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Extending the Transhuman Person: Religious Practices as Cognitive Technological Enhancements

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Abstract: Transhumanism embraces the use of technology to enhance human capabilities. In keeping with traditional theories of cognition, transhumanists typically assume that mental capacities are organism-bound (or brain-bound), and enhancement is thus achieved exclusively by modifying the human organism. However, 4E cognition challenges this assumption. Instead, understanding the mind as extended or scaffolded highlights how cognitive processes recruit environmental resources to perform their tasks. Therefore, as Andy Clark argues, cognitive enhancement is no longer restricted to modifications of the biological organism but is also achieved by using cognitive tools or niches that allow brain–body–world coalitions to perform more efficient or more sophisticated cognitive functions. Hence, humans are 'natural-born cyborgs' who have long been using environmental resources to enhance cognitive abilities. In this article, I extend this analysis to religion. Drawing on recent work on 4E cognition in religious practices, I argue that religious practices can themselves be understood as 'cognitive technologies' that count as enhancements. These insights from cognitive science serve to reframe the dialog between Christian theology and transhumanism: (1) enhancements are reframed as belonging to a long history of self-modification, rather than being the sole purview of the future, (2) humans should be understood as intrinsically technological, and (3) theologians are already in the enhancement game and, conversely, transhumanists should consider religious practices.

Keywords: embodied cognition; 4E cognition; extended mind; transhumanism; Andy Clark; religious transhumanism; cognitive technology; theological anthropology; cyborg

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1. Introduction

In a climactic scene in the film *The Matrix*, some of the protagonists operating inside the Matrix (a large world-sized virtual simulation in which most of humanity is held captive) are cornered by their adversaries. To survive they must make a quick escape from the top of a high-rise building and their only way out is a helicopter sitting on the rooftop. The problem is none of them know how to fly a helicopter. One of the characters contacts their 'operator' (a colleague outside the simulation) and relays the model of the helicopter that he wants to fly. In a memorable transhumanist moment, the operator finds the corresponding disk, uploads it directly into the character's brain through a plug in the back of their neck which also hooks them into the simulation, and—hey presto—they gain the requisite knowledge and skills to fly the helicopter in front of them. In many ways, this represents the paradigmatic transhumanist enhancement, some new ability effortlessly added to the human mind through an impressive technological intervention. The technology is 'injected' into the human organism (here specifically the brain), and provides it with new, enhanced abilities.

As it happens, the US Navy has already developed a technology that allows personnel without any flight training to fly a helicopter. However, it does not involve invasively altering anyone's brain to 'download' the requisite knowledge and skills. Instead, the untrained pilot wears a special suit that translates their body movement into helicopter instructions and uses jets of air to give them feedback on the helicopter's orientation. Clark describes the 'tactical flight suit' as follows:

> The suit (a kind of vest worn by the pilot) allows even inexperienced helicopter pilots to perform difficult tasks such as holding the helicopter in a stationary hover in the air. It works by generating bodily sensations (via safe puffs of air) inside the suit. If the craft is tilting to the right or left or forward or backward, the pilot feels a puff-induced vibrating sensation on that side of the body. The pilot's own response (moving in the opposite direction to correct the vibrations) can even be monitored by the suit to control the helicopter. The suit is so good at transmitting and delivering information in a natural and easy way that military pilots can use it to fly blindfolded. While the pilot wears the suit, the helicopter behaves very much like an extended body for the pilot. . . (Clark 2008, p. 36)

When worn, the suit creates what Clark calls a 'new agent-world circuit' which achieves such fluency that the presence of the technology is 'transparent': it feels like the pilot is directly maneuvering the helicopter rather than interacting with an external object.

Leaving aside the question of whether a Matrix-style enhancement is technologically possible, either at present or in the future, I introduce these two examples to prime our thinking about two contrasting ways to conceptualize technological enhancements. The neural download is 'internal'—somehow modifying the would-be pilot's brain to give them new knowledge and skills. The tactical flight suit is 'external', modifying the organism's immediate environment to provide the necessary feedback and control so that they can use their existing mastery of bodily movements to pilot the helicopter. Crucially, both achieve the exact same cognitive goal: they confer the ability to fly a helicopter while short-circuiting the need for a lengthy pilot training program.[1] Hence, they raise the following question: Is there any material difference between the internal and external enhancements, given that they both perform the same function?[2]

In this article, I show that classical articulations of transhumanism often presume that enhancements, including cognitive enhancements, are of the internal kind: they are organism-bound. However, in light of the view that the mind is extended, or at the very least scaffolded by external resources in the environment, then such a restriction is an unwarranted example of 'bio-chauvinism'. Hence, following Clark's (2003) proposal, we are 'natural-born cyborgs', since we already engage in heavily structuring our environments to allow us to perform cognitive tasks, or to perform them more efficiently. I then extend (pardon the pun) this analysis to the case of religious practices, to argue that these practices can count as cognitive technologies that potentially provide certain kinds of human enhancement. Finally, I explore some implications that this view has for the dialog between Christian theology and transhumanism.

