learning to give, and not simply to give up. It is a way of loving, of moving gradually away from what I want to

what God's world needs. It is liberation from fear, greed and compulsion'" (Francis 2015, n. 9; see also n. 60).

Laudato Si' begins where the *Compendium* ends its discussion on technology, with a warning that has become a lament:

> Man [. . .] must never forget that "his capacity to transform and in a certain sense create the world through his own work ... is always based on God's prior and original gift of the things that are." He must not "make arbitrary use of the earth, subjecting it without restraint to his will, as though it did not have its own requisites and a prior God-given purpose, which man can indeed develop but must not betray." When he acts in this way, "instead of carrying out his role as a co-operator with God in the work of creation, man sets himself up in place of God and thus ends up provoking a rebellion on the part of nature, which is more tyrannized than governed by him". (Pontifical Council for Justice and Peace 2004, n. 460)

Mechanizing, reducing, atomizing, and instrumentalizing nature have distorted the call to stewardship (to till and to tend) into an exercise of unconditional dominion over the natural world; the Church sees this to be the root of our current ecological crisis (Pontifical Council for Justice and Peace 2004, n. 461–65).

It is from here that Pope Francis takes up his critical assessment, in *Laudato Si'*, of the dominant technocratic paradigm of our day that exalts mastery and control above relationality, responsibility, and accountability, forsaking the value of limitation altogether (Francis 2015, chp. 3). In this framework, the connection between humankind and nature is not covenantal, but confrontational (Francis 2015, n. 106). "Those who are surrounded with technology," the pope writes, "'know full well that it moves forward in the final analysis neither for profit nor for the well-being of the human race,' that 'in the most radical sense of the term power is its motive—a lordship over all'" (Francis 2015, n. 108).

Further, the hyperspecialization of technologies may lead to a reduction of the complexity of the ecological crisis in order to divide it into manageable parts that could be dealt with without paying heed to how they are interrelated or interdependent. There needs to be a more comprehensive and integrative way of looking at things, the pontiff suggests, "otherwise, even the best ecological initiatives can find themselves caught up in the same globalized logic" (Francis 2015, n. 110–11). I have in mind here the double-edged sword that AI-based systems can be in the context of the environment. On the one hand, artificial intelligence and machine learning can be exceedingly valuable tools: they can help optimize energy generation and use; they can be used to monitor invasive or endangered species, pollution levels, changes to land, and air quality; and they can identify patterns in the extent of Arctic sea ice or track coral bleaching, for instance. And yet, these same AI-based systems (including AI hardware, digital infrastructure, and data centers) can also have a significant carbon footprint; can produce substantial levels of greenhouse gas emissions; and can generate considerable electric and electronic waste.

In spite of the emphasis, in *Laudato Si'*, on the importance of understanding, as a bare minimum, that everything is connected and in spite of the plea to widen our communal sense of solidarity, it is interesting to note that the Church stops short of espousing, or championing the adoption of, a biocentric or ecocentric worldview (Pontifical Council for Justice and Peace 2004, n. 463; Francis 2015, n. 118). According to the Church, doing so might risk an "egalitarian consideration of the 'dignity' of all living beings" that could very well efface the ontological and axiological differences between humans and all others (Pontifical Council for Justice and Peace 2004, n. 463). At the end of the day, the Catechism of the Catholic Catechism of the Catholic Church (1993) makes clear that human beings are the summit of God's creative work (n. 343). This said, *Laudato Si'* entirely rejects an "excessive," "misguided," or "tyrannical" anthropocentrism that denies the dignity and integrity of Creation as a whole, and is, therefore, unconcerned for other creatures (n. 68, 116, 118, 119).

5. Concluding Remarks

It is crucial that we draw out of the Church's vision something that could easily get lost in the oft prophetic (if not salvific) rendering of the scope and potential of artificial intelligence to change the world and to tackle every imaginable problem confronting humankind: the value of limitation. Discourse on technological innovation is more often than not about the surpassing (or obliteration) of limitation in a way that might bring us to new heights of performance and well-being. *Laudato Si'* reminds that the Biblical mandate to subdue the earth and have dominion over it is both *entrusted* and *limited*. As John Paul II declared in *Laborem Exercens*: "The word of God's revelation is profoundly marked by the fundamental truth that *man*, created in the image of God, *shares by his work in the activity of the Creator* and that, within the limits of his own human capabilities, man in a sense continues to develop that activity, and perfects it as he advances further and further in the discovery of the resources and values contained in the whole of creation" (John Paul II 1981, n. 25).

Human beings are called to imitate God in their work. Likewise, they are also called to imitate God in their rest. It is not superfluous that, in Genesis (2.2–3), the Sabbath immediately follows the creation of humankind. Exodus (20.8–11) and Leviticus (23.3) go on to make plain that "ceasing" from work and allowing the land to rest from our use are not gestures of leisure, kindness, or reward, but are obedience to divine commandment. The "excessive" anthropocentrism that Pope Francis cautions against can lead to an "excessive" use of the natural world and an enthrallment with "the possibility of limitless mastery over everything" (Francis 2015, n. 224). In his critique of the technocratic paradigm that is pivotal to *Laudato Si'*, the pope argues that the confrontational relationship between human beings and nature—in many ways perceived as one between "master" and "servant"—"has made it easy to accept the idea of infinite or unlimited growth, which proves so attractive to economists, financiers and experts in technology. It is based on the lie that there is an infinite supply of the earth's goods, and this leads to the planet being squeezed dry beyond every limit" (Francis 2015, n. 106). The Church and the sponsors of the *Rome Call for AI Ethics* seem to recognize this (although I cannot be sure how tech giants will translate the above call to limitation and rest). They warn that the ostensibly limitless potential of AI must not distract us from taking pause to think critically and constructively about risk, inequality, discrimination, the dignity of work, and the technologization of humankind.

In his book, *Faith and Doubt: Studies in Traditional Jewish Thought*, Rabbi Norman Lamm writes:

> Perhaps the most powerful expression of the Bible's concern for man's respect for the integrity of nature as the possession of its Creator, rather than his own preserve, is the Sabbath [. . .]. The six workdays were given to man in which to carry out the commission to "subdue" the world, to impose on nature his creative talents. But the seventh day is a Sabbath; man must cease his creative interference in the natural order (the Halakhah's definition of *melakhah* or work), and by this act of renunciation demonstrate his awareness that the earth is the Lord's and that man therefore bears a moral responsibility to give an accounting to its Owner for how he has disposed of it during the days he 'subdued'. (Lamm 2006, pp. 163–64)

Like the Jewish tradition, Catholicism applauds the fruit of human genius in technological innovation, but it also teaches the importance of restriction in our interference with the natural world and the value of limitation in our dominion (that is, our *stewardship*) over it. A widened ecological solidarity moves beyond a vision of care that is fixed solely on humanhood and seeks to account for other creatures in the ecosystem, not only as resources or means, but as having a dignity of their own by virtue of their createdness.

Technologies, including AI-based systems, have an impact on the way human beings relate to each other and to the environment. If pursuits in AI and other technologies are meant to extend the scope of human mastery (by programming machines and robots, for instance, as tools to achieve such a thing), the Church will measure progress not based on

how much more control we have harnessed, but on whether ecological solidarity has been enhanced in our duty to care for human beings and the natural world.

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Notes

[1] This section is a slightly modified version of a text that was originally posted on the AI and Faith website; it is reproduced here with the organization's permission. See (Labrecque 2020), The Rome Call for AI Ethics: Co-Responsibility and Commitment, AI and Faith Website, August 6, available online: https://aiandfaith.org/the-rome-call-for-ai-ethics-co-responsibility-and-commitment/ (accessed on 2 March 2022).

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Article

Artificial Intelligence, Deep Aging Clocks, and the Advent of 'Biological Age': A Christian Critique of AI-Powered Longevity Medicine with Particular Reference to Fasting

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Abstract: I argue that the use of artificial intelligence (AI) in longevity medicine to slow human aging encourages individuals to see themselves as managers of their own biology. While such a stance is not entirely unwarranted, it may nevertheless preclude other perspectives of the body as it relates to spiritual formation: namely, the Christian discipline of fasting. Using a christological anthropology informed by Karl Barth, I explore the potential impact of AI-fueled markers such as deep aging clocks (DACs) and the related technological construct of "biological age" (as distinct from chronological age) and how this construct might impact the Christian practice of fasting.

Keywords: artificial intelligence (AI); aging; longevity; deep aging clocks (DACs); Incarnation; fasting; biohorology

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1. Introduction

In this article, I offer a Christian assessment of new technological developments in artificial intelligence (AI) related to the rapidly expanding field of human aging research. I pay particular attention to interpretations of human embodiment implicit in the latest quest to mitigate the effects of aging through the use of this technology. After briefly discussing the recent history of anti-aging science, its rationale, and the contribution of AI to its growth, I will offer one brief Christian interpretation of these new developments. This particular interpretation will be informed by two core doctrines in the history of Christianity—the Incarnation of Jesus Christ and the resurrection of the body. I will argue that the project of life extension is deeply ambiguous. Moreover, I suggest that while a Christian perspective should neither wholly embrace life extension nor completely reject it, it can highlight the ways in which AI-driven anti-aging technology may foster a hostile stance toward the human body and its limitedness. It also threatens to undermine the value of the finite body for Christian spiritual practices that shape human desire such as fasting.

The quest to remain perpetually young is likely as old as the emergence of *Homo Sapiens Sapiens*; its unfolding story is marked by a bizarre history that includes everything from ancient meditative techniques, fountain legends, and the search for potable gold, to xenotransplantation (monkey gonads), hyperbaric oxygen chambers, ketogenic diets, nootropic smart drugs, and pulsed electromagnetic field therapy. Though the efficacy of these recent biohacks is questionable, most developed countries have experienced a near doubling in life expectancy over the last century, due in large part to improvements in public health and medicine (Riley 2001). Americans born at the beginning of this century can expect to live to nearly 80 years on average, compared to just 47 years in 1900, though COVID-19 will inevitably impact longevity figures in the near future, especially among marginalized communities (Center for Disease Control 2010, Table 22).[1] However, longer lifespans have not been accompanied by longer *health* spans, as such gains have led to an older society characterized by significant increases in age-related maladies such as Parkinson's, high blood pressure, dementia, and heart disease. A defining characteristic

of our age seems to be that we are both younger longer and older longer. We may be on the precipice of a "mass geriatric society", where a growing percentage of the US population is expected to live to the age of 85 and beyond. This will include a much greater likelihood of experiencing the irrevocable progression of chronic illness, increased fragility, and disability lasting several years (President's Council on Bioethics 2005). A Rand Corporation study indicated that this particular trajectory for the chronically ill accounted for roughly 40 percent of all deaths (Lynn and Adamson 2003).

These demographic changes continue to place enormous burdens on a US healthcare system that is still adapting to these changes at the end of life. The very system that has contributed to the increase in life expectancy is now confronted with the burden of its own success as waves of baby boomers require treatment for the diseases that accompany old age. Alzheimer's disease and dementia cost Medicare and Medicaid over USD 200 billion in 2020 and have been proven more expensive to treat than cancer and heart disease (Alzheimer's Association 2020). Indeed, the number of individuals with Alzheimer's is expected to rise from 4 million in 2005 to nearly 14 million by 2050, at an estimated cost of USD 584 billion (Alzheimer's Association 2020). Moreover, it is generally recognized that mitigating any single disease, such as Alzheimer's or the most common forms of cancer, would at best add a few years to life expectancy, while doing little to assuage the population growth of those 85 years and older (Olshansky et al. 1990). These findings have led to the formation of the Longevity Dividend Initiative Consortium (LDIC), a group of epidemiologists, gerontologists, economists, and others, who, in the interest of the long-term financial sustainability of the US healthcare system, argue for more resource allocation for studying human aging itself (Olshansky et al. 2006). The LDIC draws on a growing body of evidence indicating that human aging can be decelerated. They assert that shortening the period of decline before death (i.e., morbidity compression) will enable older individuals to contribute to their communities and society as a whole, creating wealth for such individuals and the nations they inhabit (Bloom and Canning 2000).[2] Since aging is the underlying cause of all age-related diseases, this approach purportedly makes good sense from scientific, economic, and public health perspectives.

2. Slowing Human Aging

Recent laboratory evidence suggests that human aging may be attenuated. Over the last two decades scientists have extended the healthy lifespans of nematode worms, fruit flies, and mice by slowing the aging process through genetic engineering, caloric restriction, and other techniques. Scientists are now searching for human analogues, and limited human trials have shown tissue-specific age-reversal in older adults as measured by DNA methylation (Daly 2021, pp. 46–69).[3] Though anti-aging research has moved from legend to the laboratory, it is far from certain that even a modest deceleration of aging will produce the desired effects as expressed by the Consortium. There is no agreement on whether the main goal of life extension should be to focus on significantly extending healthy life (adding years to one's life), or to compress the period of morbidity (adding life to one's years). Transhumanists, for example, seem uniformly committed to the former—including immortality by uploading the mind/consciousness to a more reliable substrate—while those of the Longevity Consortium are obviously committed to the latter.[4] The more hyperbolic claims of some transhumanists notwithstanding, both scenarios interpret human aging as a condition demanding our best technologically mediated manipulative efforts. While both perspectives see aging as the problem, the more ambiguous scenario, ethically speaking, concerns the morbidity compression approach envisioned by the LDIC, though defenders of this approach acknowledge that the human lifespan might also be extended beyond the biological limit of 120 years (Juengst 2004).

Though, as mentioned above, scientists have developed several techniques for slowing aging in nematode worms, fruit flies, and mice, developing analogues for human beings still faces considerable challenges. However, the use of narrow or "weak" AI has shown promise in enabling researchers to process large groups of data and may prove instrumental in untangling the intricate processes of human aging by identifying drug targets

(Aliper et al. 2017)[5] and developing therapeutics to enhance both the life and health span (Moore and Raghavachari 2019). I discuss these developments briefly here before making a general assessment and offering a Christian interpretation with particular attention to embodiment.

3. Towards an Aging Theory: Biological Age (BA) and Deep Aging Clocks (DACs)

Gerontologists and those studying aging across various scientific disciplines concede that there is no agreement concerning the ultimate cause of aging. Moreover, developing any conclusive theory of human aging is only further complicated by our inability to even quantify, much less define, human aging. Despite the growing number of human aging biomarkers—epigenetic changes, telomere attrition, and molecular clocks, among others—there is currently no single theory of aging to account for these various biomarkers in any coherent fashion. Hence, without any general agreement as to what constitutes aging biologically and how its progression is to be measured, it becomes extremely difficult to draw any substantive conclusions on the potential benefits of particular therapies. We have the means "to inspect and manipulate biological systems with precision unavailable to our predecessors, yet the mystery of aging remains unsolved" (Galkin et al. 2020, p. 1). Hence, there is a push to develop ways to measure biological aging in humans, a task that will require the use of AI to manage the multiple biomarkers already associated with aging. Indeed, the nascent, but rapidly developing field known as "biohorology", a science devoted to measuring the passage of time in living organisms, is heavily dependent on AI.

Aware of the growing disparity between lifespan and healthspan, and the economic burden of treating multiple comorbidities of old age and later life, researchers such as Alex Zhavoronkov are aggressively promoting the use of AI to bring longevity medicine into the realm of everyday clinical medical practice. Zhavoronkov has noted the potential for digital neural networks to exploit longitudinal data of both healthy individuals and those with diseases, which, with the assistance of deep learning, will "learn" the difference between aging and disease. He believes this AI-driven knowledge will lead to potential applications for risk prediction and even treatments to modulate aging itself. Like others in the field of aging research, he notes that digital neural networks are uniquely positioned for integrative analysis with massive data sets and multi-omics data (e.g., genomic, epigenomic, proteonomic, and transcriptomic data).

Recently, for example, AI has been employed to estimate an individual's biological age (BA) which is, purportedly, a better predictor of one's mortality than the presence of disease or frailty, or even one's chronological age. In particular, deep learning—a unique form of machine learning (ML) that employs multilayered neural networks—was used to establish deep aging clocks (DACs) to calculate a person's biological age from a routine blood sample (Zhavoronkov and Mamoshina 2019).[6] If human aging is caused by a multitude of damage-accumulating processes occurring simultaneously, then BA is "unlikely to be a property of objective reality but should be treated as an artificial construct".[7] (Galkin et al. 2020, p. 2) This "artificial construct" includes heavy reliance on both a scientific consensus of the core processes associated with aging, while also accounting for (ideally) socioeconomic and cultural differences among people (ibid.). Thus, there is hope that "accurate BA measurement could bring around new hypotheses on the nature of aging and be the first step towards a paradigm shift in biogerontology" (Galkin et al. 2020, p. 2). Moreover, it is hoped that biohorology, combined with AI-assisted deep learning techniques "could be used to increase our understanding of aging processes and to design geroprotective interventions" (ibid.). Interestingly, from this particular biohorological perspective, the definition of chronological aging is considered "trivial", as BA remains "a fluid, borderline placeholder concept used to refer to the time-dependent component of an organism's overall health condition" (ibid.). There are several potential uses for DACs in aging research, including dementia screening and staging, age-personalized immune-oncology treatment, age-personalized vaccines, mortality prediction, preventative medicine, and the generation of synthetic data, to name but a few (Zhavoronkov and

Mamoshina 2019; Galkin et al. 2020). The use of multimodal aging clocks and other clock ensembles trained on all accessible data types may one day even serve as a "digital twin" for a patient, whose likeness can be moved forward or backward in time through the use of generative adversarial networks (GANs), another type of AI algorithm (Zhavoronkov and Mamoshina 2019, p. 549; Galkin et al. 2021a, p. 1253).

As mentioned above, though the calculation of one's biological age may bring about a paradigm shift for the field of gerontology, some believe that this particular application of AI should be integrated into the future of clinical medicine. Determining one's biological age through DACs, says Zhavoronkov et al. (2021, p. 6), "should become an essential part of the physician's tool kit, enabling AI-supported recommendations to promote long and healthy lives". More generally, he observes:

> AI-powered longevity medicine will facilitate the discovery of drug targets for specific individuals, the identification of tailored geroprotective interventions and aging and longevity biomarkers to enhance the study of aging and disease trajectories, and the identification of interventions that may help slow down or even reverse aging-associated biological, physiological or psychological processes (Zhavoronkov et al. 2021, p. 6).

Zhavoronkov recognizes that longevity medicine will need to be practiced by physicians with the requisite clinical protocols and diagnostic and treatment guidelines for formal recognition as a branch of medicine. As such, he recognizes that "aging needs to be monitored and treated as a medical condition", with appropriate studies demonstrating the efficacy and safety of specific interventions (ibid.).

Zhavoronkov's aspirations do not lie on the fringes of legitimate medical research; longevity medicine is moving to the mainstream. In August of 2018, the National Institute on Aging (NIA) convened an interdisciplinary workshop entitled "Contributions of Artificial Intelligence to Research on Determinants and Modulation of Health Span and Life Span" to explore the use of AI. They aspired to "untangle the complex physiological process(es) that modulate health and lifespan" in order to "accelerate the discovery of novel therapeutics for healthy aging" (Moore and Raghavachari 2019, p. 1). The workshop concluded:

> AI approaches appear to be extremely valuable for integration of genetic and cellular data from human and other species and for modeling biological processes associated with aging. Such analyses could potentially resolve several unanswered questions currently pending in aging research.

Once again, the hope is that collaborative work for mining genetic and multi-omics data will overcome current hurdles with existing analytical strategies, leading to "novel discoveries to enhance health and life span" (Moore and Raghavachari 2019, p. 11). The development of DACs to measure biological age may be a significant step along this path.

Certainly, recent success with the AI-driven BloodAge has already demonstrated impressive predictive abilities concerning mortality in COVID-19 patients and may prove useful in helping hospitals determine risk stratification during prolonged public health crises, like a pandemic. Here, one finds a concrete example of the potential benefits in relying on one's biological age (BA)—or in this case, one's BloodAge—as a better determinant of a patient's mortality. Though COVID-19 has been classified as a gerolavic infection—i.e., harmful (from the Greek *epilavís*) to the old (Gk. *géros*)—chronological age may *not* be the best determinant of survival in older patients, due in large part to the variability of the human aging rate and a wide variety of associated comorbidities. Some people just age faster than others. Recently, the AI-powered Deep Longevity calculated the biological age (BA) of over 5,300 COVID-positive patients across 11 public New York hospitals, utilizing the deep learning neural network BloodAge to analyze over 40 blood biomarkers for each patient. Those whose BA was higher or lower than their chronological age were classified as "overagers" or "underagers", respectively. "Overagers" were considered to exhibit accelerated aging (Galkin et al. 2021b). Significantly, their findings indicated that the *pace* of

aging had a higher impact than a patient's *chronological age* on the lethal infection outcome (ibid.).