2. Transhumanism and Organism-Bound Enhancement

There are a number of different versions of transhumanism and posthumanism, and Jeannie Thweatt notes the importance of specifying which variant one is discussing (Thweatt-Bates 2016). In this article, I focus on Nick Bostrom's (2003) strand of transhumanism as classically articulated in his *Transhumanist FAQ*.[3] That document offers the following definition of transhumanism:

> The intellectual and cultural movement that affirms the possibility and desirability of fundamentally improving the human condition through applied reason,

> especially by developing and making widely available technologies to eliminate aging and to greatly enhance human intellectual, physical, and psychological capacities. (Bostrom 2003, p. 4)[4]

In this article, I set aside enhancements relating to longevity and physical capabilities, and focus on cognitive enhancement.

Any discussion of human enhancement requires a working conception—be it explicit or implicit—of the human who is to be the target of enhancement. One of the ways in which Bostrom (2003, p. 4) conceptualizes the human is to identify it with the human organism: 'Just as we use rational means to improve the human condition and the external world, we can also use such means to improve *ourselves*, *the human organism*' (emphasis added). Hence, the self is identified with a biological category, 'the human organism', which is typically bounded by the skin. This understanding of the human self is simply asserted in passing rather than explicitly argued for or defended, and this is perhaps unsurprising given the intuitive pull of such a commonplace understanding.

If the human self is identified as coterminous with the organism, this identification will also inform how enhancement is envisaged: namely, any human enhancement will require modification of the biological organism. Bostrom (2003, p. 6) indeed confirms that this is what he has in mind when he proposes that '[r]adical technological modifications to our *brains and bodies* are needed' (emphasis added). The connection is clear: if the human self is coterminous with a biological organism, then enhancements of the self require alternation of that very same organism. Hence, the working understanding of enhancement in Bostrom's transhumanism is that it is *organism-bound*.

Along similar lines, Harari acknowledges the pervasiveness of human reliance on technology: 'In a sense, nearly all of us are bionic these days, since our natural senses and functions are supplemented by devices such as eyeglasses, pacemakers, orthotics, and even computers and mobile phones (which relieve our brains of some of their data storage and processing burdens)' (Harari 2011, p. 453). He thus even gestures towards the notion of distributed cognition which we shall examine in the next section. However, he continues stating, 'We stand poised on the brink of becoming true cyborgs, of having inorganic features that are inseparable from our bodies, features that modify our abilities, desires, personalities and identities' (Harari 2011, p. 453). Hence, for Harari too, 'true' cyborgism is organism-bound.

As mentioned, an organism-bound view of enhancement has a certain intuitive attraction. In the case of eliminating aging, the organism is an obvious target for modification as it is the entity whose longevity is at stake. Likewise, if human physical capabilities are first and foremost the purview of the human body, then physical enhancement would also seem to require 'upgrading' the human organism. However, one can also think of fuzzy cases where it is not clear that an enhancement is limited to an organism. If air quality is an important factor in longevity; does improving air quality count as an enhancement? What about an exoskeleton designed to increase human strength? Is it an organism-bound enhancement even though it is external to the skin? Even if one allows for augmentations that are directly attached to the biological organism (as in the case of an exoskeleton), then what of technologies such as robotic arms that allow surgeons to perform remote surgery? These examples suggest that, even in the case of longevity or physical enhancements, it is not entirely clear-cut that all enhancements are necessarily organism-bound.

When we turn to the case of cognitive enhancements, recent theories of 4E cognition propose accounts of cognition that are anything but organism-bound. Instead, cognition is understood to be extended into, or at least scaffolded by, resources in the environment. Moreover, on this distributed view of cognition, the creation of new cognitive niches can dramatically reshape the capabilities of a cognitive agent (as the example of the tactical flight suit demonstrates). Hence, we shall now turn to distributed accounts of cognition before considering how they might challenge an organism-bound view of enhancement.

3. Distributed Cognition

In their classic article, 'The Extended Mind', Clark and Chalmers (1998) put forward two contrasting cases in which two characters solve the same cognitive task: remembering the directions to a museum. Inga recalls the directions in her biological memory and Otto, who suffers from Alzheimer's, uses a notebook that he always carries with him to recall the directions. Using a parity argument, they contend that since the biological memory and the notebook both fulfill the same function, the information stored in the notebook can be said to form the content of Otto's belief about where the museum is located. They conclude that 'The moral is that when it comes to belief, there is nothing sacred about skull and skin. What makes some information count as a belief is the role it plays, and there is no reason why the relevant role can be played only from inside the body' (Clark and Chalmers 1998, p. 14). They conclude that the mind is therefore not limited to the brain, the central nervous system, or even the organism, but cognitive tasks can be conducted by coalitions of resources spanning across the brain, body, and world.