> These findings illustrate that biological age may be more informative than chronological age for mortality prediction. The correction for BloodAge may account for individual differences in the aging process and quantify the intuitive understanding of a patient being chronologically old but looking young, or the opposite (Galkin et al. 2021b, p. 11).

In this particular instance, BA proved a better predictor of mortality for COVID-19 patients than chronological age. A similar study carried out in Germany and Austria demonstrated the effectiveness of AI in predicting the survival of COVID-19 patients. By analyzing blood samples with the use of AI, researchers identified several specific inflammatory proteins closely associated with the risk of death and other proteins associated with survival (Demichev et al. 2022).[8] A machine learning model based on a single timepoint measurement of these specific proteins was developed and tested on 24 critically ill COVID-19 patients, correctly predicting the survival of 18 of 19 patients and fatality for all of the patients who died (five of five). The potential clinical application of AI-powered predictive data of this sort stands to impact the practice of medicine dramatically and will likely become an object of bioethical discussion in the near future.

When it comes to determining one's biological age however, one need not wait for a disease diagnosis; AI is already here. Young.AI, with its claims of "Longevity Science that Works for You", is a free app that can easily be downloaded onto any smartphone. It offers a personalized system that analyzes one's biological data by tracking several biomarkers that help users to "control your aging and extend your longevity".[9] It is based in large part on a blood sample analyzed by the aforementioned deep learning neural network BloodAge, which, according to Young.AI, is "your real age". In addition to calculating one's "photo age", "psychological or mind age", and "behavior age", the app also creates a personalized longevity-enhancing program, allowing users to track, highlight, and eliminate unhealthy habits and behaviors. Young.AI boasts of using deep neural networks "to highlight the habits you need to change, splitting them into small, easy to do tasks". It is possible to upload even more data to improve one's age prediction. This is another practical application of biohorological information, encouraging its users to "Hack Your Longevity and Improve Your Results".

4. What Is Different about AI?

Before considering these developments from a Christian perspective that takes its guidance from the Incarnation and bodily resurrection, a few observations may be made regarding the application of AI to longevity research and the possibility of slowing human aging. First, the potential applications of AI in researching human aging have clear benefits in helping us understand the complex process of human aging and in promoting healthy aging by allowing individuals to track several biomarkers that measure one's overall health. Predicting mortality with COVID-19 positive patients may also prove useful during times when demand greatly outpaces medical resources, though such a grim task would not be without controversy. Moreover, processing and sharing various omics data across various scientific disciplines ought to spur collaborative efforts in helping us better understand various diseases associated with aging. The initial results of AI-driven aging-attenuation technologies do seem promising in several areas, whether it be dementia screening and staging, age-personalized immune-oncology treatment and vaccines, mortality prediction, or preventative medicine.

There are of course ethical concerns that, once again, would hardly be unique to a Christian perspective on slowing aging through AI. The usual list of suspects here are privacy and information bias, the "black box" challenge regarding machine learning, the potential of AI to contribute to ageist and ableist interpretations of persons, justice and accessibility of the technology,[10] and the subtle power by which predictive knowledge of this kind can influence human behavior in ways that are inimical to human flourishing.

For instance, there are examples where judges put more faith in the use of an algorithm (COMPAS)[11] to assess the risk of recidivism than in the agreements arranged between the defense and the prosecution (Coeckelbergh 2020, p. 6). The algorithm also led to controversy as those predicted to reoffend but did not were disproportionately Black (Fry 2018, pp. 71–72). There are clear implications for healthcare systems (Panch et al. 2019). A core philosophical debate in data set collection concerns whether data sets should *reflect* current reality (the mirror view) or try to *change* reality in ways that are more just (Coeckelbergh 2020, chp. 9). Scientists are at least aware of the potential for bias in collecting population data, given especially that human aging is a universal phenomenon.

A related issue is machine learning and the "black box" phenomenon. While programmers know the architecture of the network, it is not clear to others how decisions are reached between input and output.[12] In this "unsupervised" machine learning, training algorithms make their own categories, rather than looking at a predetermined variable selected by the programmer.[13] The hope is that the AI may find patterns that are otherwise fundamentally inaccessible, patterns that domain experts have either not yet identified or make no sense from a human perspective. However, a certain opacity is introduced here, that might only be made clear through the development of transparent AI. Little wonder then that philosopher Mark Coeckelbergh refers to statistics and the big data usage in (narrow) AI as "the new magic" (Coeckelbergh 2020, p. 94).

Here, we might ask, what, or to whom are we entrusting our bodies, our future? Is there a difference between manipulating certain genes with CRISPR-Cas9 and utilizing big data with machine learning, other than differences in transparency? Are these two different kinds of knowledge or is the latter merely information? Margaret Boden reminds us that AI lacks our understanding of relevance (Boden 2016). In addition, it also lacks "understanding, experience, sensitivity, and wisdom" (Coeckelbergh 2020, p. 90). Moreover, while scientists press forward in their quest to understand and control human aging, such efforts are not without social consequences. Our understanding of aging itself, and what it means to grow old, will likely be influenced by our attempts to measure it more precisely and bring it under our control. It is difficult to envision a future where any success in forestalling aging does not imply a negative judgment on the aged, especially on those who have not aged well. Moreover, as feminist, disability, and queer theorists have pointed out, such judgments are disproportionally aimed at women (Sontag 1972; Holstein et al. 2011).

In addition, there are subtle dangers in the use of AI for aging research, especially the calculation of one's biological age through the use of DACs. This concerns the danger of abstraction and the temptation to alter one's actions in light of such abstractions. While it is likely impossible to make any sense of the world without making abstractions, some may have more impact than others. There is something Platonic here when the AI estimation of one's biological age is interpreted as one's "real age": for one's biological age is actually an elaborate and opaque statistical abstraction from the messy material world, and that it may mean more than one's chronological (or actual?) age. Either way, though AI puts science behind the well-worn trope "age is just a number", abstraction is never a neutral process. The advent of AI-powered BA will have implications for human embodiment and will be the focus of a brief Christian assessment of its use in aging research. Before offering this assessment however, it is worth briefly considering how the advent of BA might impact our behavior.

Of course, BA may very well encourage some individuals to pursue a healthier lifestyle. However, it might be seen as another guilt-inducing burden. Or, conversely, a BA score considerably lower than one's chronological age might tempt some to relax or abandon disciplines that have served them well or leave one with the impression that they have more time to live than they otherwise thought. There is a subtle danger here as well, as BA is indeed more than just a number; it is laden with formative and predictive power and has the potential to put us into a self-inflicted prison of the possible, inducing a degree of paralysis or angst, whether higher or lower than our chronological age. This phenomenon is

already apparent for those who, having learned of a troubling family genetic history, press for aggressive preventative measures to head off the potential development of diseases like cancer. Hence the term "previvor" (Mukherjee 2021). In other words, as the existentialists remind us, there is the danger of living life in an "as if" mode, of abstracting one's life from one's lived body. In this final section, I examine the nature of the aging body as understood by contemporary AI research in light of the Christian doctrines of the Incarnation and the resurrection of the body, concluding with some brief reflections on how the use of BA might influence Christian faith and practice by reference to the ancient Christian discipline of fasting.

5. One Christian Perspective on AI-Driven Aging Research

It should be noted that what follows is one *possible* Christian assessment; there may be as many Christian approaches to AI-assisted aging research as there are Christian denominations. Moreover, each denomination will likely have a variety of views on particular doctrines ranging from conservative to liberal (Mercer and Trothen 2021, chp. 3). In addition, Christianity in general is capable of accommodating a wide variety of perspectives on the morality of slowing human aging, ranging from sharp rejection (Radner 2016) to enthusiastic (though not uncritical) endorsement (Christian Transhumanist Association). This Christian perspective with a particular attention on embodiment will be informed by the Incarnation of Jesus Christ and the resurrection of the body.

Historical Christianity confesses the Incarnation of the Son of God, the Divine Logos, who was made flesh by the Holy Spirit (John 14). Historically, the church has confessed that Jesus Christ is both fully God and fully man—two natures, united in one person. This means that Jesus lived and walked on this earth as a human being with a body and a soul, without, at the same time, ceasing to be fully divine. In his enormously influential *Church Dogmatics*, the Swiss Protestant theologian Karl Barth (1886–1968) argued that the human nature of Christ is not to be determined by our humanity, but vice versa. In other words, in depictions of Jesus Christ as attested in Scripture, Christ's humanity confronts ours, giving us a picture of humanity as it is meant to be. Jesus is the "Archimedean point" from which true knowledge of humanity might be established, though there are no simple, straight lines from Jesus' human nature to ours (Barth 1956–1977, vol. 1/2, p. 22). Barth is singled out, here, for his extensive treatment of human existence in time as a feature of Jesus Christ as "Lord of Time" (Barth 1956–1977, vol. 3/2, p. 437 ff.). In light of the Incarnation, Barth insisted that our natural, bounded lifespan is a sign of our divine determination as finite creatures (Barth 1956–1977, vol. 3/2, p. 439). Hence, "the existence of the man Jesus in time is our assurance that time as the form of human existence is willed and created by God and given to man" (Barth 1956–1977, vol. 3/2, p. 552). Not only was Jesus' embodied limitedness necessary for him to die on the cross, but his finitude also means that human mortality is proper to our existence and should not be regarded as intrinsically negative or evil. As embodied souls and ensouled bodies, we are finite beings.

Though Barth was certainly sympathetic to the desire for longer life as a covenant partner with God, he was also acutely aware of the reality of sin as understood in light of the real man Jesus, whose soul was in perfect submission to God, and whose body was perfectly ruled by his soul.[14] Sin, said Barth, manifests itself as both sloth (*Trägheit*), a disruption in the proper order of body and soul, and anxiety (*Sorge*), understood as a disruption of our right relationship to our temporality. In our sloth, we are unable to rest in the givenness of our own embodied being and allotted time, but rather fret over our limited existence by trying to "arrest the foot which brings us constantly nearer to this frontier" (Barth 1956–1977, vol. 4/2, p. 468). In our anxiety (*Sorge*), an allotted span becomes unbearable, fueling a frenetic, ceaseless activity, including our quests for longer life (Barth 1956–1977, vol. 4/2, p. 463). From Barth's Christocentric perspective, attempts to slow aging through AI technology might be seen as products of both sloth and anxiety, though the question remains as to whether *every* such attempt to slow aging must be understood as such. Nevertheless, Barth's Christology may prove useful to any

larger consideration of human enhancement from a Christian perspective insofar as Jesus Christ presents us with the picture of humanity as determined by God. Though great care is required in drawing out the implications Jesus' humanity has for our humanity, the Incarnation bespeaks a divine validation of human creatures *as* finite human beings.[15]

The resurrection of the body is no less important for a Christian understanding of embodiment. The apostle Paul speaks of bodily resurrection as witnessed to and established by the resurrection of Jesus Christ (1 Corinthians 15). This new body is given by God (15:38), and, as Paul explains, is marked by a series of contrasts with our original bodies. The old body is perishable, the new is raised imperishable (v. 42); the old is sown in dishonor, the new is raised in glory (v. 43); the old is sown in weakness while the new is raised in power (v. 44); the old is sown a physical body, the new is raised a spiritual body (v. 45). Two observations are relevant here. First, the "perishable . . . imperishable" ("*phthora* . . . *aphtharsia*") distinction does not name a quality but a *process*. Anthony Thiselton has noted the significance of this:

> The word *phthora* [perishable] denotes the process of *decreasing capacities, increasing weakness*, and *approaching exhaustion*, which are all too familiar to those of us in our seventies, eighties, or nineties. These finally reach stagnation and death. The term *aphtharsia* [imperishable] in *Paul's context* does not denote the static quality of "being immortal", but the *reversal* of decreasing capacities, that is, increasing ones" (Thiselton 2015, p. 361).

The resurrection body is one that no longer endures the slow decline of age.

Second, the term "spiritual body" is not a contrast to a material or physical body but is best understood as a body that is constituted and enlivened by the Holy Spirit (Thiselton 2015, p. 363; Wright 2003, pp. 347, 354). Indeed, the postresurrection appearances of Jesus in the Gospels offer a clue to the nature of the resurrection body.

Bodily resurrection reminds Christians that human life is indeed limited but also that the body will not be cast off or discarded in the eschaton. Resurrection is not reincarnation, nor is it mere resuscitation. As Cardinal Walter Kasper has noted, "the body is so vital to humanity, that a being without a body after death is unthinkable" (Kasper 1976, p. 150; Keenan 2014). Though Christianity has at times sounded Platonic, the Incarnation and resurrection are reminders that embodiment is a core feature of our identity and what it means to be a human being (Hrynkow 2019, pp. 178–79).

From this particular vantage point, there are several things that can be said about the AI-powered quest to bring human aging under control. First, this project, like much of modern medicine, is Cartesian. This may seem an odd claim to make when contemporary science tends toward a reductionistic materialism. However, insofar as there remains some distinct locus of selfhood, some intentional "I" that is responsible for my body as an object, the current technological project aimed at modulating aging is indeed informed by a dualism where one's deep desires (and fears) stand over against one's body. As Sarah Coakley observes,

> This might be said to be the *dominating* 'paradox' of bodiliness in the privileged post-modern West: does reductive scientific physicalism really reign, or does a stark dualism still dominate our obsessions with manufactured fitness and sexual youthfulness? (Coakley 2015, p. 1).

Indeed, Gerald McKenny has also noted that because of the triumph of the Cartesian self in the context of modern medical breakthroughs, we are constantly tempted to treat the body as subservient to the unencumbered "naked will" (McKenny 1997, p. 199). When scientists aim to modulate aging, it seems that aging itself has become a problem. We are thus encouraged to adopt a managerial stance towards the aging body. In this paradigm, aging is primarily viewed as a failure. If AI-driven approaches prove successful and become widely available, aging may be interpreted as a failure of human responsibility and resolve, a failure to utilize such technology for the greater economic and social good, and a profoundly human failure at that.

If the AI-fueled quest for longevity is dualistic or Cartesian, it is also gnostic, insofar as the body itself is seen as the heritage of undirected evolutionary forces and as raw material for the naked will. It is gnostic to the degree that it harbors a distrust of the materiality of the body, of its operations and many deleterious processes that continue to elude scientists. In this economy, AI-assisted gerontologists, evolutionary biologists, chemists, and programmers are the "new gnostics". These are the elite who have the knowledge (*gnōsis*) to bring about the redemption of humanity from old age, decrepitude, and dependency by "untangle[ing] the complex physiological process(es) that modulate health and lifespan", solving the great mystery of aging itself (Moore and Raghavachari 2019, p. 1). This new priesthood offers an AI-mediated salvation (temporarily, at least) from the ravages of time.

None of these reflections, however, should be interpreted as an implicit—much less explicit—rejection of the use of AI to slow aging on Christian grounds. If AI is successful in helping compress the period of morbidity before death, and even extend the healthy lifespan, Christians may indeed welcome and even participate in such developments as a creative way of bringing a degree of redemption to a fallen world that awaits a final redemption in the eschaton (earthly immortality, however, would be problematic as a denial of bodily resurrection). It is however important to point out that this AI narrative of redemption is limited by a larger, transcendent salvation, mediated through the risen Christ who did not remove the vulnerability of aging, but entered into it and suffered death for the sake of the world. Moreover, Christianity has a long tradition of caring for the weakest and marginalized, which has always included providing care for the body, a practice that is grounded in the Incarnation, where God became weak and marginalized.

From this particular Christian perspective, caution in AI-assisted aging attenuation is warranted. Instead of asking "How far is too far?" or "What lines should Christians not cross?" Christians should consider whether or not the use of data from DACs might foster a Cartesian-like "management" attitude towards the aging, declining body, which runs counter to the picture of human embodiment as revealed in the Incarnation and resurrection. Will the use of this technology foster an attitude of sloth (*Trägheit*) and anxiety (*Sorge*) with one's body? Will AI enable or diminish our mandate to care for the aged or possibly redefine what counts as care? Will Christians be as inclined to take as many risks for the cause of justice, or to "take up one's cross?" (Luke 9: 23–25)[16] These questions merit greater investigation.

Finally, I will briefly consider how various Christian practices might be influenced by the development of biological age, such as the neglected ancient Christian discipline of fasting. The Incarnation also informed the fasting of the Desert Fathers as a moral project in which the body was heavily implicated in the reformation of one's soul, even as the body benefitted from the soul's reformation. Contrary to what is often asserted, the Desert Fathers were not at war with the body but were at war with the disordered desires of the soul. Through fasting, they sought to bring the soul in submission to God *through* the body, not solely in spite of it. The body and its desires were useful for refining the soul. Rather than seeing the body as merely an instrument of the soul, as an object of one's desires, the body and the impulses and desires arising from it were accorded the role of *instructor*, in order that one's embodied soul might be more fully aligned with the will of God.

St. Antony (251–356) was the paradigmatic figure of the desert ascetic, who, in denying the body through fasting, was able to come face to face with his own recalcitrant, twisted will. The goal of fasting was not primarily to transform the *body* (though this often occurred) but was a first step in bringing one's body and soul into their proper order: the soul being submitted to God and the body in submission to the soul. Though the body was meant to serve the soul, attention was first directed towards subduing the impulses and distractions of bodily needs and desires. Here, the body is the instructor. However, Antony also believed that the body could be transformed to that of Adam's prelapsarian state in the Garden of Eden: specifically, by slowing down the aging process, regaining longevity enjoyed by the biblical patriarchs (Genesis 5–11). St. Antony lived to 105 years of age,

though that is hardly the point. Longevity was never the primary goal: it was understood as the byproduct of a moral endeavor.

The project of life-extension—especially as it concerns various forms of biohacking—has been called the "new asceticism", which views the body largely as a managerial project (Juvin 2010). The philosopher–statesman Hervé Juvin has argued that in the new asceticism, the body becomes everything. This new asceticism confirms "that the body has become a material, a plastic substance that should lend itself to being changed, modeled to project the desired image, my body is my own property, my own responsibility; I choose it, mark it, distinguish it, shape it to my will" (Juvin 2010). The advent of BA and the practices it inspires might also be likened to a new asceticism of sorts, judging by the Young.AI website, though of a kind that is quite different than that practiced by early Christians. It provides a theological lens through which to view contemporary attempts to mitigate aging.

Finally, I will briefly consider how the advent of AI technology, and the development of BA in particular, might impact Christian faith and practice, considering fasting in particular. Admittedly, fasting for many Protestant Christians is a lost discipline, even in Eastern Christianity. If a new asceticism informed by AI is coming, one with deep learning algorithms that know our bodies better than we do, it seems that the ancient forms of Christian fasting will remain largely unpracticed. The new asceticism sees the body as morally neutral at best, as capable of being shaped in ways to meet one's nearly limitless desires (or avoid one's deepest fears). However, it may tempt Christians to reject finitude and see aging itself as the enemy. Ancient asceticism saw the body as both friend and enemy (on account of sin and the Fall), where fasting was a way in which the body could become an instructor, where one could learn from the wisdom of the limited body. Indeed, the Psalmist asserts that rightly numbering one's days is a prerequisite for acquiring wisdom (Ps. 90:10). The use of AI to determine one's BA might render the wisdom of the body as less important. More extended reflection on the difference between BA through artificial intelligence and the wisdom of the body seems a worthwhile endeavor, though one beyond the scope of this article.

Even so, several have observed that Christianity already suffers from a discarnate spirituality "which tends to disdain bodily works and to be interested only in states of soul" (de Vogüé 1989, pp. 95–96). Indeed, Christians still need to be reminded that prayer is more than a spiritual exercise, but also a physical one, says Fr. Evan Armatas, including the direction one faces, one's posture, and even one's surroundings, because "a human person is not simply a soul trapped in flesh" (Armatas 2020, p. 15). There is some irony here, for recapturing the practice of fasting may enable Christians to become the kinds of people for whom a longer life may no longer seem quite as important, while at the same time shaping their bodies to live longer than might have otherwise been the case.

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Notes

1 Centers for Disease Control/National Center for Health Statistics, Table 22, "Life Expectancy at Birth, at 65 Year of Age, and at 75 Years of Age, by Race and Sex: United States, Selected Years 1900–2007", Available online: https://www.cdc.gov/nchs/data/hus/2010/022.pdf (accessed on 22 February 2022). Drops in life expectancy will inevitably impact Black and Latino populations more than others (Andrasfay and Goldman 2021).

2 Their language of allowing older individuals to remain "useful" is, admittedly, troubling. The LDIC envisions a modest decelaration of aging sufficient to forestall the onset of age-related diseases by approximately seven years (Olshansky et al. 2006, pp. 31, 32).

3 It should be noted, however, that there is no single theory of aging that earns wide support across the scientific community, much less agreement on how aging should be measured, though AI promises to change this.

[4] Not all who argue for radical life extension, including potential immortality, espouse transhumanism as a philosophy. Biomedical gerontologist Aubrey de Grey, for instance, argues for potential immortality while distancing himself from transhumanist philosophy.

[5] AI can be used to discover mimetics of existing drugs with known anti-aging properties, such as metformin and rapamychin.

[6] Deep learning is a specific form of machine learning (ML) that employs multilayered neural networks. These networks are composed of layers of computational units commonly dubbed "neurons", units loosely inspired by the behavior of biological brain neurons, whose connections can be strengthened through positive reinforcement. It is capable of handling very large training sets (Moore and Raghavachari 2019, pp. 7–8).

[7] "If there is indeed no singular process behind all the manifestations of aging, measuring BA is infinitely harder than in the case of single-source aging" (ibid.).

[8] The study examined 50 patients who were critically ill with COVID-19. A machine learning (ML) approach was used to study the levels of 321 different proteins in blood samples taken from these patients at 349 different timepoints and was able to find associations between the measured proteins and patient survival.

[9] https://www.young.ai/ (accessed on 20 February 2022).

[10] As one commentator noted, AI might become a tool for the "survival of the richest" (Rushkoff 2018).

[11] Correctional Offender Management Profiling for Alternative Sanctions.

[12] This contrasts with decision trees where humans can check and evaluate the accuracy of the AI, as the outputs are deterministic.

[13] Coeckelbergh astutely notes, however, that the terms "supervised" and "unsupervised" have little to do with the level of human involvement, since all AI is initially designed by human beings (Coeckelbergh 2020, pp. 84–90).

[14] However, Barth was no Cartesian. Though he could distinguish between the body and soul, he also referred to Jesus' humanity—and therefore ours—as an embodied soul and an ensouled body. Barth referred to this particular understanding of the human as a "concrete reality" or "concrete monism" (Barth 1956–1977, vol. 3/2, pp. 393, 399, 417).

[15] That Jesus was a man in no way suggests that being a man or identifying as a male is superior to being a woman or identifying as a female.

[16] See (Cole-Turner 2009) for a helpful discussion.

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Faster, Higher, More Moral: Human Enhancement and Christianity

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Abstract: The three authors of this article explore the intersection of moral enhancement, ethics, and Christianity. Trothen reviews the meaning and potential of moral enhancements, considering some of the risks and limitations. Trothen identifies three broad ethical questions, which all three authors agree upon, that arise from a Christian theological perspective: what it means to be human, choice, and social justice. Trothen concludes that respect for human dignity and social justice requires rejecting a reductive view of moral improvement as purely biochemical. Buttrey then argues that biomedical moral enhancement (BME) is simply one in a series of attempts to morally improve human beings and can be compared to other efforts such as neo-Aristotelian virtue ethics. He argues that BME cannot be simultaneously more reliable than moral education in virtue and no more restrictive of human freedom. He concludes by suggesting that tensions between BME and Thomistic virtue are even stronger due to Christian conceptions of martyrdom and radical self-denial. Finally, McQueen argues that Christianity emphasizes the common good and social justice as essential for human flourishing. Building on the foundation established by Trothen and Buttrey, McQueen insists that accurate cognitive knowledge is needed to make good conscience decisions, but emphasizes that right human action also requires the exercise of the will, which can be undermined by AI, automation, and perhaps also BME. She concludes by encouraging further attention to the true nature of human agency, human freedom, and wisdom in debates over AI and biomedical enhancement. The authors conclude that BMEs, if they become medically safe, may be theologically justifiable and helpful as a supplement to moral improvement.

Keywords: moral bioenhancement; Christianity; ethics; virtue; dignity; justice; empathy

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1. Introduction

As enhancement technologies increase, we will be able to make ourselves stronger, calmer, able to think more quickly and sharply, maybe even have more intense and transformative spiritual experiences, and possibly become more virtuous with the help of biomedical moral enhancements (BME). Artificial Intelligence (AI) will take care of many everyday tasks. We are developing computer programs and data banks that provide much more thorough and complex problem solving and give us ways to quickly process complex questions and problems. In the face of increasing human enhancement technologies (HET), we need to become more intentional about what it is that really matters to us—what we *really* value and desire. This intentionality involves deliberate self-reflexive work concerning our values and the effects of our social locations and experiences in shaping our values and worldviews.

In this article, we consider biomedical moral enhancement (BME) through a Christian theological lens. Our goal is to introduce BME, and some of the important ethics issues associated with BME arising at the intersection of moral enhancement and Christianity.

We do not claim to provide an exhaustive discussion, but we hope to introduce some significant challenges to the possibility of intentional moral bioenhancement and stimulate further conversation. This is not merely a thought experiment. As will become clear, many potential BMEs are already available and are being used for therapeutic purposes other than moral bioenhancement.

In her section, Trothen reviews the potential of biomedical enhancement (BME) and some of its risks and limitations. She explores the contextuality of morality, including the contextual meanings of empathy and assertiveness. Trothen argues that the Christian doctrine of the imago Dei affirms human dignity and implies an appreciation for interdependence. Providing a basis for Buttrey's exploration of virtue and freedom, she emphasizes the need for self-reflexivity in order to fully understand the context of human freedom and contends that collaborative design is necessary for biomedical enhancement to serve social justice, instead of magnifying prejudices. Finally, Trothen concludes that respect for human dignity requires rejecting a reductive view of moral improvement as purely biochemical.

In his section, Buttrey demonstrates how many BME proponents acknowledge standing in a long tradition of attempts to morally improve human beings, both to validate BME and to demonstrate the need for it. He argues that BME cannot be simultaneously more reliable than moral education and no more restrictive of human freedom, but also that analogies to moral education and biomedical therapies justify some forms of BME. Buttrey then summarizes two traditional views of virtue, Aristotelian and Thomistic, before comparing them to BME. Drawing on neo-Aristotelians, including Julia Annas, he argues that virtue is an intelligent skill, and therefore, it is at a higher level and more flexible than BMEs. Next, Buttrey argues that virtue's intelligence, flexibility, and relative rarity means it cannot be dismissed by simple observational studies. He is more concerned about virtue's tendencies towards elitism and ableism. Buttrey argues the Thomistic virtue tradition can remedy these problems by providing a balanced account of divine grace and human freedom. He concludes by suggesting that the tensions between BME and Thomistic virtue are even stronger due to Christian conceptions of martyrdom and radical self-denial. Buttrey's arguments add depth to the overarching argument in this article regarding the relevance of virtue and social justice to the intersection of Christianity and BME.

In her section, McQueen first questions fear-based arguments for BME. Next, she builds on the preceding discussions, arguing that Christian theology and church structure should lead to an emphasis on social justice and the common good as central concepts in human flourishing. McQueen then reviews invasive and non-invasive methods of brain stimulation, and their medical and potentially moral uses. She also examines Kevin Warwick's work on brain to computer interfaces, and other proposals to integrate technology with the human brain. McQueen then reflects theologically on whether we can expect computer algorithms to improve moral judgements. She argues that accurate objective facts are needed by the conscience to make good decisions, suggesting that cognitive enhancements that simply improve access to information would be helpful. However, she emphasizes that right human action also requires the exercise of the will, which can be undermined by AI, automation, and perhaps BME as well. She concludes by encouraging further attention to the true nature of human agency, human freedom, and human wisdom in debates over artificial intelligence and biomedical enhancement.

The three authors of this article served on the Faith and Life Science Reference Group of the Canadian Council of Churches at the time of the writing of this article. These three ethicists are informed in part by their diverse Christian traditions, respectively: The United Church of Canada, The Anglican Church, and The Roman Catholic Church. All three authors are committed to an ecumenical approach that respects diverse Christian traditions, as well as other religious traditions. Their diverse Christian identities and inclusive commitments have assisted them in introducing a range of Christian theo-ethical issues related to BME. The main objective of this article is modest: to serve as a starting point to further research and discussion.

2. Introducing Moral Bioenhancement and Christianity, by Tracy J. Trothen

2.1. Why Moral Bioenhancements?

Proponents of BME hope that these biomedical technologies will better the world by improving moral reasoning (and possibly altruism (Van Eyghen 2021)) through cognitive enhancement, increasing prosocial behaviors, strengthening motivation to do good, and/or enhancing moral virtues (Harris 2016; Douglas 2008; Hughes 2017). Well-known philosophers, Ingmar Persson and Julian Savulescu, advocate for the use of BME as a safeguard against the destructive potential of fast developing technologies that could be used to obliterate the planet (Persson and Savulescu 2008, 2012). They reason that with the proliferation of technologies, and especially cognitive enhancements, we will have more opportunities and tools for inflicting mass destruction. Consider, for example, autonomous weapons such as flying drones with sniper sensor devices and facial recognition software that tells these drones whose skulls to penetrate, and how to evade bullets. A professor of computer science at Berkeley warns that these unstoppable "slaughterbots" are not merely a science fiction-based figment of our imagination: slaughterbots could be created now by integrating tech that we already have in miniature form (Dust 2019).

Might Persson and Savulescu, and others including bioethicist James Hughes who writes from a Buddhist perspective (Hughes 2013), be right to say that biomedical means have the potential to help us become more moral in how we use technology? Particularly in the context of growing secularism in parts of Europe and North America, BMEs may become important augmentations to moral education. Historically, the church and other faith groups have served as focal points for many communities, providing moral guidance and social cohesion. Many places that have experienced a decline of organized religion may have yet to fill the moral guidance hole left behind. In some cases, social media has become a strong source of inconsistent and questionable moral guidance. An era of "fake news" has added to this instability. Can BMEs help to strengthen altruism, social justice, and lessen hostility, or are we looking for an easy way out of a problem that has no quick fix? BMEs may be consistent with some Christian perspectives, *if* moral education is used alongside these bioenhancements, BMEs are tailored to individuals and their social contexts, and BMEs are medically safe.

Persson and Savulescu may well be correct in arguing that our collective sense of justice, and inclination to care for each other, needs improvement to minimize the possibility of mass destruction. There is much room for global moral improvement in the context of war, human rights atrocities, abuse, and systemic ecological harm including climate change. The question is how best to do this from an informed Christian perspective.

2.2. How Might We Bioenhance Our Morality?

Since morality is partly neurobiological, morality can be affected by pharmacological interventions. For example, the stimulant drug methylphenidate, sold under trade names including Ritalin and Concerta, reduces impulsive aggression (Douglas 2008, p. 233). Methylphenidate may also contribute to moral enhancement by sharpening focus and augmenting problem-solving abilities, possibly including one's capacity to do ethical analyses. Modafinil, sold under the trade name Provigil, and the hormone oxytocin, increase empathy, cooperation, trust, and concentration. Serotonin may increase empathy and aversion to harming others.

Potential non-pharmacological MBEs include deep brain stimulation (DBS), transcranial magnetic stimulation (TMS), and transcranial direct current stimulation (tDCS), which are all types of brain stimulation that may increase cooperation (Piore 2015) and neuroplasticity. Greater neuroplasticity could enhance one's ability to learn prosocial behaviors such as cognitive empathy and decrease impulsive aggression. Later in this article, McQueen further explores the possible role of brain stimulation in moral enhancement.

Genetic modification technologies may be the next frontier for moral and emotional improvement. Military organizations have expressed interest in neuroscience involving the alteration of genes that influence traumatic memory formation (Tennison and Moreno 2012;

Pitman et al. 2002). Traumatic memories can deter people from repeating or even initially engaging in violence. This is only a subset of the technologies that are emerging as possible ways to improve morality.

2.3. Limitations and Risks of BMEs

There are limitations and risks associated with the potential use these medical treatments as BMEs, instead of for their primary therapeutic purposes. Oxytocin increases empathy but only towards ingroup members, or kin. It is possible that an increased empathy to kin could increase hostility toward those who are perceived as outgroup members (Trothen 2017a, 2017b). Persson and Savulescu suggest that this limitation of oxytocin could be mitigated by moral reasoning and education: "we contend that this restrictive tendency can be counteracted by moral reasoning and, thus, that BME 'would have to go hand in hand with reasoning which undercuts race, sex, etc. as grounds for moral differentiation'" (Persson and Savulescu 2019, p. 816). Although moral education may suffice to make some MBEs justifiable and even helpful, ingroup/outgroup thinking seems to have a strong instinctual and emotional rootedness that may not be sufficiently overcome by an education in moral reasoning to the degree needed to make oxytocin more helpful than harmful. The tendency to distrust outgroup members has been well established as part of a human survival instinct. This distrust may lead to hostility if this "natural disposition" to distrust is not addressed constructively (Van Eyghen 2021, p. 8). Although cognitive enhancements may help address this distrust, few people may be willing to do the necessary educational and self-reflexive work to overcome such biased thinking.

Potential BMEs also have health risks in spite of their therapeutic value. As McQueen discusses later in this article, DBS is a successful treatment for many people with Parkinson's Disease, intractable clinical depression, and other conditions, but may cause seizures or headaches, and affect personal identity in unforeseen ways by possibly changing thought patterns (Cabrera et al. 2014). Although these biomedical technologies successfully treat some serious medical conditions, there is no consensus regarding the potential efficacy of these technologies for the primary purpose of improving morality.

2.4. The Contextual Nature of Morality

Morality is very difficult to define. Ought the focus be on moral behaviours, on motives that underlie behaviours (Douglas 2008), on virtues such as altruism and justice (Persson and Savulescu 2012; Hughes 2013), or on the improvement of cognitive abilities that could improve ethical reasoning (Harris 2011)? One reason morality is difficult to define is its contextuality. As Buttrey probes in the next section of this article, the meaning of doing good (Hauskeller 2016) and of virtues such as altruism or justice changes a bit or a lot depending on the situation and who is involved (Jones 2013, p. 150; De Melo-Martin and Salles 2015; Hauskeller 2016).

For example, empathy and self-sacrifice may not be virtues for every person in every situation. Empathy is not "uncontroversial" as has been claimed by some in the BME conversation (Persson and Savulescu 2012, p. 409). Feminist scholars have established that marginalized people often are socialized to be overly altruistic and self-sacrificing to the neglect of adequate self-love. In addition, psychologists have demonstrated that socio-economically privileged people are in greater need of enhanced empathy compared to those with less money (Piff et al. 2012; Kraus et al. 2011). Although pride may be the prominent sin for many privileged people, the prominent sin for many marginalized people is often the loss of self, power, and voice (Saiving 1960). Assertiveness, self-pride, self-interest, and even some aggression may be what needs to be enhanced to make some people more virtuous, if dignity and social justice are valued.

2.5. Non-Biomedical Tech Moral Improvement? Robotics, Empathy Labs, and Spirituality

Perhaps a safer and less controversial alternative to moral enhancement may be through narrow AI. Robots increasingly are being used in healthcare to provide caring

support. "Robot pet therapy" helped during the COVID pandemic when many hospital and long-term care patients had little outside contact with loved ones (Knibbs 2020). Other robots, such as Pepper, have been around longer. As Pepper explains, "I was created in 2014 by Softbank Robotics in Tokyo, Japan. I flew all the way to Toronto to work at Humber River Hospital—I love it here". Equipped with sensors and cameras, Pepper is designed to detect emotions and respond supportively. Robots can model caring and compassionate behavior, encouraging recipients to do likewise. Robots may be able to model a degree of empathy, but robots are limited. Human touch and compassion cannot be entirely replaced (Purtill 2019). Spiritual distress, including existential angst, will not be addressed fully by robots but could be alleviated in a supplemental capacity.

Empathy labs, designed based on neurological and other social-scientific research, are another emerging moral enhancement modality (Trothen 2016). Moreover, spirituality, too, is associated with increased compassion and prosocial behavior toward strangers (Saslow et al. 2013). Traditional and new ways of enhancing spirituality may also serve to enhance morality (Mercer and Trothen 2021, pp. 115–40).

2.6. Values and Social Processes: Technology Is Not Value Neutral

How do we decide which, if any, technologies should be used as a means of moral enhancement? Much of this conversation comes down to our values and the belief systems and worldviews that shape our values. Values "pertain to beliefs and attitudes [and ideals] that provide direction to everyday living" (Corey et al. 2014, p. 14). Values are complicated. It is tough to name and unpack the social processes that influence what we value and desire (Sherwin 2012). What do we really, really want? European philosophers Marcuse (1964), Habermas (1971), and Foucault (1988) have made a strong case that technology (which includes moral bioenhancements as applied science) is not value neutral, but that technology promotes the values of utility and efficiency. Not only are we bombarded by advertising messages telling us what we desire, technology may contribute to the often false belief that utility and efficiency are more important than other values such as relationships, social justice, and environmental health. (A quick way to help unearth some of the things that are most important to us is to imagine what you want in your obituary; how do you want to be remembered?).

2.7. Introducing BME and Christianity

What can religion bring to this conversation? For followers of religions, values are strongly influenced by the central stories and doctrines of the religions. There are many points of intersection between Christianity and BME. Three significant theological intersections are: interdependence as a key aspect of what it means to be human, the meaning of choice, and social justice. My goal is to identify some of these intersections and begin to suggest theological issues relevant to the creation and use of BMEs. My co-authors deepen the meaning of these issues.

2.7.1. Theological Anthropology: BMEs and What It Means to Be Human

In Christianity, the doctrine of the imago Dei affirms the inherent dignity and value of humanity. What it means to be human—and the best humans we can be—is at the heart of the moral enhancement conversation. Debate regarding what it means to be made in the image of God partly reflects differing views on the nature of God. Although some have placed an emphasis on a capacity for rational thought, others disagree, seeing the essence of God—and humans as created in God's image—as more about relationality (Trothen 2017a, 2017b). The latter view has gained support in the last half century, including from relational, liberation, and feminist theologians. A relational interpretation of the imago Dei doctrine emphasizes covenant and interdependence. Christian theologian Philip Hefner proposed the interpretation that people are created co-creators (Hefner 1993), with a moral and theological duty to work for the improvement of life. Although Hefner's theological anthropology has been critiqued as being too trusting of human freedom

and the human capacity to do good, his proposal aligns well with more liberal Christian theologies that emphasize potential human goodness. The "created" aspect of Hefner's proposal acknowledges the Christian belief in human capacity to create harmfully, either intentionally or accidentally.

A relational interpretation of the imago Dei includes a recognition of the interdependence of life. This recognition shifts the focus of the moral enhancement debate from the individual to the enhancement of communities. An emphasis on individual rights gives way to an emphasis on responsibility. Part of this responsibility requires self-reflexive awareness of systemic power and inequitable access to resources.

Theological anthropology embraced the steps that are considered to make humans better. Later in this article, McQueen develops the theological claim that humans are created with intrinsic dignity and responsibility for one another, in relation to BMEs. Buttrey adds to this conversation by asking what it means to be a morally improved human being; however, a thorough exploration of Christian theological anthropology is beyond the scope of this article. For our purposes, it is sufficient to introduce the question of what it means to be human as a question that arises at the intersection of BME and Christianity.

2.7.2. The Meaning of Choice

There is much debate about choice in discussions of BME. There is concern regarding the freedom to choose to be morally enhanced and the freedom to make authentic moral choices following enhancement. Will our individual choices reflect individual dignity and contribute to a socially just world? An elite athlete may not choose to be less aggressive but may choose to become better able to evaluate when aggression is needed. A very selfish person would likely not choose to become more altruistic unless it would benefit them. It may be that those who need BMEs most would not choose them. For those who would embrace BMEs, would their subsequent choices—after being morally enhanced—be in keeping with their authentic selves (Harris 2011), or would those subsequent choices merely reflect the influence of a drug or other BME? Maybe, by pharmacologically removing or minimizing neurological barriers, BMEs will be able to improve our capacity to make choices that are more authentic to who we truly want to be and were created to be (Hughes 2017).