Beyond the Otto and Inga thought experiment, advocates of extended cognition have identified real-world examples of cognitive tasks that recruit environmental resources. Kirsh and Maglio (1992) discuss the case of expert players of the Tetris computer game. Instead of rotating mental representations of the Tetris blocks (or 'zoids') in their minds to determine where they will fit, players rotate the blocks to help identify their shape and often begin by moving them against a side wall to ensure they will be lined up in the correct column. Hence, the players did not rely solely on representations in the mind but used perception-action loops to improve their speed. Similarly, Gray and Fu (2004) ran an experiment in which participants programmed a VCR simulation on a screen (a now outdated recording device, which could be programmed to record a television show scheduled to be broadcast on a particular channel at a particular time). The experimenters varied conditions so that participants could access the television show information via (1) using their eyes to see it displayed, (2) using a mouse click to reveal the information, or (3) retrieving the information from biological memory. They found that participants used whatever strategy could access the information the fastest, regardless of whether the information was internal (i.e., in biological memory) or external.

Since the publication of the original extended mind article, the thesis has been widely discussed and critiqued (for a useful survey, see Menary 2010). The original article already attempts to pre-empt various lines of critique, and Clark (2008) further develops and defends the thesis. It is not within the scope of this paper to evaluate all of the debates surrounding the extended mind thesis. For the purposes of the argument advanced here, a more modest picture of 'scaffolded cognition' will suffice.

The notion of scaffolded cognition is proposed by Sterelny (2010). Although he does not rule out the existence of genuine cases of extended mind, he argues that if these exist they lie at one extreme of a spectrum of cases; in the middle of this spectrum lie a wide range of cases in which cognition depends on environmental resources, without these external resources necessarily constituting the mind. Drawing on niche construction from evolutionary models, Sterelny suggests an analogy between cognition and digestion:

> Our under-powered jaws, short gut, small teeth and mouth fit our niche because we eat soft, rich and easily digested food. Our digestive system is *environmentally scaffolded*. But is my soup pot, my food processor and my fine collection of choppers part of my digestive system? As far as I know, no one has defended an

> extended stomach hypothesis, treating routine kitchen equipment as part of an agent's digestive system. . . (Sterelny 2010, p. 468)

Similarly, there may be a range of environmental resources that aid our cognition, and significantly reshape the parts of cognition that are handled by the biological organism. Even if these external resources do not constitute part of the mind, they nevertheless scaffold it so as to create a new cognitive niche that makes it possible or easier to perform certain cognitive tasks. Provide someone with ready access to a calculator, and their incentive to perform complex mental arithmetic is greatly reduced and may well atrophy (Davison 2024, p. 166).

Crucially, scaffolded cognition does not (necessarily) include the controversial claim in the extended mind thesis that extra-corporeal entities can be part of the mind. It thereby obviates much of the criticism leveled against the extended mind thesis. For example, Adams and Aizawa's (2001, 2010) critique the use of 'coupling' as a criterion for identifying instances of extended cognition. In coupling, the output of one step of a cognitive process becomes the input for a subsequent step, such as when one writes a number on paper in long multiplication for later use in solving a mathematical problem (Shapiro 2011, pp. 175–78). Adams and Aizawa argue that such 'coupling' does not entail that the external resources constitute parts of the mind (the so-called 'coupling-constitution' fallacy). A scaffolded view of cognition side-steps this critique by stopping short of the claim that scaffolds are part of the mind, whilst nevertheless highlighting the often significant role that external resources play in supporting or enabling certain cognitive tasks.

It is worth noting that Clark (2008, pp. 111–39) is aware of something like the scaffolded position, when he responds to Rupert's hypothesis of 'embedded' (rather than extended) cognition. According to Rupert's (2004, p. 393) view, 'cognitive processes depend very heavily, in hitherto unexpected ways, on organismically external props and devices and on the structure of the external environment in which cognition takes place.' However, this dependence does not entail that the mind extends beyond the skin. In light of this alternative, Clark defends his extended mind hypothesis, reiterating the parity principle (that internal and external resources serve the same cognitive function), and pointing to empirical examples where humans are impartial when choosing between internal and external cognitive resources, favoring whichever is easier to access (such as the VCR programming study).

His defense notwithstanding, Clark nevertheless sees the value in alternative theories. For example, he is willing to qualify his position by adding the auxiliary hypothesis that cognition is organism-centered (but not bound), to emphasize that it is the organism that recruits external resources into 'soft-assemblies' for a particular cognitive task (Clark 2008, p. 139). Moreover, Clark is honest about the status of the extended mind as a hypothesis or research program that is in need of further investigation rather than a relatively settled theory with a broad and well-established evidential base. Indeed, a primary purpose of these hypotheses is that they generate new ways of conceptualizing cognition which in turn lead to novel questions and lines of research. Emphasizing the need to remain open-minded given the nascent state of the theories he discusses, Clark writes,

> We should not feel locked into some pale zero-sum game. As philosophers and as cognitive scientists, we can and should practice the art of flipping among these different perspectives, treating each as a lens apt to draw attention to certain features, regularities, and contributions while making it harder to spot others or to give them their problem-solving due. (Clark 2008, p. 139)

Hence, one of the attractive elements of Clark's rhetoric is its epistemic humility: he is quick to acknowledge the limitations of empirical evidence as it currently stands and therefore open to future modifications of his views. Given the tentativeness of the conclusions of some of even the most vocal proponents of the extended mind, I shall adopt the less controversial and less metaphysically ambitious (or less extravagant, as critiques might have it) view of scaffolded cognition, which nevertheless remains open to the prospect of genuine cases of an extended mind. The scaffolded view preserves the insight garnered from numerous examples that human cognition intimately depends on environmental resources. With this view of the human cognitive agent as one who readily solves real-world problems by regularly recruiting environmental resources, we turn our attention to the implications this picture has for human enhancement.

4. Distributed Enhancement

A scaffolded view of cognition poses a direct challenge to organism-bound versions of human enhancement which we detected in transhumanism. It does so by revealing that there are multiple possible routes to enacting human enhancement. Directly modifying human organisms is one such route, but it is no longer the only one. If cognition is scaffolded it can equally be enhanced by providing it with better cognitive tools or environments designed to provide enabling cognitive niches. (Of course, these two options are not mutually exclusive—an enhancement may leverage the interconnectedness of internal and external cognitive resources and modify both). To return to our opening example, the Matrix-style neural download and the tactical flight suit both provide a would-be pilot with new capabilities. Hence, to adapt Clark and Chalmers' parity argument, if both types of modification achieve the same new capacity, both have equal claim on being enhancements. To insist that only modifications to the human organism count as enhancements seems to be a clear example of the 'bio-chauvinism' which Clark cautions against: an unwarranted privileging of biological substrates of cognition over other ways of performing cognitive tasks.

The working definition of an enhancement here is anything that makes possible (or increases) a capacity. Crucially, on a scaffolded picture a 'capacity' is not determined by the organism alone, but is co-determined by the organism and its environmental resources. To motivate this point, one can draw inspiration from the notion of 'affordances' in Gibsonian ecological psychology. For Gibson (1979), an affordance depends on *both* the organism *and* the environment. A chair affords sitting for a human being, but it affords something quite different to a mouse; hence the affordances of a chair are relative to the organism. Likewise, the affordances that are present to an organism depend on the resources available in the environment; a room with a chair presents different affordances to a room with a bookshelf. Thus, the notion of an affordance is co-determined by the organism and its environment; one needs to know something about both to describe the affordances present. Similarly, on the scaffolded picture, cognitive capacity is co-determined by the organism and its environment. Enhancements can therefore modify capacities by alternating the organism or its environment (or both). Hence, a distributed view of enhancement does not rely on the 'person', the 'self', or even the 'mind' being directly enhanced.

Clark himself has seen and articulated this implication of re-thinking cognition in his account of humans as 'natural-born cyborgs':

> I am slowly becoming more and more a cyborg. So are you. . . without the need for wires, surgery, or bodily alterations. . . Perhaps we already are. For we shall be cyborgs not in the merely superficial sense of combining flesh and wires but in the more profound sense of being human-technology symbionts: thinking and reasoning systems whose minds and selves are spread across biological brain and nonbiological circuitry. (Clark 2003, p. 2)

Here, Clark shows that the stereotypical ways of conceiving of a cyborg—say a neural implant, a powerful prosthetic limb, or an otherwise 'bio-hacked' body—are not required to achieve human-technology hybrids. Rather, our reliance on technological resources (broadly construed) for our everyday cognition need not be nearly so exotic. Clark identifies two (overlapping) ways in which our external technological enhancement takes place. First, we readily wield cognitive tools:

> . . . human brains repeatedly create and exploit various species of cognitive technology so as to expand and reshape the space of human reason. We—more than any other creature on the planet—deploy nonbiological elements (instruments, media, notations) to complement our basic biological modes of processing, creating extended cognitive systems whose computational and problem-solving profiles are quite different from those of the naked brain. (Clark 2003, p. 78)