Given the complex social processes influencing our values and desires, we need to ask to what degree are we truly free to choose (Sherwin 2012; Marcuse 1964; Habermas 1971; Foucault 1988). Self-reflexivity may be most effectively cultivated through education and emerging techniques such as empathy labs (Trothen 2016), than it may be through pharmacological or neurological means such as brain stimulation. Self-reflexivity requires awareness of the social, political, and cultural factors that help to form experiences. An awareness of the ways in which systemic dynamics shape power and affect perceptions of the self and others is necessary to becoming better morally, if moral is assumed to have a communal dimension. Without self-reflexivity, choices and relationships will suffer from the uncritical projection of what are assumed to be normative experiences. McQueen calls this capacity for self-critique and attentiveness to global implications, conscience, and examines the role of conscience further in her section. Although BMEs may not be able to replace traditional modes of moral development, including education about marginalization and equity, BMEs may assist moral capacity development in a supplementary manner. BMEs that increase attention or computational power, combined with traditional and innovative educational approaches, may help us to further self-reflexivity. Buttrey furthers this discussion regarding the complex relationship between education and BMEs in the following section.

2.7.3. Social Justice

If interdependence is understood as a virtue instead of an undesirable limitation, implications for community rather than the individual must be the starting point for ethical discussions about BME (Trothen 2017a, 2017b). Relationship is a central feature of

covenantal Christian theology, as is social justice and the Roman Catholic concept of the common good, as McQueen elucidates later in this article. Questions regarding equity and access to enhancing resources assume a high importance if human dignity is respected and individual well-being is understood to be firmly connected to communal well-being (we have only to consider the COVID-19 pandemic to see how inequitable access to vaccines affects global health).

Technology alone, no matter how accessible, will not get rid of bias. Algorithms such as those used in facial recognition software often reflect the biases of coders and may magnify social marginalization patterns. In their subsequent sections, Buttrey and McQueenexpand on social justice and offer further analysis of systemic bias as it relates to BME. Who decides what is "normal" and desirable and what needs to be "fixed" has a bearing on which virtues are assumed to be virtuous and which are seen as undesirable. Even when some virtues are agreed on in principle, such as dignity, compassion, and social justice, the meaning and application of these virtues varies, depending on context and community.

Co-design—meaning the inclusion of diverse voices at the creation stage of technology—is a principle consistent with the Christian commitment to the last being first. The epistemological prioritization of those at the social margins is core to Christian interpretations of social justice; the voices of those living on the margins are believed to be necessary to knowing what is wrong socially and understanding how to address these injustices.

2.8. Concluding Comment

Respect for human dignity and social justice suggest that a reductionist approach to humanity is to be rejected. Humans are more than enhance-able components and cranial neuro-pathways (Wiseman 2016). Attempts to make humans better morally will fall short if moral improvement is assumed to be a biochemical task only. BMEs cannot replace moral formation, disciplines, and other education regarding self-reflexivity; however, BMEs could be congruent with some liberal interpretations of Christianity if they are medically safe, socially just, and considered as supplementary to other forms of moral enhancement.

3. "Moral Improvement, Old and New" by Michael Buttrey

3.1. Introduction

Persson and Savulescu's first publication on biomedical moral enhancement (BME) call it "moral enhancement" (Persson and Savulescu 2008). Later works by them and other proponents add the prefixes "bio" or "biomedical", as in "biomedical moral enhancement" (BME) or "moral bioenhancement". Why was the modifier added? Due to the fact that there is a long history of attempts to morally improve human beings, a history that can be read to validate or vitiate proposals for BME; thus, distinguishing BME from these other attempts became necessary.

For my section, I will be comparing biomedical moral enhancement (BME) to two traditional approaches to moral improvement: Aristotelian virtue ethics and Thomistic virtue. I will start with how proponents of BME compare their proposals to traditional moral education, then present a contemporary account of Aristotelian virtue, and finish with a brief discussion of Christian virtue. My thesis is that biomedical moral enhancement proponents are right to suggest there are limits to our biological capacity for virtue and that virtue risks elitism; contemporary virtue theorists are right to insist on the potential of Aristotelian virtue for moral improvement; and the Christian virtue tradition reconciles these insights in an egalitarian, non-elitist fashion by balancing acquired and infused virtue.

3.2. Moral Enhancement vs. Moral Education

Many proponents of BME use moral education as a point of comparison for their proposals. According to Persson and Savulescu, "it is obvious that moral enhancement by traditional, cultural, means—i.e., the transmission of moral instruction and knowledge from earlier to subsequent generations—has not been as effective and quick as cognitive

enhancement by these means" (Persson and Savulescu 2008, p. 168). Thus, they suggest medical and genetic treatments may be faster and more accessible methods of BME. At the same time, they use the comparison to education to defend BME against the charge that it could restrict freedom. As they put it, "there is no reason to assume that moral bioenhancement to which children are exposed without their consent would restrict their freedom and responsibility more than a traditional moral education to which they are also exposed without their consent" (Persson and Savulescu 2008, p. 113). For Persson and Savulescu, the traditional moral education of children does not necessarily restrict their freedom, but it is also not effective at producing right action. In contrast, they claim that BME will be more productive of right action and yet no more restrictive than moral education.

Writing at the same time as Persson and Savulescu, Thomas Douglas also draws on an analogy to moral education to defend BME. Douglas is particularly interested in the possibility of reducing counter-moral emotions like racial aversion and impulsive violent aggression. He argues that even if such bad motives are 'natural' or part of an agent's given identity, "the appropriate attitude to take towards such properties is precisely one of *non-acceptance* and a *desire for self-change*" (Douglas 2008, p. 235). Douglas then contends that if such a change can be accomplished through moral education or BME, there is no reason to prefer the former or see the latter as more 'unnatural'. If human goal-directed action makes a change unnatural, then BME through self-improvement is just as artificial, and if it is rather the use of technology that is unnatural, then medical treatments for diseases are just as objectionable.

A later thinker, Mark Walker, proposes a 'Genetic Virtue Project'. He argues that vices and virtues are at least partially inherited, and if we can identify the genes responsible, we could use genetic selection and engineering to reduce vice and promote virtue. Walker's comparison to moral education arises in response to the objection that genetic moral enhancements would be much harder to change than traditional virtues. Walker's reply is that he sees no reason why new moral insights could not lead to new genetic moral enhancements; in addition, "children born with the wrong enhancements could be sent to remedial camps" (Walker 2009, p. 36). Walker does not reflect further on this chilling suggestion, and he also does not acknowledge differences between education and genetic engineering. One difference is that students who are educated in a certain way may individually choose to resist and reject the moral framework they were given, whereas individuals who were engineered to favour a certain morality will need the assistance of willing physicians, geneticists, and/or pharmaceutical companies to make further changes to their genetic inheritance.

Finally, Barbro Fröding sees the potential for moral enhancement to complement education in virtue. In her words, "to be vicious is to be irrational as such agents subscribe to mistaken beliefs about the good life" (Fröding 2011, p. 228); therefore, she believes cognitive enhancement in particular could be conducive to the development of virtue, by enabling less biased judgements, and encouraging a deeper understanding of virtue. Moreover, given that most people are subject to "substantial cognitive constraints", Fröding believes cognitive enhancement may be an essential tool to elevate them to the intellectual level where they have a good opportunity to develop the virtues needed for the good life; BME is therefore a remedy for the difficulties and elitism within traditional virtue education.

To some extent, some of these arguments are convincing. For example, Persson and Savulescu's claim that BME will be more effective than moral education, but no more restrictive of human freedom, is difficult to sustain. Human freedom is a major reason why traditional moral education is such an unreliable method of producing right action, and presumably it will be a major obstacle for effective BME as well. Failing to acknowledge this and a failure to explain how freedom can be protected without equally impeding the prospects of BME, is a major oversight by Persson and Savulescu. Similarly, although both education and genetic engineering of children requires the contributions of other

people, Walker does not consider how the latter will involve experts with more specialized knowledge, more sophisticated tools, and more financial and ideological commitments than the average parent or teacher. The required involvement of technical experts does not necessarily make genetic engineering more nefarious than traditional moral education, but it will make it harder for individuals or small groups to deviate from an elite moral consensus.

On the other hand, Douglas is right that the analogies to moral education and medical therapies justify some forms of BME. Brain surgery or genetic engineering is far more invasive than parents verbally correcting their children, but a hypothetical drug that could reduce episodes of impulsive violent aggression is not that different from treatments we generally accept, such as stimulants to treat ADHD or SSRIs for depression. Similarly, although accusing most human beings of cognitive constraints is a poor rhetorical strategy for overcoming elitism, I agree with Fröding that BME is better understood as a complement to virtue rather than a simple replacement for it.

Building on Trothen's discussion, next, I probe the meaning of "traditional moral education", and how it results (or not) in moral improvement. In the next two sections I summarize two understandings of virtue—neo-Aristotelian and Thomistic Christian—and consider how they compare to these BME proposals and if they address some of these concerns.

3.3. New Aristotelians, New Virtues

Neo-Aristotelian virtue theory is a contemporary reimagining of Aristotle by scholars such as Julia Annas (Annas 2011). According to Annas, developing virtues does not depend on the circumstances of your life but how you live it. Your circumstances include anything that is not under your control, such as age, gender, height, family, nationality, language, and so on. These circumstances influence your life and potential, but the measure of virtue is how skillfully (or not) you use your 'raw materials'. Moreover, until we all have do-it-yourself genetic engineering kits, genes will remain a greater part of our circumstances compared with how we live our lives. Thus, even if it helped provide a better starting point, Walker's genetic virtue project could not result in true virtue; developing virtue would still depend on what you did with your genetic gifts.

Like Aristotle, Annas argues that virtues are intelligent skills. That is, the brave person is guided by a rational understanding of bravery, traditionally understood as a context sensitive middle point between cowardice and recklessness. If so, then Thomas Douglas's proposal to medically suppress counter-moral emotions like racial aversion, even if potentially helpful, would still need to be complemented by an intelligent understanding of racial tolerance for true virtue.

Finally, Annas contends that virtues, like other skills, are initially learned by imitation, but the goal is for students to appropriate and understand the skill to the point that they may surpass their teacher. In contrast, pharmaceuticals and other medical technologies are usually designed for uniform effects. This difference identifies a significant difference between moral education and BME and reveals how the uniformity of BME may be more restrictive of freedom than virtue.

Even if virtue is clearly distinct from biomedical moral enhancement, does it work? Some critics claim that traditional moral education has been shown to be ineffective. For example, a study of thousands of American schoolchildren in the 1970s found a lack of consistent altruism, honesty, and self-control between situations (Hartshorne and May 1975). Similarly, a study at Princeton Seminary found that students who were late to give a talk were less willing to stop and help someone groaning in an alley, even if the subject of the talk was the parable of the Good Samaritan (Darley and Batson 1973). A third study often cited is the famous Milgram experiment, where subjects complied with instructions to administer simulated shocks up to a supposedly dangerous level (Milgram 1963). In light of these, some have argued that moral behaviour is primarily situational rather than reflective of any underlying character, and suggested Aristotelian virtues may not exist.

Virtue theorists interpret these studies differently (Annas 2005; Croom 2014). First, each of these studies found that some people acted well, regardless of situation. Second, Aristotle believed virtue is rarely found in children, because they lack life experience; this is also true of students, and so virtue being rare in these groups is to be expected. Third, if Annas is right, virtue involves the ability to vary actions intelligently in different situations, which makes it hard to measure empirically. Put another way, to accurately judge if someone is acting virtuously or viciously, you need to examine the reasons for their actions, not just their outward behaviour. For example, the seminary students may have passed by because they were trying to keep a promise to their professors and fellow students. The subjects in the Milgram study may have thought they could trust a biology teacher at Yale University to be honest and not let them hurt anyone. These reasons do not excuse their actions, but they suggest that simple observation is insufficient.

Another critique of virtue is Barbro Fröding's claim that virtue is elitist and too difficult. For Aristotle, who lived 24 centuries ago, one's potential for virtue depended on being born as an intelligent free man with good parents and a good society. However, Annas, writing in the 21st century, takes the more egalitarian route of emphasizing how you live your life over its circumstances. Virtue is also more egalitarian than BME because its price is not set by pharmaceutical companies or insurance providers, and its availability is not determined by market forces. Finally, even if BME were cheap or covered by universal healthcare, it would still be elitist in the sense that only some people in some countries would have the power, resources, and skills to choose the goals of BME, design biomedical moral enhancements, and decide who receives them. Every agent inherits an understanding of virtue from their parents, teachers, and society, but through life experience, self-reflection, and rational understanding, every agent has the freedom to adapt the virtues to their life and context as they develop them. Unless every human being is able to receive the education and tools to do their own genetic engineering or drug design, BME will inevitably be less accessible and less flexible than virtue.

Nevertheless, Annas agrees with Aristotle that children are incapable of virtue, because they lack the life experience needed for practical wisdom. Annas' account also implies that people with intellectual disabilities cannot be virtuous. Is there an alternative to excluding these two groups?

3.4. Thomistic Virtue and Conclusion

A full analysis of the Christian virtue tradition is beyond the scope of this paper, but I will highlight some initial insights. The Christian theologian with the greatest influence on the virtue tradition is Thomas Aquinas. In his *Summa Theologiae*, Aquinas agrees with Aristotle that the proper end of human life is happiness, but interprets true happiness as the beatific vision of God. Furthermore, he argues that moving towards this happiness requires gifts from God: the theological virtues of faith, hope, and charity (ST I-II 62.3). As these virtues are given, not earned, their acquisition does not depend on having certain capacities, so children and people with intellectual disabilities can be virtuous. Of course, any appeal to the ability of divine action to infuse virtue may seem like a form of special pleading that merely confirms the ableism of virtue, suggesting that although most people can acquire virtue themselves, people with disabilities need help. A better way to understand infused virtue begins with Alasdair MacIntyre's insight that "[t]here is no point in our development towards and in our exercise of independent practical reasoning at which we cease altogether to be dependent on particular others" (MacIntyre 1999, p. 97). In other words, dependency is not a rare state, found only among those with disabilities, but a fundamental aspect of the human condition. This observation of universal dependency is in tension with the Enlightenment model of the self-sufficient rational agent, but it harmonizes well with Aquinas' theological claim that all human beings depend on gifts from God to achieve human happiness; thus, a properly Thomistic theological anthropology sees all human beings as being in a position of *dis*ability to achieve true virtue without God, not just those people we see as having particular disabilities.

Nevertheless, understanding theological virtues as divine gifts naturally invites the question about whether Christians have human reasons to pursue moral improvement. Aquinas says yes: even with grace, fully restoring human nature requires the repeated cooperation of human freedom over time, to acquire an easy facility with virtue (ST I-II 65.3ad2). Famously, the Reformer Martin Luther was deeply suspicious of even the potential of practices such as reading scripture or prayer to help acquire virtue. He held the belief that sanctification, similarly to justification, requires total human passivity, so that God can work in us unhindered (Herdt 2008). Calvinism, with its stress on limited election and double predestination, undermines the motivation for good works even further (Herdt 2008); however, theologians such as Augustine, Jonathan Edwards, and N.T. Wright are more positive about moral virtue. For example, Augustine sees spiritual exercises, and industriously "checking and lessening . . . greed", for temporal things as good methods for moral and spiritual development—if they are driven by a passionate love for God (De Trin. 14.23); therefore, both Augustinian and Thomistic accounts of sanctification preserve motivations for moral improvement.

Finally, although BME may be used by Christians to supplement virtue development, the history of Christianity suggests that tensions between BME and virtue may be even stronger with Christian views of virtue. For example, many Christians venerate martyrs who were killed for their faith, and the early church tradition of ascetic monasticism persists until this day; however, it seems unlikely that many government agencies or pharmaceutical companies will fund research into biomedical moral enhancements that encourage martyrdom or monasticism. Similarly, we may ask if modern parents will see extreme generosity, radical self-denial, or even a passionate commitment to justice as good goals for BME or as distractions from achieving a successful life; therefore, although Christians may use BMEs to supplement the virtue development of themselves and their children, they will have to carefully discern whether a given BME has the flexibility to serve their understanding of the good life, or whether it risks further co-opting them into a model of goodness chosen and codified by the BME designers.

4. Technological Bio-Enhancement and Moral Agency, by Moira McQueen

4.1. Introduction

Persson and Savulescu's call for biomedical moral enhancement (BME) seems to be based on fear: fear that, in the face of the destruction of our planet as climate changes caused by humanity increase and multiply, we do not have the moral knowledge and will to enact changes because of our limited regard for others (Persson and Savulescu 2012). They believe more moral education is necessary, since not enough is being done at present, with changes advancing faster than humans' capacity to respond. If enhancement through external means could enhance our capacity for achieving results faster, then they believe they should be used. They feel the need to 'put these ideas on the table' because they view the situation as desperate.

Many questions can be asked here. Do Persson and Savulescu paint a realistic picture or are they being overly negative? As Trothen points out, climate change dangers are real, and dramatic changes have already taken place, e.g., receding glaciers, increase in extinction of some species, encroachments and destruction of rainforests and woodlands, land scarring from mining and oil production, etc. It is true that awareness of these factors is growing, but the will to combat them seems to be lacking, if, for example, lack of compliance with measures such as reduction of carbon emissions by every country can be taken as indicative. On the other hand, there have been many lifestyle changes globally, even if they have been inadequate so far, but could we be encouraged to be more intentional in our approach? There is a touch of 'Nostradamus' in Persson and Savulescu's approach, but fear of the threat of calamity is not always the best motivator. Savulescu often claims that we find it easier to harm people than to help them and this might appear to be accurate, given the scale of enmity, warfare, and colonization that has gone on since the beginning of

recorded history, all of which militate against people working together to save the planet and all that is within it.

4.2. Is There a Christian Alternative to Fear as Motivator of 'Better' Moral Thinking?

The story of humankind, however, also reveals other aspects of human nature which Christianity aims to foster. Along with our propensity towards enmity, there is a seemingly natural urge to be *better* persons in the moral sense; we *do* often recognize that our neighbour is as important as ourselves; there *is* a concept of the common good. These are acknowledged to be human, experiential and relational realities and many national, legal, and parliamentary systems are built on forms of social contracts which try to embody these realities. One of the theological mainstays of Catholic social teaching, for example, is that the pursuit of life and flourishing is not only about the individual but also about the common good. The two are tied: one aspect cannot flourish properly if the other aspect is ignored. Christianity itself is a global, communal organization centred on membership in the Body of Christ. If any people should be leading the way in emphasizing the need for the common good, it should be Christians! What are we, as Christians, saying about our responsibility for the common good in response to our common ecological problems? Much has been written by various denominations about these matters, (e.g., by Francis 2015), whereas Persson and Savulescu and others believe our response could be greatly improved through the use of biomedical moral enhancements. Those enhancements must be ethically evaluated to show how such moral improvement would be achieved (i.e., are the methods used ethical?) and whether they contribute to the moral growth of the individuals concerned and the common good (i.e., are they effective?).

4.3. Various Means

In our discussions, Trothen shows, among other points, the results of using pharmacology on moral thinking, and asks salient questions about the social justice aspects of BME, stating that 'the voices of those on the margins are necessary to know how to avoid injustice in these areas. This fits with my denomination's emphasis on 'the preferential option for the poor', which is hard to exercise in these discussions, especially in the world of 'high tech'which informs much of our paper. These concerns must be raised as a counter to questions about elitism and ableism in accessing possible treatments for cognitive and/or biomoral enhancement, noted by Buttrey.

Buttrey's comparison of BME with traditional methods of moral education emphasize the necessity of virtue in its many forms and how we can become more moral (i.e., morally enhanced), but not through the use of BME, which use external means. All our denominations take the Christian approach that knowledge without virtue is not enough: our actions must reflect Christian values, and achieving those values takes multiple virtues: discipline in learning and research; wisdom in reflecting and concluding; altruism in transcending subjective desires on consideration of the common good and social justice, and so on, within the context of following the Way of Jesus Christ in loving God and loving our neighbour as ourselves. That is a far cry from a more reductionist approach found in some 'research imperative' or moral compulsion models of achieving better moral thinking.

In my part of the paper, I would like to comment, first, on current technological means of improving cognition and ascertaining behaviour; and second, whether they might also be capable of enhancing moral thinking and decision-making.

4.4. Technological Means

Concerning the first part, there are several technological methods currently in use to improve cognition with application in healthcare to remedy the effects of stroke, dementia, and other neurological problems caused by illness or accident. Some of these have already been indicated by Trothen, and not all are currently fully approved by the FDA, since some are considered to be still in the experimental stage, although they have been shown to be relatively safe and effective.

Transcranial Magnetic Stimulation, Deep Transcranial Magnetic Stimulation, and Deep Brain Stimulation

The most commonly used method is transcranial magnetic stimulation (TMS), which is non-invasive and uses electromagnetic induction. An insulated coil is placed over the scalp on the part of the brain believed to be involved in mood regulation. Magnetic pulses about equal to those used in magnetic resonance imaging (MRI) are repeated rapidly (repetitive TMS or rTMS) and can make lasting changes to brain activity. This method was approved by the FDA in 2008 as a safe treatment for people with depression, and especially for those for whom antidepressants have severe side effects (Johns Hopkins Hospital n.d.).

The Johns Hopkins Brain Stimulation Program uses a coil "designed to affect extensive neuronal pathways, including deeper cortical regions and fibers targeting subcortical regions, without a significant increase in the electric field induced in superficial cortical layers." (Johns Hopkins Hospital n.d.).

Another method, deep brain stimulation (DBS), has shown improvement in clinical trials for mood and cognitive disorders such as major depression and Alzheimer's disease. Electrodes are implanted in specific regions targeting the underlying cause of the disease. Although studies have shown that DBS can reverse blood flow changes, much like antidepressant medication, it is not currently FDA approved for depression or bipolar disorder. It is approved for use in essential tremor, Parkinson's disease, dystonia, and chronic and severe obsessive-compulsive disorder, use for the latter being the first psychiatric indication to win approval.

Johns Hopkins Hospital also uses transcranial direct current stimulation (tDCS), for non-invasive, painless brain stimulation using two electrodes placed over the head which modulates neuronal activity. Although it is still experimental, it has the advantages of being cheap, non-invasive, painless, and safe. Several studies suggest it may be a valuable tool for the treatment of neuropsychiatric conditions such as depression, anxiety, Parkinson's disease, and chronic pain. For the purposes of this section of the paper, research shows cognitive improvement in some patients (Johns Hopkins Hospital n.d.). The results of these treatments in improving cognitive function are important for the functioning and rehabilitation of many patients and are also presumably helpful in improving their capacity to make better informed moral decisions. If results from these therapies continue to improve, then such technologies, provided they are ethically safe and effective in improving cognition, will have a role to play in helping people make better moral decisions.

4.5. Brain to Computer Implants

The second technological method that may help people make better moral decisions is through the use of brain-to-computer implants. Although this is presently remote for most people, Kevin Warwick's experiments show its potentially therapeutic use in health care for people with brain injury or mental health problems (Warwick 2014). At the same time, he foresees the possibility of immense strides in cognitive enhancement through this method, aligning with Persson and Savulescu's hope that improving cognitive capacity will also improve human moral awareness and decision-making.

Warwick had a link-to-computer chip implanted in his brain to test his theory. He was then able to control a robot arm in England remotely, from the US, showing implications for future actions and control over machines, presently through extensions of brain-to-computer actions, and possibly in the future, where he thinks brain-to-brain links could be established.

Elon Musk's group, *Neuralink*, continues its work in attempting to merge AI with the human body, claiming we must do so, otherwise we are in danger of becoming inferior to machines that may develop and operate faster than humans. *Neuralink* attempts to link the brain with AI in such a way that AI that would circulate through the veins and arteries using a 'neural lace interface', a wireless brain-computer interface (Hinchcliffe 2018). In other experiments, Charles Lieber of the chemistry department at Harvard says his team is

working to match structural and mechanical properties of electronic and biological systems, and agrees that is should be possible to achieve their integration (Hinchcliffe 2018).

Warwick is enthusiastic about brain-to-computer possibilities in the field of communications: AI is already faster in math, information processing, memory, sensory input, ability to think in more dimensions, etc. These complex machines have a fast-acting networking capacity and we already do not have complete control over them, e.g., we cannot 'switch off' the internet. More importantly for our thesis, he points out that although emotions, feelings, images, and so on, cannot be transmitted from brain-to-brain in their original form; *direct* brain-to-brain communication would enable that. His work, along with others, involves experimenting with radio telegraphic communication between human nervous systems, and this approach looks promising (Warwick 2014).

4.6. Technology and Improved Moral Thinking

Concerning the second part of my comments, I question, similarly to Trothen and Buttrey, whether technology might enhance our capacity for better moral thinking and decision-making. That is, will more information and more accurate information be obtainable by, say, computer algorithms that yield more accurate human moral judgments? Savulescu and others hope so, but obviously cannot know this in advance. There are several matters to consider here, in the context of what is usually thought of as moral agency, where the individual exercises personal conscience in the process of decision-making.

4.7. The Role of Knowledge and Freedom in Moral Agency

We three authors accept the Christian teaching outlined earlier by Trothen that we are created in God's image. According to Aquinas, being created as such endows us with an innate capacity to know right from wrong, or synderesis (Aquinas, *Summa Theologiae*, 1, Q79), which is the faculty of conscience to resolve situations in a way that respects love for God and love for our neighbour. Although it is highly individual in its innermost workings, Christian conscience formation must look first to objective realities in its assessment of the context of any situation where a decision is to be made.

Contexts often need to be interpreted separately from a subjective viewpoint, but the factual reality of the situation needs to be assessed and clarified (*Aquinas, Summa Theologiae* I-II, Q. 94, a.4). A Christian conscience will take into consideration obedience to God's will, at least as far as we can judge it, as opposed to our own. Conscience is, then, not principally a faculty to promote our own individual progress, but to make an informed judgement about reality. We must look at and assess all the circumstances and the possible short- and long-term consequences of our actions on ourselves and others, as well as deciding whether the means we plan to use are ethical, at the same time taking into account as far as possible our own subjective biases and cultural prejudices, and, most importantly, praying and discerning God's will for us in deciding what is the right thing to do.

4.7.1. Manipulation of the Brain and Moral Agency

In light of this inner work of forming conscience, would we still be truly individual moral agents if a means such as TMS were to be used to an extent that could affect our moral thinking by manipulating the brain? Would the freedom of our agency be compromised, or would the means simply open us up to information to which we would otherwise lack access? If changes through, e.g., TMS, were cognitive only, the latter would apply. Could TMS then help us make better moral decision? Although it has been shown that such methods can improve cognition, it must be remembered that information may not always mean WE will be 'better', since, being human, we will still make mistakes, or despite having cognition improved through therapies, and thus having information pointing towards a good moral decision more available, all human beings sometimes deliberately move in a direction we know to be wrong and against what we know to be right. In Christian language, we would then be 'sinning'. One of the fascinating features of our God-given moral freedom is that we experience the freedom to choose either way, despite perfect (or

improved) knowledge (*Catechism of the Catholic Church* n.1857). It is doubtful that advanced cognition would change that.

A question raised about technological brain stimulation by any of these methods is whether they could be used to subdue traits in a person that *others* find undesirable? What about the 'freedom to fall or fail' argument (Harris 2011)? It could be argued that moral education always involves other people's conclusions, too. That is an inevitable part of education, but another part is that it should help us make our own choices eventually, with the freedom to take a different path from our teachers. The argument about bias in AI is also applicable here and is problematic, since many studies have shown results that are distorted racially, politically, ethnically, regarding gender, and so on, depending on the views of those responsible for the original questions and theses, as well as on methods used for acquiring subjects for the studies. As Trothen notes, morality has a contextual dimension.

4.7.2. Moral Agency Composed of Intellect and Will

Theological explorations of virtue, Buttrey claims, are more robust if they include reference to formative historical theological thinkers including Aquinas. Aquinas discusses this linkage of intellect and will in the Summa Theologiae (1, Q 82 and 3). Knowledge of facts and circumstances is needed in the first place in making a moral assessment, but it takes an exercise of the will to execute an action. We know that we can be educated to absorb and appreciate knowledge about right and wrong through logic and understanding, but it is another matter to enact those right or wrong deeds. Aquinas is a good source for discussing the difference between intellectual habits and moral habits, but the 'free will' question continues to challenge philosophers and theologians. Although the debate continues as to whether and when our will is truly free, we experience a sense of completion when we finally execute a deliberate plan of action: 'there, I've done it!' No more time is to be spent wondering when and if I should do what my conscience and self-reflexivity has already formulated for me (the Hamlet dilemma).

5. Could Enhancement Enable Us Always to Choose the Moral Good?

Could our capacity for making better moral decisions be enhanced to the extent that we would always choose the moral good? An ongoing challenge here is to know our starting point, as both Trothen and Buttrey indicate. Just as Alasdair MacIntyre asked: *Whose Justice? Which Rationality?* (MacIntyre 1989), we must ask whose and which starting points in ethical thinking should be used? Whose agenda, whose educative tools? Persson and Savulescu are clear that we must work to save the planet before technology produces weapons that are increasingly destructive; therefore, if they were in charge of this moral revolution by biomedical enhancement, those are the outcomes that would be sought through programming.

5.1. Varying Views of 'The Moral Good'

A spanner in the works is that experience has shown that, perhaps unfortunately for their agenda, people can and do reach different conclusions, even if they are given the same factual information. Knowledge by itself does not lead to better moral decisions, and society continues to disagree on vital matters such as our responses to the challenges of climate change. We base our decisions on different values, and surely this would happen even if we were morally enhanced by any method?

Persson and Savulescu, however, believe that *more* of us, at least, would think in the same way if we were to be so enhanced, which could affect change. They already have a certain conclusion in mind that would be the point of the procedure: they believe that, with more information about approaching dangers, every one of us will recognize what needs to be done. Perhaps, perhaps not, as noted above. Some people might decide that it would be better if the population were to decrease, through famine or otherwise. Some might see scope for control of resources and personal profit. Some might capitalize on others'

misfortunes. These tendencies have always arisen in times of warfare and both authors acknowledge that a constant human trait persists that finds it easier to harm than to help.

5.2. Biotechnological Moral Enhancement and the Replacement of Moral Agency

Russell Hittinger writes: "[b]ut most distinctive of contemporary technology is the replacement of the human act; or, of what the scholastic philosophers called the *actus humanus*. The machine reorganizes and to some extent supplants the world of human action, in the moral sense of the term . . . [There is] a new cultural pattern in which tools are either deliberately designed to replace the human act, or at least have the unintended effect of making the human act unnecessary or subordinate to the machine" (Hittinger 1993).

He adds that, above all else, our culture prizes " . . . the machine insofar as it promises an activity superior to the human act" (Hittinger 1993). Hochschild says, "[i]f that is right, then the threat of automation isn't the bad things it tempts us to do, but its ability to hypnotize us into thinking we don't even rise to the status of moral agents" (Hochschild 2015). There are certainly fears about the threat of the machine regarding people's employment, being 'taken over', and reduced in our capacities by the superiority of machines in some fields. The playing out of "Human v. Machine' continues to be of great importance for the individual, the common good, and the way we perceive our role in society.

Some claim that Hittenger's traditional interpretation of the actus humanus is reflected in the two hemispheres of the brain, left and right. Although this is not an attempt to produce anything like a full account of this, Hittenger briefly stated that it shows how right brain thinking facilitates appreciation of beauty, life, the sacred, and relationships, whereas left brain thinking demands explicitness, clarity, and rationality (Sharkey 2021). The two spheres are connected and balanced through the neural tissue of the corpus callosum. Psychiatrist/philosopher Iain McGilchrist theorizes that modern people have allowed left brain thinking to predominate, and that this is rampant in many fields of study, especially in the use of artificial intelligence (McGilchrist 2021). AI has the characteristics of a *wunderkind* in dealing with facts and statistics, but it does not possess the balancing effects of right brain characteristics and, therefore, it cannot carry out fully human acts. Pursuit of this type of study is important for developing concepts of human anthropology and spirituality, as well as for considering the question of *human* agency, *human* freedom and *human* wisdom. If machines cannot incorporate these experiences, they will continue to outperform humans in terms of the speed at which they master facts and in patterning, but not in wisdom, spirituality, transcendence, and other experiential realities. A major question lingers: is there any way in which a machine could ever experience the 'numinous?'

5.3. Is Biotechnological Moral Enhancement an Imperative?

Some reject this, on the basis that moral traits form the core of a person's identity and that employing technological means of manipulating them could endanger that identity (Huang 2018; Crutchfield 2018). Savulescu and Persson believe use of such a means of manipulation would be to our mutual advantage; therefore, they do see it as an imperative, given present global circumstances. Others think cognitive enhancement could be allowed to complement an already developed virtue of prudence in a person, and that technological means would be permissible to achieve some higher-order desire people wish to attain but cannot reach on their own.

6. Concluding Statement

It is clear that further long-term studies are needed on the technological means of achieving either cognitive or moral bio-enhancement, since those currently being undertaken remain mostly conjectural until clearer evidence of their effectiveness can be demonstrated.

7. A Cautiously Optimistic Recommendation

All three authors agree that better moral thinking and education are good in themselves. Persson and Savulescu tie their desire for enhanced moral thinking to the specific goal of climate change, since they believe time is running out for planet Earth and that we must encourage every means possible, including biomedical and biotechnological enhancement, in an urgent effort to resolve this potential catastrophe.

However, even when faced with this dilemma, ethicists such as ourselves raise additional issues. Trothen cites concerns about the theological meaning of being human, the meaning of choice, and the interdependence of life as this relates to social justice; Buttrey refers to the need for virtue and raises questions concerning elitism and ableism when assessing who will benefit from enhancements; McQueen urges for more attention to be paid to human freedom, moral agency, and the common good, agreeing with the conclusions of her co-authors.

These ethical concerns, along with the necessary risk assessments that must be performed on all pharmaceutical and biotechnologies that aim to bring about cognitive or moral improvement, demand a precautionary approach to their use, whether already in practice, being tested in clinical trials, or in the process of obtaining regulatory approval. A hasty deployment of these enhancements, despite their rapid application urged by people such as Persson and Savulescu, would be unethical until concerns such as those raised here are answered more fully. If these concerns are addressed, BMEs may be theologically justifiable and helpful, *as a supplement*, to moral improvement.

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Article

Sparking Religious Conversion through AI?

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Abstract: This paper will take the stance that cognitive enhancement promised by the use of AI could be a first step for some in bringing about moral enhancement. It will take a further step in questioning whether moral enhancement using AI could lead to moral and or religious conversion, i.e., a change in direction or behaviour reflecting changed thinking about moral or religious convictions and purpose in life. One challenge is that improved cognition leading to better moral thinking is not always sufficient to motivate a person towards the change in behaviour demanded. While some think moral bioenhancement should be imposed if necessary in urgent situations, most religions today see volition in conversion as essential. Moral and religious conversion should be voluntary and not imposed, and recent studies that show possible dangers of the use of AI here will be discussed along with a recommendation that there be regulatory requirements to counteract manipulation. It is, however, recognized that a change in moral thinking is usually a necessary step in the process of conversion and this paper concludes that voluntary, safe use of AI to help bring that about would be ethically acceptable.

Keywords: cognitive and moral enhancement; artificial intelligence (AI); volition; conversion

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1. Introduction

Moral bioenhancement through AI and other technologies has the aim of improving people, making us 'better', perhaps more able to solve society's problems. This is, for example, the background to the famous Persson and Savulescu approach to moral enhancement: we should use every means we have to solve current problems, especially climate changes that threaten destruction to our planet and future generations. Their theory suggests that not enough of us have the moral capacity to react to this and other serious situations with the urgency required, and that moral bioenhancement, even involuntarily, is needed.

The hope of moral bioenhancement is that people will be able to reason better morally, not just as a good end in itself but also to spark the realization that concrete action and the will to change situations are necessary. These steps are needed for traditional moral and religious conversion, and it is proposed here that cognitive enhancement promised by the use of AI or other means could be a first step in bringing about moral enhancement. The use of AI would therefore be important in sparking or short-circuiting conversion, depending on whether or not it is able to help bring about better moral thinking as a precursor to the changed behaviour that conversion entails. Some of the challenges to moral bioenhancement as it relates to moral or religious conversion will be discussed.

2. AI and Cognitive Enhancement

Using AI for human enhancement has proved a great aid in restoring physical capacity. Methods used so far include deep brain stimulation (DBS), computer to brain interface, and brain implants to achieve superior learning. Several studies show some of these methods help people with reduced capacity brought about by illness or accidents, while others show the possibility of learning to operate mechanisms through neural activity, perhaps by implanted chips in the brain, thereby opening or developing neural pathways with greater capacity for cognition. Important here is the possibility of not simply being able to receive

more knowledge, but also the capacity for understanding. In other words, " . . . cognitive abilities relate to mechanisms of how we learn, remember, problem-solve and pay attention rather than with actual knowledge" (Kaimara et al. 2020).

In a recent pilot study, researchers from the National University of Singapore (NUS) showed that an artificial intelligence (AI) platform, CURATE.AI, produces training programs personalized to the individual's learning capacity to enhance training for maximum benefit. Results of the study showed the CURATE.AI platform has potential to enhance learning capacity and could lead to successful use in digital therapy, perhaps even preventing cognitive decline. Digital therapeutics using personalised applications already exist in many platforms and would be accessible to anyone with a smart phone, tablet, etc., with the potential of replacing some drug therapies and perhaps even preventing cognitive decline.

Participants' scores varied, leading to a statement by one of the authors to a daily science journal: "We need a strategy that adjusts the training—which can involve many tasks that interfere with each other—according to the participant's changing responses" (*Science Daily* 2019). It is recognized that it is difficult to standardize anything in educational theory and this remains problematic, but at the same time, personalized programs could add moral and religious content to applications (apps) tailored to the individual and helpful for cognitive and moral thinking and reasoning.

In an extensive survey on methods of cognitive enhancement conducted by the US National Institutes of Health, several different methods are discussed, noting the challenges to new methods of enhancing cognition, including the possibility of brain hacking. Dresler et al. write: "Just like the hacking culture in the realm of computer software and hardware, an increasing number of individuals experiment with strategies to creatively overcome the natural limitations of human cognitive capacity—in other words, to hack brain function" (Dresler et al. 2019). The authors note that those in the field are concerned about the usefulness of enhancement techniques when it could be employed and exploited nefariously (Dresler et al. 2019). These differing viewpoints and warnings cause hesitancy in developing open techniques using technology, while a lack of solid evidence of successful results leaves observers with questions.

The article points out that another set of disagreements arises when it is not accepted that cognitive enhancement is true enhancement, and the authors themselves demand higher standards for the use of enhancing equipment including that employing AI, etc., saying: " . . . only on the basis of a clear picture on how a particular enhancement strategy might affect specific cognitive processes in specific populations, along with side effects and costs to be expected, can an informed theoretical debate evolve and a promising empirical research designs to test the strategy can be proposed" (Dresler et al. 2019).

At the same time, the mode of action of AI in cognitive enhancement recognizes that there has been solid progress in pharmacological ways of enhancement or in behavioural intervention treatments. The NIH refers to a cluster of physical strategies for cognitive enhancement, including brain stimulation technologies. Quite apart from treatment of subjects with pathological conditions, it states, " . . . several forms of allegedly non-invasive stimulation strategies are increasingly used on healthy subjects, among them electrical stimulation methods such transcranial direct current stimulation (tDCS), transcranial alternating current stimulation (tACS), transcranial random noise stimulation (tRNS), transcranial pulsed current stimulation (tPCS), transcutaneous vagus nerve stimulation (tVNS), or median nerve stimulation (MNS)" (Dresler et al. 2019). While the authors raise doubts about the effectiveness of many of these procedures, they add a more positive note in listing 'transcranial magnetic stimulation (TMS), optical stimulation with lasers, and several forms of acoustic stimulation, such as transcranial focused ultrasound stimulation, binaural beats, or auditory stimulation of the EEG theta rhythm or sleep EEG slow oscillations' as having potential for cognitive enhancement (Dresler et al. 2019). Recently, fMRI neurofeedback is also showing potential to increase sustained attention (i.e., helpful for those with attention deficit disorders) or visuospatial memory (helpful for those with dementia) (Dresler et al. 2019).