Second, although humans are by no means unique among animals in reshaping their environments, they have become particularly adept at creating cognitive niches that already substantially enhance our cognitive capacities:

> We then begin to actively structure our worlds. . . in ways that help promote better thinking. Soon, we inhabit a world not simply adapted to our bodily needs (with heating, clothes, and cooking) but to our cognitive strengths and weaknesses. All of art, science, education, and culture, I shamelessly speculate, is testimony to this runaway process. . . The biological organism is just one part of the chameleon circuitry of thought and reason, much of which now runs and flows outside the head and through our social, technological, and cultural scaffoldings. (Clark 2003, p. 82)

Thus, from a cognitive perspective, humans are already natural-born cyborgs given the many ways in which they augment their cognitive capacities. It is worth noting that in the previous two quotations, Clark takes a broad view of what might count as cognitive modifications; a far broader view than the kinds of phenomena that would fulfill the criteria for counting as examples of 'extended mind' (see Clark and Chalmers 1998, p. 17). Moreover, he not only talks about 'scaffoldings', but also describes 'structuring of worlds' for cognitive purposes in a way that is consistent with Sterelny's account of cognitive niche construction in scaffolded cognition. Thus, it is my contention that Clark's argument that humans are natural-born cyborgs is not contingent on the extended mind thesis. Instead, Clark's own articulation of natural-born cyborgs shows that a scaffolded view of cognition is sufficient to motivate an account of distributed enhancement.

But what makes something a candidate for being identified as a cognitive enhancement?[5] Not all of the resources in our context serve as modifications all of the time. Establishing some criteria for identifying instances of distributed enhancement will be a helpful tool when we turn our attention to religion in the next section. Clark proposes two such criteria:

> First, we care about the potential of technology to become integrated so deeply and fluidly with our existing biological capacities and characteristics that we feel no boundary between ourselves and the nonbiological elements. Second, we care about the potential of such human–machine symbiosis to transform (for better or for worse) our lives, projects, and capacities. (Clark 2003, pp. 23–24)

Hence, things become cognitive technologies once they achieve 'transparency': i.e., they no longer require deliberate conscious attention to control them (cf. Clark 2008, pp. 9–11; Krueger 2016, p. 239). Instead, they become second nature, in the same way that moving our limbs becomes second nature after infancy. Achieving such transparency may, of course, require a period of learning and practice. Consider the analogy of driving a car. The learner driver will, at first, be very aware of the car's controls (steering wheel, pedals, shifter, etc.) that they need to use to drive the car. But once they become sufficiently proficient, they achieve a level of subconscious fluency so that they no longer need to consciously attend to these controls to achieve the desired effect. At the extremes, highly practiced drivers can achieve the 'lorry driver effect', in which driving is fully automated by their subconscious and they find themselves on 'auto-pilot', arriving at their destination without having exerted conscious effort.

Must all cognitive technological enhancements be physical tools? Discussions of cognitive technologies sometimes fall under the area of embodied cognition which Shapiro (2011, pp. 158–200) calls the 'constitution hypothesis'. This hypothesis proposes that physical media beyond the brain (or central nervous system) constitute the physical media upon which human cognition is implemented. Clark and Chalmers' (1998) extended mind thesis neatly falls into this hypothesis. Framing the discussion this way can give the impression that cognitive technologies are limited to material objects or devices (such as Otto's notebook, or computer display for the Tetris player). Clark's linguistic expressions ('nonbiological elements' and 'human–machine symbiosis') can also at times give this impression. However, it is important to note that Clark never makes this a formal criterion for a cognitive technology and some of his examples of mind-extension do not necessarily isolate specific physical media.

For example, Clark draws on the work gesture studies, which suggests that gestures are not exclusively communicative, they also aid thinking (e.g., Beilock and Goldin-Meadow 2010; Goldin-Meadow and Wagner 2005). People born blind gesture, even when they speak on the telephone or with someone else they know to be blind. Preventing someone from gesturing can also inhibit their cognition in various ways. In this example, it is bodily *movements* that are in the loop of cognition. Another example that Clark is fond of is language and symbolic thinking. Drawing on examples in which non-human primates are able to solve cognitive tasks only when trained to use symbolic representations, Clark (1998) argues that language itself is a cognitive technology that greatly extends human capacities. While language can clearly be instantiated on physical media, it does not rely on such media to perform the cognition-transforming role that Clark has in mind.