Many of these methods function with AI assistance, and a step further in the use of AI is found in developments that the authors say 'converge minds and machines where machines are closely integrated with the person through the use of wearable electronic memory aids, AI related reality gadgets or, more permanently, bodily implants.' (Dresler et al. 2019). Neural implants that could aid memory are being tested and some are in use while brain–computer interfaces, such as those developed by Kevin Warwick, connect the central nervous system with computers through wearable or implanted electrodes to bring about enhanced cognitive function.

Indications of further use of AI in cognitive enhancement is found in commercial video games and in customized computer training programs designed to enhance specific cognitive capacities and skills. Unfortunately, recent controlled studies and meta-analyses have shed some doubt on the success of computerized brain training programs, since no single cognitive enhancer augments every cognitive function. (Dresler et al. 2019). In fact, the authors found that some cognitive training programs do enhance memory, processing speed and visuospatial skills, but work against functions and attention (Dresler et al. 2019). If an enhancement program promotes some aspects of cognition but damages others, then it will not be worth using.

For example, the studies show that electrical stimulation of posterior brain regions was found to facilitate numerical learning, whereas automaticity for the learned material was impaired. In contrast, stimulation on frontal brain regions impaired the learning process, whereas automaticity for the learned material was enhanced. Brain stimulation has thus been suggested to be a zero-sum game, with costs in some cognitive functions always being paid for gains in others (Dresler et al. 2019). This implies that enhancement may have to be tuned to the most pressing current cognitive function for the person, and certainly shows that conclusions about efficacy are rather distant, limiting not only cognitive capacity but also the capacity for moral and/or religious development through enhancement.

A major ethical and anthropological question is raised by Clowes, who notes that, "Electronic-Memory (E-Memory), powerful, portable and wearable digital gadgetry and "the cloud" of ever-present data services allow us to record, store and access an ever-expanding range of information both about and of relevance to our lives" (Clowes 2015). The cloud is the '. . . wireless internet of data and processing services . . . which while providing local information is connected to a wireless internet that provides data-warehousing and, increasingly, processing capacities that moreover track and collect information on the minutiae of our lives' (Clowes 2015). As these technologies become more pervasive and as we grow ever more dependent on them, the author asks, " . . . but what, if anything, might be happening to our minds and sense of self as we adapt to an environment and culture increasingly populated by pervasive smart technology . . . ?" (Clowes 2015). The question is important for the possibility of cognitive and moral bioenhancement if there are negative as well as positive effects, and if, as has been shown in cognitive enhancement, there are impairment possibilities that in some ways cancel the enhanced capacities.

He is concerned about negative results on users, and questions raised by him include asking whether answers that are fed to us at the touch of a screen might dilute human capacity for thinking. We constantly use e-memory for providing information rapidly, or as an electronic diary, or, variously, as GPS/calculator/camera/video recorder of events, etc. The question is important for human capacity for learning and memory over the long haul as our dependency on machines and AI grows. On the other hand, the possibilities for cognitive enhancement, for example, in supporting the failing memory of those in the early stages of dementia, is a desirable outcome. E-memory could also have ramifications for moral bioenhancement and even for conversion, if there were good information to help people with their moral decisions. As these technologies and our habitual use of them increasingly become a part of everyday life, the tendency is for them to become invisible, fading into the background of cognition and skilled action. Clowes notes that whereas drugs that may produce cognitive enhancements or more direct brain–machine interfaces have a more public, academic and popular audience, use of the Cloud and AI is

so widespread in everyday work and tasks that we scarcely even notice our dependency (Clowes 2015).

In terms of improving cognition, he suggests e-memory provides, " . . . a scaffolding upon which we build for recall and accuracy" and this seems less threatening than the suggestion that we may be damaging human thinking, especially when he discusses how e-memory adds material we did not know before, even when we thought we 'knew' someone. E-memory adds to our store of information, and most of us are happy about that expanded knowledge and see it as positive in shaping our picture of reality, always assuming the information is accurate and verifiable, the very matters that can be problematic in this age of disinformation. Could there be cognitive diminishment in this easy access to information, even as we think our horizons are being expanded through memory aids or prompters? Will we 'learn to forget' as we become more reliant on external forces of AI for our poor memory, or will we simply use e-memory as an aid until we become familiar with the facts provided? Clowes uses the example that GPS devices guide us through areas we do not know, yet once we have navigated routes for a time, our brain takes over and we function on our own (Clowes 2015). If there is concern that our problem-solving functions and capacity for analysis could be affected, it should be remembered that e-memory is already proving valuable in helping people in cognitive decline to remember people, places and bygone times. The usual ying/yang of advantage/disadvantage applies also to technology, and time will tell if human memory will be affected by our 'not needing' to remember, e.g., telephone numbers, driving directions, historical dates, lists of capital cities, poetry or other memory lapses, now that we can even turn to portable, ever-present smart phones, tablets, wristwatches, etc., for answers.

In his article on AI as a means to moral enhancement, Klincewicz identifies a major ethical problem in noting that "There are reasons to think that leading a moral life is even more difficult today than in Aristotle's time. Many contemporary societies face rapid technological advance and moral practice is not catching up" (Klincewicz 2016). His thesis is, not unlike Persson and Savulescu's, that we are neither cognitively nor morally prepared for the advent of computers, biotechnology, and new forms of medicine. We tend to be concerned about more immediate concerns, such as family, local politics over geo-politics, and to resist action in spheres that are distant from us. Klincewicz calls this the 'Moral Lag Problem', describing all the things that cause us to be not as moral as we could or should be, and this fits with Persson and Savulescu's view that this gap threatens our planet, resulting in their urging people to take steps to remedy the problem.

He notes that Savulescu and Maslen appeal to advances in computing technology and artificial intelligence as a way of moral enhancement (Klincewicz 2016). In their view, "the moral AI would monitor physical and environmental factors that affect moral decision-making, would identify and make agents aware of their biases, and would advise agents on the right course of action, based on the agent's moral values" (Klincewicz 2016). Noting that there are concrete examples of the way in which this could be achieved, Klincewicz concludes that the approach with most promise would be to use discoveries from machine ethics along with engineering solutions featuring AI to formulate such programs to bring about moral bioenhancement (Klincewicz 2016). These ideas involve developing moral environment monitors that would prompt information about environment issues that would then 'nudge' a person towards moral conclusions to assist the person, but not attempt a take-over of the person's moral agency. Klincewicz foresees machines that would give answers to normative questions, but there could be challenges: What if I do not agree with a suggested course of action, e.g., to stop driving my car or to buy only local produce? Since machines rely on algorithms, would they not then produce a type of utilitarian ethic, for example, suggesting an answer that the greatest number of people have so far expressed? There is the possibility that the person would listen to AI suggestions over their own beliefs, since there is evidence that people can be persuaded to change their behaviour by appropriately designed technologies. Agent computer trust can be high when it comes to automation, but the problem is that humans may end up trusting an automated

system when it is not really appropriate to do so, since the machine may contain skewed information or has systemic problems of which the users are unaware. Klincewicz points to research that shows that there is reason to think that a machine that can advise and give reasons would be more successful in changing behaviour than the kind of training programs proposed by others, showing that there may be potential for creating an artificial moral advisor with AI playing a normative role (Klincewicz 2016). He notes that, "The key problem is that all of the component parts of moral AI are tied up with the agent's own moral values and those values might be based on morally compromising biases and beliefs" (Klincewicz 2016).

He suggests that a response to these challenges could lie in the authors of programs employing a morally pluralistic approach (not relativism) and points out that 'common human morality', while not always in agreement on finer points, does require some objective standards (Klincewicz 2016). I see this as an interesting referral to the possibility of some norms being seen as necessary, in contrast to today's tendency towards individual relativism or other theories that challenge the existence of any universal, objective norms. Perhaps some actions that benefit the common good or other universals, such as 'You shall not kill an innocent party', 'you shall not steal', and 'you shall not commit adultery', carry more weight than is often realized. Some also argue that any 'interference' or 'nudge' by any form of AI should allow for what Harris calls 'the freedom to fall', meaning one must decide for oneself, rightly or wrongly, and not by others' standards (Harris 2011). While against any form of compulsion in the use of AI, Klincewicz makes a good point in saying that perhaps the best points in AI's favour if used as a moral enhancer/advisor is that it " . . . invites its user to engage in rational deliberation that he or she may not have gone through otherwise" (Klincewicz 2016). After all, in any ethical theory, full information is essential for good moral decision making, and is not always easy to find.

3. Moral Bioenhancement

Since studies show that cognitive improvement through the use of AI is sometimes possible, the next step is to ask whether moral thinking can be enhanced by it. One view emphasizes the need for the exercise of personal moral agency by an individual, free of compulsion or manipulation. The person needs cognitive and moral capacity to sift through information and possibilities and to reflect on outcomes in order to make a freely willed moral decision. Schaefer suggests, following Jotterand, that moral neuroenhancement is impossible because, " . . . we can only become better through careful, reflective exercise of our moral agency, not through neural implementation" (Schaefer 2011). He notes a deeper problem alluded to by Jotterand: disagreement about the goal of moral enhancement threatens to make such projects untenable. I think his view is more accurately about the means used, since he asks, " . . . if part of being virtuous is to adequately process relevant factors in moral decision making, why couldn't we (at least in theory) use neural manipulation to enhance cognitive capacities and thereby make people more likely to be virtuous?" (Schaefer 2011). Jotterand, however, believes that when the word 'manipulation' is used, there is already an ethical objection: a threat to human agency and free will, an imposition of someone else's thinking on the individual concerned (Jotterand 2014).

Schaefer suggests that certain forms of cognitive manipulation would not pose the same risks to agency that, for example, emotional manipulation does. The latter could diminish agency by promoting the manipulator's values, whereas this does not necessarily happen in cognitive enhancement. He thinks the manipulator could be 'content-neutral' about values, only trying to improve the other person's ability to reason. I do not think neutrality is possible, as so many have attested to. Machine learning, in particular, has shown how algorithmic results can be skewed because of bias of various kinds, often depending on the participants featured in studies It is omnipresent and it is almost impossible for humans to be value free, a complication being that we are often unaware of our own biases. It is the hall mark of human agency that the person be free from manipulation (at least obvious manipulation!) and, therefore, free from other people's biases, in forming beliefs

and deciding on actions. Allowing for these challenges, Schaefer thinks that cognitive manipulation could make the decision-making process, including moral decision making, easier and would allow moral bioenhancement.

Jotterand acknowledges that there is strong evidence of the possibility to alter, manipulate, and regulate moral emotions using neurotechnologies or psychopharmacology. For example, increased levels of oxytocin make people more trusting and selective serotonin reuptake inhibitors (SSRIs) reduce aggression and enable cooperation (Jotterand 2014, p. 2). Similarly, the use of neurostimulation techniques seems able to produce changes in mood, affect, and moral behaviour. She accepts that these technologies can alter how people react to situations that implicate a particular moral stance. Her critique is that manipulative control of behaviour is not enough to show genuine moral enhancement, whereby the individual's moral thinking would change and develop across the spectrum. Rather, people develop morally "...through the development of a vision of the good life and an understanding of the meaning of human flourishing" (Jotterand 2011, p. 8). This is essentially Aristotelian and the accepted teaching of Thomas Aquinas, constituting my own leaning in this field but in this case does not, to me, preclude safe voluntary methods that may aid cognition and possibly moral decision making.

Regarding the question he asks about the goal of moral bioenhancement, Schaefer accepts Alasdair MacIntyre's critique that tradition-free approaches to ethics such as consequentialism and deontology, have failed to produce uncontroversial or unproblematic results, applies equally to the tradition-infused approach of virtue ethics (Schaefer 2011). If the disagreement about what it is to be good or moral remains unresolved, what is the real point of moral enhancement at all? I believe this is a valid point. Without agreement on at least some moral values and implications, the responses, even if moral bioenhancement were effective, would still leave divisions and hesitance about how to rank ethical problems in terms of priority, not to mention solutions to them. To me, this is a fundamental problem about ethics and is an ongoing dilemma in moral philosophy and theology. While we may be able to reach a degree of overlapping consensus in a few cases in the field of neuroethics (e.g., mitigation of psychopathic tendencies counts as a cognitive and moral enhancement), much of the time there may be deep moral disagreement. What might seem to be moral improvement to some could well seem moral deterioration to others and we would be divided about the content of treatments and programs. Jotterand is sceptical about consensus in these issues, writing that, "The motivation to develop biotechnologies to enhance human capacities does not occur in a vacuum, and a particular moral stance about human nature and notions of embodiment, enhancement, and morality are at play in shaping the discourse" (Jotterand 2014). Therefore, current notions of relativism, consequentialism, utilitarianism, transhumanism, libertarianism and distrust of legitimate authority and religions, and so on are at play, as well as a deepening individual relativism, where even the social notion of the common good takes second place to 'my rights' as basic justifying factors.

This disagreement is both symptomatic of and a reason for deep uncertainty about what it is to be good or moral. Various competing theories are all compelling in their own way, making adjudication of what counts as enhancement even more difficult than adjudicating the morality of actions. This makes an inclusive sort of pluralism about value attractive, but then the problem manifests itself in a different way: if, for example, we agree that being virtuous, doing the right thing and seeking the best consequences are important in being good, how do we weigh our *different* conclusions about what is right or wrong in given situations. Should majority decisions win the day, thus turning to utilitarian or pragmatic approaches? MacIntyre's critique still stands to be answered, unlikely in today's exceedingly pluralistic yet individually relativistic moral world, but answers still have to be looked for in the field of moral bioenhancement as in any other, and 'agreement to disagree' is already an answer of sorts in at least democratic societies.

Concerns about volition and privacy of thought and feelings are raised by neuroethicists such as Lavazza, who realizes the possible danger to personal freedom in applied

technology aided by AI. He notes that there are already neural prostheses " . . . depriving individuals of full control of their thoughts" (Lavazza 2018). Those who insist on the importance of the capacity for free will as a basic marker of human identity will want to safeguard those areas out of respect for human dignity and to make sure others do not acquire the right to invade private territory or to use any information obtained from patients who are treated by these means. It is easy to see how technologies could be used nefariously, but as long as most applications are used in health care treatments such as for neurodegenerative diseases, he sees no reason to think about forbidding use, since safety and cure of disease are ethical duties of the first rank.

Nonetheless, Lavazza proposes strict internal controls on what can be 'sparked' in a person's thoughts, and what can be used thereafter. He reminds us that neuroscientific techniques can be invasive, threatening a patient's cognitive freedom and privacy and therefore protective human rights have become necessary (Lavazza 2018). Access to a person's thoughts should be strictly regulated and dependent on the person's full consent to any use of material obtained. He notes this approach is necessary not only for AI devices but should become a general 'technical' operating principle to be observed by any systems connected in decoding a patient's brain activity (Lavazza 2018). I agree with this approach, and would point out another concern that there is generally a lack of enforceable regulations in many technological and health care-related fields, e.g., gene editing, because of a lack of agreement on fundamental principles. In some cases, suggested principles fail in favour of pragmatism, which could lead to severe risks to human dignity, free will and personal privacy in some instances of moral bioenhancement.

Rakic agrees with moral bioenhancement as long as it is safe and voluntary (Rakic 2017). I agree with both conditions and with his stating, like Jotterand, that, "To make it obligatory deprives us of our freedom" (Rakic 2017). He sees compulsory moral enhancement as a contradiction in terms, violating free will, and he asks "MacIntyre-type" questions such as "Whose means? Who creates the input for the 'software?' Where does thee moral authority to enhance come from? Under what terms?". He is concerned that use of any mechanism might actually reduce our will power, thus also reducing freedom of thought. He takes a hard look at the future in this perceptive statement: " . . . if such form of ultimate harm changes our species beyond recognition, compulsory moral enhancement itself obliterates humans and is, therefore, not even consonant with biological morality as an ethics of survival of the species . . . " (Rakic 2017). He finds resorting to majority decisions about these matters (which I term pragmatic rather than ethical) make matters more political than moral, because then it seems that only numbers count in ethical decision making, which for him and others is an insurmountable difficulty.

Parker Crutchfield suggests that the manipulation of a person's moral traits, i.e., the core of a person's identity, amounts to 'killing' the person (Crutchfield 2018). While the widespread use of AI or other means to perform such manipulation is still rare and mainly used as therapy, he, like Jotterand, Rakic and Lavazza, warns that we should anticipate future problems in such use and be prepared. His thesis is that change brought about by technical interventions may result in a person acting like a different person and, further, the change is not due to the person's own agency, even if voluntary. What comes to mind is Jack Nicholson's portrayal of a person changed by a lobotomy procedure (for suspicious reasons) in the movie, "One Flew over the Cuckoo's Nest", which, while fictional, resulted in a complete change in the character's identity, personality and behaviour. This is not to suggest that current brain manipulation could or would effect that level of traumatic damage, where the cure is worse than the disease, but it is a stark reminder that human manipulation could go wrong or be performed for the wrong reasons, perhaps at a cost for some.

4. Moral or Religious Conversion and Bioenhancement

At another level, the 'change' in moral thinking hoped for by those who advocate the use of AI in moral bioenhancement is something I shall compare with moral 'change' or

conversion, partly from a secular and partly from a Christian viewpoint. Using a popular literary example, Scrooge in Dickens' *A Christmas Carol* reveals what is meant by a spiritual or religious conversion, brought about seemingly by the 'Spirits of Christmas' in the tale. The story uses his own memories, imaginings, dreams and fear of untimely death, resulting in a late-life recognition of his own earlier woundedness and loneliness, complicated by the development of his antisocial, 'closed in' and miserly character. After Scrooge's change in heart (conversion), only Tiny Tim is allowed to invoke God expressly, but it is clear that a spiritual concept of 'love of neighbour' prevails, and Scrooge becomes a different person towards his fellow creatures. He acknowledges his earlier suffering and mistakes, he expresses repentance for those whom he had wronged, and he manifests a truly Christian spirit in making amends. These reference points are generally reckoned to be necessary for religious conversion, meaning that change in one's moral thinking leads to an actual change in behaviour. No matter what causes moral change, it is necessary for true religious conversion, and if moral bioenhancement cannot effect such change, it is more or less pointless. Crutchfield confirms this in writing, " . . . people undergo changes to their moral traits all the time, but usually these trait changes don't result in different identities because only very few traits change or because the changes occur within the person's narrative in a way that allows the narrative to continue to unify the self, preserving the person's identity through the change" (Crutchfield 2018). He is doubtful about moral bioenhancement's capacity for actual change in the person. *A Christmas Carol* is only a morality tale and may not stand up to Crutchfield's charge about real change, but it does seem to have had a great deal of influence on how people think and act and could be considered a 'universal' in capturing certain aspects of human nature, almost in the same way as a parable.

Crutchfield is concerned that if and when a change in identity occurs through bioenhancement, the person 'dies'. His concern is perhaps justified if the change is for the worse, but Saint Paul's example points to the possibility of another type of 'dying where the person is then 'reborn', and is thankful to God for that rebirth. Of course, if a person's identity is changed through external means and his or her free will is taken over by human design with the intention that he or she 'die' through bringing about radical change in personality, as happened to Jack Nicholson's character in the movie, few people would find that ethical.

Yet the possibility that the change might be positive should also be recognized. Although Saul was clearly not bioenhanced technologically, the biblical story tells us that his 'sight' was affected for some time before being restored when he underwent a drastic change in identity in becoming Paul, the follower of Christ. His conversion seems to have come from a more internal mechanism of insight and openness to grace: being 'knocked off his horse' is variously interpreted as a Scriptural way of saying that a great insight dawned on him, and he acted accordingly. He 'died' but was reborn. It can be hard for those telling their conversion stories to explain their subjective moments of insight and 'dawning' realizations, many giving witness to dramatic stories and others experiencing conversion, such as Elijah, 'in the gentle breeze'. The saying, "The bigger they come, the harder they fall", may have had some significance in the account of Saul's conversion, given his forceful and zealous nature. The main point is that many people point to the reality of conversion, and if cognitive and moral bioenhancement can set people on that path, safely and voluntarily, such enhancement could also serve a religious purpose.

5. Challenges to Moral or Religious Bioenhancement

Many philosophers, ethicists and scientists, however, say that evidence for effective cognitive and, in turn, moral enhancement by any means is not yet strong enough. I agree with those who say that the cognitive capacity for change in moral thinking needs to be high—especially for 'new' questions. Thinking through values and moral stances can be a difficult and ongoing task even for those in the field, often taking considerable time to arrive at conclusions or workable solutions. At the same time, another challenge exists in that new, ethical questions will always run ahead of us as technology develops at great speed and we will always be running to catch up, often *post factum*. I believe that partly

explains Persson and Savulescu's frustration, as well as Klincewicz' 'Moral Lag': if society cannot think fast and well enough to grasp the impact of a given moral dilemma, then why not enhance society to do so? Even were that to be a reality, we would still have the challenge of 'running to catch up', since it is impossible to anticipate the many questions science, medicine or technology throw our way.

Another challenge, already mentioned, is that ethicists disagree about many matters, not only on account of religion, but through disagreement about facts, sources of facts, values and norms. Assuming that is the case, we will never be sure what morally bioenhanced people will value after treatment. Short of piping the 'manipulator's' values and information into them, people are still going to think for themselves. Unless somehow 'enslaved' through a sci-fi brain–computer interface or chip (to date more sci-fi than actual), the voluntary and free will aspects of morality will be maintained. Interestingly, these are perhaps the aspects of the moral life about which most people agree. Prospects of having moral information 'piped' into a person raise the usual questions: whose information and whose morality? A lack of agreement on universal norms may still render the process of moral bioenhancement problematic at least from the standpoint of those with a specific moral agenda.

Another factor to be taken into account is that conversion is an ongoing process in spiritual life, involving cognitive, moral and religious change. It is difficult to see that compliance with, for example, Christian principles could be a *direct* result of moral bioenhancement through deep brain stimulation, e-memory or other uses of AI when human circumstances are so variable. The biblical parable of 'the sower' makes sense here: as Jesus tells it, some seed fell on rocky or stony ground, but some fell on fertile soil. Even that which fell on fertile soil was sometimes choked by weeds or was eaten by birds. Some seed grew and gave a hundred fold of itself: the same seed, but different soil and circumstances. At the religious and spiritual level, there is a need to leave space for the seed to work in us as unique individuals, and we discover that spiritual matters cannot be forced or compelled. Followers of Christianity learn that Jesus simply invites us to follow him, knowing that the harvest will not be one hundred fold. Whether moral or religious conversion occurs as a result of existing teaching methods or bioenhancement, I would venture to say that even under compulsion, the results are likely to be the same.

6. Conclusions

Still, cognitive enhancement is already a reality, and it looks as though it will be further developed and be more effective, at least for individuals with cognitive impairment. More people will then have improved cognition, which may in turn improve their moral thinking. We will still face disagreements about ethical theories and still run into different views of resolving those moral questions and problems. Although somewhat pessimistic, it is difficult to see that, even were it successful, moral enhancement would be able to change enough people, soon enough, to respond to more immediate global challenges such as climate change or other societal problems.

That does not mean, however, that cognitive enhancements or moral bioenhancements that are voluntary and safe are useless. If they lead to better moral thinking in individuals, they deserve a place. Better or clearer moral thinking could lead to moral and possibly religious conversion, where a person desires to change his or her behaviour, whether towards people, in choice of career, in life decisions, and so on, taking into account the values which now resonate as primary (Cf., St Paul, Scrooge—seemingly vastly different, but actually similar in experience). Moral conversion can lead us to 'see' matters in a different light and to act differently. In Canada, for example, facts have recently been revealed about the treatment of Indigenous peoples, facts that may have been deliberately concealed and obscured, while society continued in biased behaviour against these peoples, based on misinformation. When society eventually had its blinkers removed, Canada came to fully acknowledge its wrongdoing and moved to change its behaviour, a necessary

corrective in achieving justice and in allowing the process of reconciliation and healing to begin, with the intention of working towards a more egalitarian and just society.

The same process occurs in moral and religious conversion. A change in evaluative (based on cognitive) knowledge is needed first, whether sparked by spontaneous or enhanced means, leading to changed behaviour. A change in action is then needed to right the wrong that occurred, as a matter of justice. The healing process of the harm caused (sin, in religious terms) can then begin, with the person responsible for any harm resolving never to cause such harm again. Christians in Canada experienced the same moral conversion as the rest of society regarding societal treatment of Indigenous peoples over the years, but their religious convictions should have made them realize afresh how so many had abandoned or ignored their own 'Great Commandment': to love God and love one's neighbour as oneself. This does not imply love only in the affective sense, but socially and politically in accord with the important principles of social justice and the maintenance of the common good.

When it is realized how long it has taken for this wrongdoing to have been addressed, Klincewicz' point about 'moral lag' in these matters comes home to roost. Given this lag, which to future generations will appear ethically unacceptable, there is all the more reason to look for help from any sources in trying to resolve such major issues. Although there are clearly some challenges to the effectiveness of bioenhancement, advances through AI and other technologies are growing rapidly and already show potential for moral influence. With the same caveat as before as to the need for them to be safe and voluntary, their influence could be turned to great good in fostering better moral thinking and action towards achieving higher standards of individual and societal relationships.

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Article

Will Superintelligence Lead to Spiritual Enhancement?

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Abstract: If we human beings are successful at enhancing our intelligence through technology, will this count as spiritual advance? No. Intelligence alone—whether what we are born with or what is superseded by artificial intelligence or intelligence amplification—has no built-in moral compass. Christian spirituality values love more highly than intelligence, because love orients us toward God, toward the welfare of the neighbor, and toward the common good. Spiritual advance would require orienting our enhanced intelligence toward loving God and neighbor with heart, mind (or intelligence), and soul.

Keywords: intelligence; superintelligence; machine intelligence; artificial intelligence; intelligence amplification; reason; love; transhumanism; public theology; AI ethics; Knud Løgstrup

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1. Introduction

We already enhance our vision by wearing glasses. With CRISPR gene editing along with implanting artificially intelligent memory chips in the brain, could we enhance our spirituality? With the term "spirituality," I ask about motivated behavior such as moral resolve, compassion, faith in God, love of neighbor, sanctification, and deification.

Theologians routinely emphasize that healthy spirituality conforms human free will with God's will. Would technological enhancement[1] override our free will? Or, would it enhance our free will? Or, would it ignore our free will? Should we expect a morally advanced humanity in the future? (Herzfeld 2017, Introduction: Religion and the New Technologies).

No. Not if we restrict our criterion for measuring human progress to superintelligence. Why? Because the *summum bonum of* Silicon Valley is not sanctification or love of neighbor. Rather, the highest good sought here is intelligence. That is it. Intelligence. As desirable as superintelligence in either artificial or human form might be, it would have no necessary effect on moral responsibility or spiritual enhancement.

If human intelligence could be enhanced artificially by means of ML (machine learning), AI (artificial intelligence in robots), or IA (intelligence amplification through brain implants), the Christian theologian would celebrate (Herzfeld 2018, The Enchantment of Artificial Intelligence). This would count as an advance in human health and wellbeing. But, make no mistake. Enhanced intelligence in itself does not constitute an achievement of spiritual goals such as virtue, sanctification, or neighbor love. No matter how valued and respected intelligence is, moral or spiritual enhancement is something else.

2. What Is the Highest Good: Intelligence or Love?

How should we formulate the issue? Here is the problem. The goals set by ML, AI, and IA researchers as articulated especially by transhumanists are set by a vision of superintelligence. The technological destination, according to Max More and our other transhumanist colleagues, is a posthuman species augmented by superintelligence. This may be a laudable vision. However, this is not the goal of Christian spirituality, let alone the spiritual end of most religious traditions.[2]

The *trans* in transhumanism refers to the present phase of propelling both AI and IA toward the Singularity, toward the threshold where superintelligence grabs the reigns

of evolution, steers humanity toward posthumanity, and discards current *Homo sapiens*. We will become fossils of an extinct species (More 1996).[3] The "Singularity...is a point where our old models must be discarded and a new reality rules," wrote the prescient Verner Vinge (Vinge 1992).

The engineer shining the headlight on the transhumanist train is Oxford's Nick Bostrom. He describes the end station.

> Let us make a leap into an imaginary future posthuman world, in which technology has reached its logical limits. The superintelligent inhabitants of this world are autopotent, meaning that they have complete power over and operational understanding of themselves, so that they are able to remold themselves at will and assume any internal state they choose in any technological utopia we have a realistic chance of creating a large portion of the constraints we currently face have been lifted and both our internal states and the world around us have become much more malleable to our wishes and desires (Bostrom 2008, pp. 202–3).

Futurist Bostrom projects a utopia replete with humanistic values such as dignity and freedom. Yet, the path to utopia is the one-way track toward increased intelligence.[4] There is nothing in this posthuman Eden that causally links enhanced intelligence with enhanced spiritual integrity.

Despite this lacuna, technological enhancement should still attract the theologian. Why? Because both H+ and theology look forward to human transformation. Reformed theologian Ronald Cole-Turner, for example, is attracted to H+ because "human transformation is central to Christian thought" (Cole-Turner 2011, p. 5, Introduction: The Transhumanist Challenge).[5] For both critical as well as complementary reasons, the church theologian should participate in the wider public discourse. Specifically, the positive contributions of intelligence technology could benefit the common good.

Perceptive religious insights belong in this public discussion. "Religion can play an important role in assessing these technologies and shaping a beneficial outcome. Playing that role requires religion to be responsive, relevant, and prophetic in the public square," declare Tracy Trothen and Calvin Mercer (Mercer and Trothen 2021, p. 210).

It becomes the task of the public theologian, then, to board this train and ride as far as conscience will allow (Peters 2018, Public Theology: Its Pastoral, Apologetic, Scientific, Political, and Prophetic Tasks). The public theologian dare not ride to the end station because the Christian vision of human flourishing depends on love, not intelligence (Peters 2019c, Boarding the Transhumanist Train: How Far Should the Christian Ride?).

So, we must ask: what role should the religiously informed AI ethicist play? To date, AI ethics is pretty much restricted to professional ethics. AI and Faith, an organization made up of techies and theologians, is pushing the frontier further down the track toward religious engagement. What might be the implications long term, for human wellbeing or flourishing?

3. Five Concerns of the Public Theologian

Here are the implications. The public theologian has an opportunity, if not a responsibility, to engage in discourse clarification that lifts up five concerns (Peters 2019d, The Ebullient Transhumanist and the Sober Theologian).

First, contest the view that the defining feature of humanity is rationality and propose an account of spirituality that dissociates it from reason alone (Peters 2021, Enhanced Intelligence and Sanctification November).

Second, search for a way to invalidate the growing faith in a posthuman future shaped by the enhancements of ML, AI, and IA. What the public theologian sees that the transhumanist is blind to is the ambiguity of technology. Technology can be pressed into the service of evil as well as good. So can intelligence.

Third, assert strongly that it is love understood as *agape*, not rational intelligence, which tells us how to live a godly life. Love tells us how to be truly virtuous, authentically human, even holy.

Fourth, demonstrate how the transhumanist vision of a posthuman superintelligence is not only unrealistic, it portends the kind of tragedy we expect from a false messiah[6] (Peters 2019b, Artificial Intelligence, Transhumanism, and Rival Salvations).

Fifth and finally, proclaim that if, as a byproduct of AI and IA research combined with H+ zeal, the wellbeing of the human species and the common good of our planet is enhanced, then we should be grateful.[7]

4. What Is Love?

What is Love? Briefly, love comes to us in the form of divine grace and human compassion (Peters 2019a, Artificial Intelligence versus Agape Love: Spirituality in a Posthuman Age). This kind of love can be shared by smart people and not so smart people alike. It can also be shared with the animal kingdom.

> And this is his commandment, that we should believe in the name of his Son Jesus Christ and love one another, just as he has commanded us. All who obey his commandments abide in him, and he abides in them. And by this we know that he abides in us, by the Spirit that he has given us (1 John 3: 23–24).

This kind of love is known by its Greek name, *agape.* If superintelligence would be a scoop of ice cream, love of God and love of neighbor would be the hot fudge topping. Intelligence without love risks being only something cold.

Again, intelligence—whether in AI form or enhanced human form—is something to value. But intelligence alone lacks a moral compass. *Agape* love provides the moral compass that makes us godly. For enhanced spirituality, we need more than enhanced intelligence.

5. Human Intelligence and Human Reason

Yes, intelligence is a most valuable commodity. General intelligence, among other traits, marks us as distinctively human. The common good could benefit from super-general intelligence.

We *Homo sapiens*—sometimes *Homo sapiens sapiens*, to stress the point—are rational animals. According to Aristotle, we human beings are "thought-bearers" (ζῷον λόγον ἔχον, *animal rationale*). We think. We reason. Intelligence makes thinking and reasoning possible.

Today's scientists, following Aristotle, call us wise animals *Homo sapiens sapiens*, a subspecies evolving between 160,000 and 90,000 years ago from the more inclusive *Homo sapiens*.

Should we human beings think of ourselves as the pinnacle of creation? We are a unique species, right? No. Not exactly. We human beings share our intelligence with other animals. What distinguishes *Homo sapiens* is not our particular mental capacity but rather our linguistic capacity. At least, according to Terrance Deacon at the University of California, Berkeley (Deacon 2012). And now that computers are gaining linguistic capacity, how long can we maintain the delusion that we wet-brains are the kings of the beasts? Or, even the kings over our electronic progeny?

Despite what I have said about love, the capacity and exercise of reason that intelligence affords is something to be cherished. Whether computers or robots will surpass us in the future, we need to make clear that Christians and Jews in Western culture have lauded the human capacity to reason.

When the Vatican takes up the question of AI ethics, Pope Francis reaffirms that rational intelligence contributes to making us human. "All human beings are born free and equal in dignity and rights. They are endowed with reason and conscience and should act towards one another in a spirit of fellowship" (Francis 2020, Rome Call for AI Ethics).

It is reasoning power that connects the human to both God and the nonhuman machine (Peterson 2010).

Yet we must re-ask: is rationality a trait unique to our species? Do we share intelligence with animals or plants or extraterrestrial civilizations? If so, must we humans surrender our claim to uniqueness in the biosphere?

In our present era with heightened eco-consciousness, the time is ripe for emphasizing continuity rather than discontinuity between our species and other living creatures. We definitely share intelligence with animals and even single-celled organisms, although to date we do not share intelligence with computers or other machines.

Looking toward the future, it is quite possible that we *Homo sapiens* may encounter other beings of equal or superior intelligence and reasoning capacity. Our future superiors might come in the form of either robots on Earth or disembodied machine intelligence living in cyberspace on exoplanets. Let us ask: does it matter for Christian spirituality whether we humans alone bear the level of intelligence common to our species? My answer: no, it does not matter.

5.1. What Is Intelligence? Do We Humans Share Intelligence with Other Life Forms?

Intelligence is by no means the private property of our friends and neighbors within the human race. Our highly developed human reasoning exists in continuity—not discontinuity—with other living and embodied creatures.

Let us saunter down intelligence lane for a few paragraphs. The street sign reads: "Intelligence This Way." Well, what will we find when we get there?

The literature on intelligence generally avoids defining intelligence. I find this curious. Scientists dealing with this subject matter prefer to sort through degrees or levels of intelligence rather than telling us what intelligence is. They prefer to distinguish between smarter and dumber. This results in scales of intelligence, in ranks ranging from simple to complex. In short, our scientists do not typically draw lines between the total absence of intelligence and the presence of intelligence. At least in living creatures.

Shane Legg and Marcus Hutter, however, have done us a favor. They have collected definitions of intelligence. They prescribe a minimum of three components essential to any definition of intelligence: (1) agency when interacting with the environment; (2) goal setting leading to success or failure; and (3) adaptation to the environment by altering goals. In sum, "Intelligence measures an agent's ability to achieve goals in a wide range of environments" (Legg and Hutter 2006).

With this background in mind, let us adumbrate seven criteria that reveal the presence of intelligence. These criteria are roughly ranked from simple to complex. The lines between stages are blurry rather than sharp, to be sure; but levels are discernable.

Let us consider a seven-mark description of intelligence. With this list, I hope to demonstrate that very simple life forms exhibit some, though not all, marks of intelligent creatures. An organism is intelligent when it exhibits one or more of the following seven traits (Peters 2017, Where There's Life There's Intelligence):

1. Interiority: a membrane or barrier that separates the interior from the exterior environment or world; further, the interior maps the exterior to guide intentional behavior.
2. Intentionality initiated from within that relates to the without—that is, goal-oriented behavior risking success or failure.
3. Communication with the environment, including other organisms (Laird et al. 2015).
4. Adaptation: the capacity to change in order to adapt and evolve.
5. Mental activity, including reasoning in problem solving.
6. Mental activity, including self reflection and theory of mind.
7. Mental activity, including rendering sound judgment.

Our intelligence makes judgement possible. But intelligence does not in itself dictate which judgments to make. A moral compass must be added to make sound moral or spiritual judgments.

We human beings exhibit all seven marks. Many mammals exhibit similar traits of intelligence. Brainless microbes and simple organisms exhibit the first four marks. This spectrum of traits suggests that all life, from the simplest to the most complex, can be dubbed intelligent. There may be differences in levels of complexity, to be sure; yet, we *Homo sapiens* share intelligence with amoebas.

This should come as no surprise to the theologian. In Augustine's *City of God* (16.8) we find such continuity affirmed.

> But whoever is anywhere born a person, that is, a rational, mortal animal, no matter what unusual appearance he presents in color, movement, sound, nor how peculiar he is in some power, part, or quality of his nature, no Christian can doubt that he springs from that one protoplast. We can distinguish the common human nature from that which is peculiar, and, therefore, wonderful.

Augustine was including within the *imago Dei* monstrosities, unusual races, persons with mental disabilities, persons with birth defects and such. We dare not underestimate the value of rational capacity in the Christian tradition.

As said above, Aristotle and the Christian tradition were on target when describing us humans as "thought-bearers." Here is the point: we *Homo sapiens* are not alone in this. We humans may bear more abstract thoughts than amoebas, to be sure. But there is no solid line dividing human reasoning from simple cell interiority or intentionality.

If this seven-point spectrum is relevant and illuminating, then we should explore questions about its implications for the future of machine intelligence. For artificial intelligence.[8] For intelligence amplification. For meeting extraterrestrial intelligence.

5.2. Will Disembodied Intelligence Really Be Intelligent?

If we apply the above seven criteria, what is commonly called artificial intelligence or AI is not intelligent at all. AI is only a bucket of code, some of my techie friends tell me. AI is only a laundry basket of processes with rules of operation, say other Microsoft colleagues. AI may perform jaw-dropping feats of calculation, but this does not imply that intelligence is present. There is no doubt that we should applaud uproariously the computer engineers who have designed machines that learn how to provide us with answers to complex questions. Yet, *intelligence* is not the word to describe information processing, no matter how dramatic.

When we look at a computer or robot we might ask: "who is allegedly doing the thinking here?" Answer: "nobody is at home". There is no self or agent who deliberates, renders judgments, makes decisions, and takes actions.

The stated goal of the strong AI movement is to create artificial general intelligence (AGI). AGI is defined as "interactive, autonomous, self-learning agency, which enables computational artifacts to perform tasks that otherwise would require human intelligence to be executed successfully" (Mariarosaria and Florida 2018). But, alas, this goal may be furtive.

What is missing in machine intelligence? Item seven on our list of intelligence traits. ML lacks knowledge produced by sound judgment. Data classification and calculation alone does not constitute the level of judgment required for actual knowledge, let alone moral resolve.

AI in the form of DNNs (deep neural networks), for example, rely on pattern-recognition technology. And reliance on pattern recognition to classify inputs sets the limit of what DNN can accomplish. Without the capacity for judgment, DNNs can be easily fooled.

Douglas Heaven, writing in *Nature*, points out that the change in just a few pixels changes a DNN's perception from seeing a lion to seeing a library. It is easy "to make DNNs see things that were not there, such as a penguin in a pattern of wavy lines" (Heaven 2019, p. 164). No number of rules can overcome AI's lack of judgment. "Even if rules can be embedded into DNNs, they are still only as good as the data they learn from" (Heaven 2019, p. 164). Data without judgment means that Al has not yet reached stage seven.