Sutton (2010, pp. 208–13) further develops the possibility of cognitive technologies that go beyond the manipulation of physical media. Citing the example of renaissance memory technologies, he notes that cultural techniques were used to reliably memorise complex information by providing static structures. He observes that these techniques 'are cognitive even though they are not, in a straightforward ancestral way, natural and biological; and they are extended even though they are not literally external' (Sutton 2010, p. 209). For Sutton, these technologies count as examples of extended mind since they require cultural training and inculcation; however, once they have been mastered, they can be deployed without such cultural scaffolds.

The view that we are natural-born cyborgs differs markedly from the organism-bound vision of enhancement we identified above. The most obvious difference is that it allows us to recognize a far wider range of technologies which might count as enhancements, enhancements that we would miss if we retained myopic focus modifications to the organism itself. This revised view of enhancement also has two broader implications for how transhumanism is conceptualized.

First, it significantly blurs the distinction between humanism and transhumanism. As Burdett (2014b, pp. 4–5) notes, humanism sought to improve the human condition through 'external' means, providing environments which formed and developed humans; in contrast, transhumanism seeks 'internal' modifications the human organism: 'whereas humanism sets itself the task of improving the human condition through education, art, politics, and other cultural means, transhumanism applies this *directly to the human organism*…'. This quotation echoes Bostrom's organism-bound view of enhancement. Once one adopts a distributed view of enhancement, however, it is no longer clear what this distinction hangs on. As Clark suggests, the social, technological, and cultural scaffoldings that one might associate with a humanist strategy for enhancement are no longer different in kind from modifications of the organism.

Second, a related implication is that a distributed view of enhancement opens the door to a whole host of examples that suggest we are already transhuman, and long have been. Bostrom already considered this idea in his 'Transhumanist FAQ':

> One might ask, given that our current use of e.g., medicine and information technology enable us to routinely do many things that would have astonished humans living in ancient times, whether we are not already transhuman? The question is a provocative one, but ultimately not very meaningful; the concept of the transhuman is too vague for there to be a definite answer. (Bostrom 2003, p. 6)

Although Bostrom is largely ambivalent about the possibility, distributed enhancement makes it difficult to write off the idea that we are already transhuman. Bostrom's (2003, pp. 7–19) list of potential technologies that could be used to enhance the human organism includes only recent innovations or yet-to-be-developed technologies. However, in Clark's picture, enhancement and cyborg hybridization is not a recent innovation, rather it is fundamental to how humans have long operated and developed (hence the *natural* in natural-born cyborgs). Hence, there is a notable conceptual shift from a 'pure', technologically unenhanced organism to a being that is defined by its symbiosis with various technologies of its own invention.

Thus far, with some important qualifications, we have largely followed Clark's account of how human cognition draws upon a wide range of resources to create soft-assemblies of brain–body–world coalitions to perform cognitive tasks. We have seen that this account entails a distributed view of enhancement, and is therefore at odds with the organism-bound view of enhancement often assumed in transhumanist discourse. In the next section, we shall extend this picture to the case of religious practices. If our cognitive scaffolds are drawn from our broader cultural inheritance, then religious practices too can be examined from the perspective of their potential modifications of and contributions to cognition.

5. Religious Practices as Cognitive Technology

Theories of 4E cognition have begun to filter into the study of religion and the psychology of religion (Day 2004; Krueger 2016; Soliman et al. 2015; Tanton 2023). Although religion in modern Western contexts has most readily been associated with beliefs and doctrines (Vásquez 2011), a scaffolded view of cognition drives a reframing of how religious cognition is to be understood. In particular, the scaffolded view draws attention to embodied religious practices such as rituals. These practices can now be understood not merely as ornamental or as outward expressions of prior beliefs, but rather as having their own distinctive cognitive import and therefore an important epistemic significance (Coakley 2013; Cuneo 2014; Wolterstorff 2016).

What insights can be gained when religious practices are viewed with the fresh perspective offered by scaffolded cognition? Religious material culture offers some clear examples of cognition being outsourced to non-biological media. Take, for example, prayer beads or the rosary (Krueger 2016, pp. 242–43; Tanton 2023, p. 160). The physical form of these objects—typically beads threaded or knots tied along a length of string—represents the form of a ritualized prayer, with identical beads representing repetitions of the same short prayer formula. Roughly speaking, the religious practitioner fingers their way along the beads and recites the formulae that a particular bead represents. The position of their fingers registers the point they have reached in the overall act of prayer. Hence, the practitioner no longer needs to keep track of the stage of the prayer they have reached in biological memory since this task is offloaded to the physical media of beads and finger positions. This offloading potentially frees up cognitive resources so that, depending on the type of prayer, the practitioner can focus their attention elsewhere or attempt to free themselves from attending to anything at that moment.