If today's human intelligence provides the model for future AI, we are not yet close. "Robots that can develop humanlike intelligence are far from becoming a reality... [AI] still belongs in the realm of science fiction", is the observation of Diana Kwon, writing for *Scientific American* (Kwon 2018, p. 31). After six to seven decades of attempting to construct a machine with intelligence, Noreen Herzfeld concludes, the accomplishment rate is zero. "We are unlikely to have intelligent computers that think in ways we humans think, ways as versatile as the human brain or even better, for many, many years, if ever" (Herzfeld 2018, p. 3, The Enchantment of Artificial Intelligence).

So, we must ask about the H+ vision of superintelligence. Is it possible for moderately intelligent *Homo sapiens* to procreate superintelligent children? The answer depends on your philosophical assumptions. Scholastic theologians thought that the creator would necessarily be more complex and more intelligent than what gets created. "No effect exceeds its cause," said Thomas Aquinas (Aquinas 1485, II-II, 32, 4, obj. 1). This implies that God is more complex and more intelligent than us creatures. Might this classic theological principle of causation apply to today's human AI progenitors?

What should we conclude here? If the criterion by which we measure AI or machine intelligence is stage seven intelligence itself, then the criterion would be embodied intelligence. I am not likely to invite my Dell computer to determine what I should buy my spouse for Christmas or formulate public policy.

5.3. Wet versus Dry Intelligence

AI techies and H+ visionaries have so overemphasized intelligence and autopotency that relationality has faded into the background. Therefore, the public theologian must remind us how relationality remains important on two fronts: (1) the relationship of intelligence to the body, and (2) the relationship of the person to other persons. Disembodied souls of the Cartesian type are out of fashion with Jewish and Christian theologians of our era. Rather, authentic humanity as well as eschatological humanity are now thought of holistically, body included. Even in the resurrection, according to St. Paul (1 Corinthians 15:42–44), the eschatological human person lives in a spiritualized body.

In addition, every intelligence we have known to date has been wet. To be wet is to be embodied. Robotic AI and cybernetic immortality envisioned by H+ are dry, disembodied. Is this a problem theologically? (Herzfeld 2002, Cybernetic Immortality versus Christian Resurrection), (Tirosch-Samuelson 2018) Yes, indeed, according to Tracy Trothen and Calvin Mercer: "Jewish and Christian theologians, who affirm the importance of embodiment, are concerned about what they perceive (sometimes rightly) to be transhumanism's denigration of the body biological, therefore making some transhumanist projects like mind uploading theologically problematic" (Mercer and Trothen 2021, pp. 165–66).

5.4. Technologically Advanced Intelligence Would Still Be Morally Ambiguous

We have seen in history that technological advances lead to both plows and swords, firecrackers and guns, medicine and poison, communication and miscommunication. Does this apply to envisioned superintelligence as well? Yes, indeed. Intelligence has no built-in moral compass, let alone commitment. Like a teeter-totter, greater intelligence could bounce both ways: for good or evil.

Hybrid geneticist and theologian Arvin Gouw raises this challenge. He places the burden of demonstrating that H+ technological advance will have any positive influence on human moral advance.

Technologies are neutral tools by default; thus, the assumption that technology will make humanity better is a questionable hypothesis given the fact that, over the years, technologies have given birth to atomic bombs and biological weapons precisely because human nature is not neutral, unlike technology (Gouw 2018, p. 230).

ML, Al, IA, just like other technologies in our past, are morally ambiguous. They can edify. They can destroy. This applies to the concept of intelligence as well. Intelligence all

by itself feels no compassion, no love, no responsibility for the welfare of either humanity or the planet.[9]

Methodist theologian Alan Weissenbacher cautions us that technological advance could backfire. "Instead of salvation...technological advances represent a new set of benefits as well as challenges to overcome, particularly the tendency of human technical creations to reflect the sins of their creators even under the best of intentions" (Weissenbacher 2018, p. 69).

Perhaps Carmen Fowler LaBerge provides the most fitting recognition of moral ambiguity. "From a Christian worldview, technology is not inherently good nor evil. Technology is morally benign but we are not. Human beings who develop and use technology are moral agents who stand responsible before God who defines the boundaries of good and evil. So, part of what Christians bring to the transhumanist conversation is the question of should" (LaBerge 2019, p. 774).

Might we sidestep this ambiguity by pressing technology into the service of educating the person or community who is already committed to a life of virtue? After all, making practical decisions in pursuit of the common good will require knowledge and informed judgment. A bioethicist at Santa Clara University, Brian Patrick Green, invites AI technologies into the service of virtue education. Virtual reality would contribute to Virtue itself. AI as a pedagogical tool could accelerate educational programs, "raising up future generations to be prepared for the difficult situations they will face, by experiencing, through a VR education personalized by AI, vastly more moral situations and their best solutions, than contemporary people could hope to experience, even with immense effort" (Green 2018, p. 227). What Green has done here is turn AI into a means toward virtue as the end.

5.5. Confusing the Penultimate with the Ultimate

Let us turn now to distinguishing means from ends. Or, what is penultimate from what is ultimate.

The snarling nemesis of H+, Francis Fukayama, complains that H+ visionaries confuse the penultimate with the ultimate. He asks rhetorically: do transhumanists "really comprehend ultimate human goods?" (Fukuyama 2004)

No, adds Adam Willows at Notre Dame. What do the transhumanists value? "Health, wellbeing, longevity (even immortality), mental activity, reliable memory and social benefits such as increased equality and liberty—these are all important things offered by the transhumanist project," Willows observes. "All of them are valued by theologians and bioconservatives. However, none of these goods are ultimate goods" (Willows 2017, p. 179).

In the neo-orthodox tradition of Reinhold Niebuhr, Paul Tillich, and Langdon Gilkey, substituting the penultimate for the ultimate risks inviting the demonic. We will take this in two steps. First, the technological reason that imbues H+ cannot on its own apprehend what is ultimate. "Technical reason," observes Tillich, "provides means for ends, but offers no guidance in the determination of ends" (Tillich 1989, 2:168).

Second, when a person or a culture confuses means with ends or penultimate values with what is ultimate, beware! The demonic is lurking in ambush. Gilkey sounds the alarm. "Perhaps the unique insight of a Christian interpretation of the human predicament is, first, that only God is God, and, second, as a consequence, all else even the most creative aspects of our human existence, are not absolutely good, good in themselves, but possess the possibility of the demonic if they are made self-sufficient and central" (Gilkey 1980, p. 34).

This is what Willows picks up. "Life and power by these [H+ technological] means is not desirable because it cultivates the vice of pride and causes us to forget that our good is to be found in God, not our own endeavors" (Willows 2017, p. 179).

Health and wellbeing and enhanced capacity to reason are all good things. Every theologian and moralist would agree. So, the question raised by H+ and its technologies is this: what is ultimate? When it comes to matters of faith or virtue or holiness, it is love that

matters most. Love as a moral end seems to get lost in the transhumanist fog that confuses the penultimate with the ultimate.

6. What Is Our Spiritual End? Intelligence or Love?

It is love, not enhanced intelligence, that is the spiritual end for the Christian.

To demonstrate, let us turn to the interpersonal dimension of the human reality. To be a human person is to be a person-in-relationship with other persons. The very relationality of relationship includes within it a moral demand to love. Realization of our being a person-in-relationship produces an inescapable ethical demand, according Danish philosopher Knud Løgstrup (1905–1981). This ethical demand belongs to our very ontology, as human beings.[10]

To be is to be a person-in-relationship. Løgstrup observes that this relationship entails the demand that we serve the wellbeing and even the flourishing of the other party with whom we share a relationship. When we wake up to a consciousness of our own being-in-the-world, we find that we are not individuals first who then add relationships. Instead, we find that whatever individuality and responsibility we have derive from a prior nexus of concrete relationships. We are interdependent. This interdependence, contends Løgstrup, entails a silent yet potent commandment. What is that commandment? Love your neighbor! Our responsibility is inescapable.

By our very attitude to one another we help to shape one another's world. By our attitude to the other person we help to determine the scope and hue of his or her world, we make it large or small, bright or drab, rich or dull, threatening or secure (Løgstrup 1997, p. 18).

Before this becomes a commandment delivered by God to Moses on Mount Sinai, neighbor love has already belonged inherently to our human condition, even if the existence of the commandment acknowledges that sinful humans sometimes fail to shoulder their moral responsibility.

Løgstrup, following Martin Luther before him, believes each of us can serve as "daily bread" for those around us. Our impact on another person may be a very small matter, involving only a passing mood, a dampening or quickening of spirit, a deepening or removal of some dislike. But it may also be a matter of tremendous scope, such as can determine if the life of the other flourishes or not (Løgstrup 1997, 5 1516).

Jesus' double commandment is to love God and neighbor. "Love for neighbor is the concrete way in which we love God," observes Karl Rahner (Rahner 1978, p. 447). Could any technology—whether ML, AI, IA, or genetic engineering—enhance the human capacity for loving? For virtuous living? For sanctification or deification?

6.1. Genetically Engineered Spiritual Enhancement?

The possibility of moral bioenhancement is widely discussed among today's bioethicists. "We argue, moral bioenhancement should be sought and applied," say Ingmar Persson and Julien Savulescu (Persson and Savalescu 2013, p. 124). But, Valjko Dubljec and Eric Racine fear that "moral enhancement is not feasible in the near future as it rests on the use of neurointerventions, which have no moral enhancement effects or, worse, negative effects" (Dubljevic and Racine 2017, p. 338). We will not wait for this debate to come to a resolution before proceeding.

We should thank neuroscientists who search for means of motivating behavior. We have learned that pharmaceuticals can influence moral dispositions and spiritual receptivity. Yet, the matter of following a lifelong path of virtuous behavior or service to God dare not avoid one central question: what is the role of human free will, sound judgment, and moral resolve?

Because spiritual or moral enhancement requires the willful participation of an embodied self, genetic or other technological enhancements will most likely fall short. Asking AI to guide CRISPR gene editing into making us or our babies more intelligent simply will

not lead to enhanced virtue, holiness, sanctification, *theosis*, or deification. Really? Let us look into this.

Mark Walker's Genetic Virtue Project assumes that technological alteration can contribute to spiritual enhancement. Genetic technology becomes equipment in soul building. Walker is following in the tradition of Irenaeus in which the process of *theosis* or deification conforms the virtuous person to the "likeness of God" (Genesis 1:26–29).

Soul building can benefit from technologically enhancing the biological superstructure of our humanity. In particular, genetic engineering can enhance human virtue. The biological basis of our moral natures can be improved using genetic technologies, including (possibly) somatic and germline engineering (Walker 2018, p. 251).

Not so fast! Bioethicists seem to operate with an anthropology that precludes any technology, including genetic engineering, from doing our moral work for us. "It is fruitless to attempt to genetically engineer virtuous living," trumpets virtue ethicist Lisa Fullam. Why? "Traits given at birth are not the same thing as a virtuous character that can be acquired only by self-discipline" (Fullam 2018, p. 319). In other words, a virtuous character cannot be pre-programmed. It can be gained only through willful self discipline over time. Virtue could be attained through self-discipline regardless of one's genome.

What about sanctification, *theosis,* and deification? Not likely, according to Ukrainian Orthodox biologist Gayle Woloschak. Even so, she attempts to make as balanced an assessment of the technology as possible. Even if genetic technology provides us with a moral jump, so to speak, two contingencies make the outcome unpredictable: our human will and God's action. Our ability to find genes associated with virtuous behavior is very limited...Deification, which is a gift from God freely chosen by the individual and God working together in synergy, is open to every human person. (Woloschak 2018, p. 306.)

The problem with technological enhancements of any sort, observes Ronald Cole-Turner, is that they aim at enhancing the self. This is a problem. Why? Because genuinely Christian virtue is aimed at loving others even at the expense of oneself. In principle, this would preclude *theosis* or deification. "Human enhancement technologies tend to feed off the desire to expand the self," observes Cole-Turner; "while *theosis* is grounded in the idea that true divinization means we become like God in God's own kenosis of self-giving love." With this in mind, Cole-Turner can conclude that "the use of human enhancement technology is largely a matter of indifference" (Cole-Turner 2018, p. 330, Theosis and Human Enhancement).

Notice how Cole-Turner introduces kenosis, self emptying. In Hellenistic virtue, the self empties itself on behalf of an ideal such as truth, beauty, or justice. This produces a person of integrity—that is, a personality integrated around the ideal.

In Christian virtue, the self empties itself in loving God and in loving the neighbor. The resulting integrity becomes the virtuous life. Can such personal integrity be enhanced by enhanced intelligence? Not likely. Level of intelligence becomes a matter of indifference.

6.2. Again: What Is Love? The Common Good

Integrity gained through self-emptying love leads to a vision of the common good.

When society loves God by loving the neighbor, it strives to serve the common good. Universal health care stands out. Could ML, AI, and perhaps IA enhance health care? It already has. And it promises more. Moira McQueen lifts up the promise.

> Artificial intelligence has vast potential, and its responsible implementation is up to us. One way to do that would be to ask and implement the wise principles of Catholic Social Teachings: do these ways of developing health care respect the individual dignity of the patient and patient carers? As systems, do they enhance the common good and benefit human flourishing? (McQueen 2018, p. 4.)

This promise requires the human will to press ML, AI, and IA into the service of the common good. If superintelligence, either in robots or persons, enhances the common good, Christians should do cartwheels in applause.

6.3. Again: What Is Love? Compassion Is Essential

Compassion is indispensable for motivating us to neighbor love and the common good. Compassion is the capacity to feel the passion or pain of the beloved one. Our inherited term for compassion, *compassio*, connoted in medieval times an emotion, the feeling of sorrow for the misfortune of others. Compassion includes mercy, love arising out of emotion rather than reason. "The horizontal charity was understood in terms of a compassionate attitude, which in some way imitated God's mercy" (Knuuttila 2019, p. 266).

Compassionate love could require kenosis, self sacrifice. Mathematical cosmologist George Ellis together with philosophical theologian Nancey Murphy describe spirituality in terms of kenotic love. As agape love, kenotic love is willing to sacrifice on behalf of the welfare of the neighbor.

> This kenotic ethic—an ethic of self-emptying for the sake of the other—is in turn explained and justified by a correlative theology: the kenotic way of life is objectively the right way of life for all of humankind because it reflects the moral character of God. (Murphy and Ellis 1996, p. 17.)

Would enhanced intelligence enhance our compassion? No, not likely. At least according to Roman Catholic theologian Ilia Delio.

> Simply put, technology cannot fulfill our deepest capacity for love. From a Christian perspective, the crucified Christ stands as symbol of the world's openness to its completion in God. God suffers in and with creation so that we do not suffer alone. Suffering is a door through which God can enter and love us in our human weakness, misery and loneliness. As we suffer loss, so too God experiences our loss, remaining ever faithful in love. This compassionate, loving presence of God is our hope that suffering and death are not final but are a breakthrough into the fullness of life up ahead. (Delio 2020)

Despite her demure here, Delio greets with glee the transhumanist promise of a future superintelligence. But she would prefer putting this in Teilhardian terms. Pierre Teilhard de Chardin (1881–1955) was intrigued by computer technology and its potential to link humankind on a new level of a global mind, she tells us. For this reason, Teilhard can be viewed as a forerunner of transhumanism (de Chardin 1959).

Nevertheless, Delio avers, Teilhard's theological vision is not about enhancement. Rather, it is about transformation. Delio points out that Teilhard recognized how suffering and death are invaluable to the emergence of unitive love. This unitive love is exemplified in the death and resurrection of Jesus Christ. Teilhard's vision helps us realize that suffering in nature may appear to be erratic and absurd. Nevertheless, in light of God's kenotic love, suffering is oriented toward freedom and the fullness of love. (Delio 2020)

7. Conclusions

In sum, Christian spirituality places all its marbles in a single bag labeled, "love". Compassionate or even self-sacrificial love could appear among the smart and the not so smart among us. Superintelligence could not, all by itself, generate superlove. In *Laudato Sí*, Pope Francis waxes with eloquence.

> Love, overflowing with small gestures of mutual care, is also civic and political, and it makes itself felt in every action that seeks to build a better world. Love for society and commitment to the common good are outstanding expressions of a charity which affects not only relationships between individuals but also macrorelationships, social, economic and political ones. (Francis 2015)

Will technological progress toward superintelligence lead to spiritual enhancement? Not automatically. What must be added to intelligence at any level is the willful decision to act morally, show compassion, pursue holiness, and live the life of virtue.

For the Christian, the love of the heart takes precedence over the genius of the mind. This is the case even if the genius of the mind is to be treasured when we love God with heart, mind, and soul (Matthew 22:37).

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Notes

1 "The term enhancement is usually used in bioethics to characterize interventions designed to improve human form or functioning beyond what is necessary to sustain or restore good health" (Juengst 1998, p. 26).

2 For the Muslim, God-consciousness is much more important than advanced technology. "While the modern movement towards transhumanism aims to improve sensory perception by way of scientific intervention, Islamic transhumanism calls on believers to improve and purify their perceptions by way of God-consciousness, brought about increasing in remembrance of God. It might be argued that a Muslim's transhumanist goals are directly tied to their devotion to God, rather than mastery of secular science. This difference embodies the fundamental difference between an Islamic transhumanism and secular transhumanism" (Mobayed 2017). Posthuman refers to "a person who can co-exist in multiple substrates, such as the physical world as a biological or semi-biological being. The future human . . . will live much longer than [today's] human and most likely travel outside the Earth's orbit" (Vita-More 2018, p. 31).

3 "The Singularity movement is a kind of secular religion promoting its own apocalyptic and messianic vision of the end times" (Grassie 2011, p. 264).

4 Forecasts of superintelligence prompt existential questions. When I am replaced with a machine more intelligent than I am, will I drop from being into non-being? Dylan Doyle-Burke, writing for *Psychology Today*, alerts us. "They [technological advances] can make us feel out of control, disoriented, and isolated. However, there are steps we can each take to flourish in our new normal without losing our agency or integrity".

5 In the biblical tradition, transformation and renewal are initiated by divine grace. Unitarian Universalist theologian Myriam Renaud offers a blessing. "When you get stuck—in self-destructive habits, unjust systems, or simply the daily grind—may grace set you free, whatever your theology".

6 When CRISPR genetic enhancement becomes implemented, the risk of eugenics shadows the ideal. "The new eugenics could . . . be implemented on a quite individual basis, in one generation, and subject to no existing restrictions", writes Michael Sandel (Sandal 2004, I l). To avoid the eugenic scenario, we need to treat our children with dignity, appreciating how nature gives them to us. "To appreciate children as gifts is to accept them as they come, not as objects of our design or products of our will or instruments of our ambition" (Sandal 2004, p. 6).

7 Just how close should the alliance be between Transhumanism and Christian anthropology? Celia E. Deane-Drummond worries about me. "I am rather more wary of the slide from enhancement to transhumanism than are authors such as Ted Peters" (Deane-Drummond 2009, p. 259). Because of the moral ambiguity exhibited by technological advance, I recommend the Christian theologian board the transhumanist train and then get off when approaching danger.

8 Laura Ammon and Randall Reed ask whether Christian churches will recognize AI entities as neighbor and invite AI into church membership. "The history of Christianity offers ample strategies that would allow the acceptance of these entities. In fact, if the decline in church membership continues at current rates, it may be that churches will see an advantage to incorporating AI's as a way of stemming member loss".

9 I do not imply that transhumanists themselves are amoral or immoral. "Transhumanism seeks an ethical approach to the use of technology and evidence-based science to study and mitigate disease" (Vita-More 2018, p. 46). According to Micah Redding, founder of the Christian Transhumanist Association, "Christian Transhumanists will continue to advance the vision of a radically flourishing future that is good for all life" (Redding 2019, p. 794).

10 Daekyung Jung makes an argument parallel to that of Løgstmp by appealing to the East Asian notion of xiang. In order to circumvent the self-centered epistemology of transhumanism, Jung wants to "reinstate a holistic, non-selfcentered, essence-based, and dynamic-relational vision of the human and beyond... The theology of xiang proposes seeing the xiang (i.e., essence) of every being, including the self, in terms of the act of knowing... [which] means looking at the particular being and its environment simultaneously in the spatial sense, and it also means understanding its history in the temporal sense" (Jung 2019, p. 525).

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