As argued in the previous section, cognitive technologies need not be limited to physical tools or gadgets but can include culturally learned skills and techniques including language and gesture. In the case of religion, embodied religious practices such as rituals are a primary candidate to be understood as a cognitive technology. There is nothing biologically innate about these practices, rather they rely on cultural infrastructure which transcends the biological organism for their acquisition and practice. Hence, they are learned through processes of initiation and socialization. As DeSteno (2021, p. 47) observes, 'When people pray in a ritualized way—whether together or alone—their religion prescribes not only the words they say, but also how they say them. The cadence. The body movements. The direction of gaze. All these... have an effect.' Recent studies, which fit squarely within a 4E cognitive paradigm, have begun to uncover some of the cognitive effects of engaging in embodied religious practices.

Perhaps one of the best-studied mechanisms present in religious practices, which has also yielded robust results, is the case of synchronized movement. Studies have compared conspecifics moving in synchrony (performing tasks such as rocking in chairs or marching in synchrony together), with those performing similar movements together but asynchronously (Jackson et al. 2018; Macrae et al. 2008; Reddish et al. 2016; Valdesolo et al. 2010). Those who moved synchronously reported (and exhibited behaviors) which show that their synchrony created a social bonding effect. Given that religious rituals routinely employ synchronized movement, these findings suggest that they exploit this bodily technique to generate a particular cognitive effect.

The connection between synchronized movement and social bonding does not mean that this practice is the only way to achieve social bonding. (Nor is it exclusively employed in religious rituals, as the mechanism is likely equally at work in marching bands or military drills). Although it is not *the* mechanism that makes a new capability possible, it does have the potential to achieve social bonding more efficiently. (Similarly, in the example used above, gesture is not a necessary condition for thinking, but it seems to make some forms of thinking easier and more efficient.) If we consider other routes to achieving social bonding—such as exchanging information about personal narratives, histories, or preferences, or engaging in shared projects—these routes to gradually building mutual trust are typically relatively effortful and can be difficult to scale to large groups of people. By contrast, if religious rituals with synchronized movement provide a shortcut to achieving bonding quickly and with large groups; they can be seen as a cognitive technology that increases the efficiency of forming new bonds with strangers or maintaining existing bonds within communities.

Synchronized movement is by no means the only cognitive technology at work in religious rituals (for a survey, see Tanton 2023, pp. 144–98). Studies have suggested interactions between practice and cognition such as body posture and memory, which are salient in religious practices. Likewise, the settings and accouterments of ornate religious rituals, which can include visual culture, material objects, spaces that constrain and curate movement and attention, bodily movements that symbolize salient concepts such as purity or power, music and sound, bespoke vestments, food consumption, and psychotropic substances such as incense, all have the potential to impinge on or nudge aspects of cognition in particular ways. Furthermore, the possible cognitive benefits of rituals are legion: rituals seem to have the potential to generate effects as diverse as enhanced delayed gratification, increased enjoyment of food, and alleviation of grief. While experimental studies typically attempt to isolate individual mechanisms in the lab to measure their effects, live religious rituals often employ a panoply of these mechanisms in parallel. As DeSteno observes,

> religions have identified effective technologies that need to be studied in the rich contexts in which they're used (as opposed to the more constrained settings in the lab) if we're to fully appreciate how they can reinforce each other—how beliefs, symbols, actions, and group behavior can work synergistically to magnify each other's impact. It's here that religions have a long head start. It's here that they're playing a psychological symphony, not just randomly striking single notes we find soothing. (DeSteno 2021, p. 20)

It seems clear that embodied religious practices can have cognitive effects on participants. But do they meet Clark's two criteria for cyborg hybridization (introduced above)? With regard to the first criterion, it is plausible that religious practices can 'become integrated so deeply and fluidly with our existing biological capacities and characteristics that we feel no boundary between ourselves and the nonbiological elements'. This level of fluency and transparency is not a given in religious rituals, but it does seem likely that it is achievable. As has already been observed, religious rituals require initiation and learning. However, given sufficient practice and repetition, enacting a ritual can become second nature. As with the experienced car driver, the experienced religious practitioner can go through the motions of a ritual on 'auto-pilot' or indeed enter a flow state. The lack of conscious effort required suggests that the ritual becomes an integrated cognitive technology.

Religious rituals arguably also meet the second criterion: the 'potential of such human–machine [or here human-cognitive technology] symbiosis to transform (for better or for worse) our lives, projects, and capacities.' Many religious traditions do, of course, make bold claims about the possibility of deep transformations of lives and projects, as conversion narratives attest; though the empirical reality of these transformations may be more complex to assess (James 1902, pp. 326–78). We have, however, seen quite concrete examples of the way in which religious practices can modify capacities, such as the speed and scale at which social bonding can be achieved. This capacity has led some to identify practices as religious or spiritual technologies. For example, Ritchie argues that

> the embodied and flexible nature of *all* human experience and cognition renders one's religious beliefs to be at least amenable to indirect influence, alteration, and development via the appropriate use of 'spiritual technologies': habits, practices, and curated experiences that holistically affect one's openness to and experience of spiritual realities. (Ritchie 2021, p. 297)

In summary, religious practices, when subjected to the analysis of a scaffolded view of cognition, can serve as cognitive technologies.

6. Christian Theological Responses to Transhumanism

The view that humans are natural-born cyborgs and that religious practices are among the cognitive technologies that can enhance them has the potential to reframe Christian theological responses to transhumanism. It does not, however, automatically defuse all of the critiques and misgivings that Christian theologians have voiced about transhumanism. In this section, I shall distinguish between the descriptive claim that humans are natural-born cyborgs and the broader normative claims that are made by Bostrom's transhumanist vision. This distinction, I contend, shows the natural-born cyborg anthropology neither renders central theological critiques (which will be briefly sketched) obsolete nor does it make the broader project of transhumanism a *fait accompli*.

As we have seen, the view that humans are natural-born cyborgs is sometimes glossed by the statement that we are already transhuman. This gloss might be understood as a conversation stopper: why debate the merits (or otherwise) of transhumanism when the 'ship has already sailed'? However, although a distributed view of enhancement unmasks our deep technological imbrication, transhumanism does more than simply identify humans as technology users. It also affirms the *desirability* of (further) enhancing humans through technological interventions (Bostrom 2003, p. 4). Hence, transhumanism moves beyond a descriptive claim (that humans *are* technological) to a normative claim (that humans *should* embrace further technological self-enhancement). This normative dimension of transhumanism reveals that it is also a vision or an ideology, and indeed a set of practices (Burdett 2022).

If the natural-born cyborg picture is correct, there is little point in developing a theological argument that seeks to contradict an empirical reality. However, if transhumanism (updated by a distributed view of enhancement) also adds a normative dimension, these extra claims are 'fair game' for theologians. In the remainder of this section, I briefly sketch a standard theological critique, namely that transhumanist ideology resembles a pseudo-theological vision (Harari 2015, pp. 409–27) which is in some aspects profoundly at odds with core Christian doctrines. I further contend that these normative critiques remain largely untouched by the descriptive picture developed in the previous sections.

Although transhumanism remains a relatively small movement in sociological terms, Christian theologians (and those of other traditions) have taken a keen interest in its ideas. This interest is perhaps best explained by a combination of both uncanny resemblances and jarring divergences between transhumanism and Christianity. This admixture of similarity and difference has spawned a wide variety of Christian responses, ranging from eager embrace (including a Christian Transhumanist Association) to outright rejection. These responses are prefigured by Christian responses to technology and its relationship to human futures, which again range from the techno-optimism of Fedorov (1990) and Teilhard de Chardin (1959) to the techno-pessimism of Ellul (1970) (for a survey, see Burdett 2014a, pp. 113–62).

In terms of resemblances, although transhumanism is avowedly non-religious (Bostrom 2003, pp. 45–46), it can nevertheless be seen to mirror the structure of the Christian metanarrative in proposing an overarching project for humanity. It begins with an account of human shortcomings, a doctrine of sin if you will. The lack it identifies is centered around the inadequacy of the human body and mind bequeathed by evolution: a body which is frail, limited in its capacities, prone to suffering, and ultimately subject to death (as one memorable transhumanist motto puts it, 'your body is a death trap'). These shortcomings are to be addressed by a remedy, a doctrine of salvation. The remedy consists of exercising human reason to develop and administer a wide range of technological enhancements. Finally, this program of salvation leads forward to a vision for the future akin to an eschatological hope: a world free from suffering, in which we are no longer encumbered by the current limitations of our bodies and minds, and—in the case of mind-uploading—achieve a state of quasi-immortality.

In spite of structural similarities and some notable, though perhaps superficial, alignment in goals (reducing suffering, overcoming death), it is fair to say that most Christian theologians are unwilling to articulate a full-throated endorsement of transhumanism. Critiques question (a) whether all of transhumanism's goals are indeed noble (such as leaving behind human embodiment in the mind-uploading scenario); (b) the method through which goals are to be achieved, and (c) the ethical conundrums which enhancement introduces (such as widening the gap between rich and poor, or the power differential between the enhanced and the unenhanced).

More specifically, Christianity traditionally sees sin as running deeper than the 'symptoms' of suffering and death, understanding humans as originally created good but now subject to misshapen desires. This theological anthropology, in which humans are an admixture of noble and malign desires, leads to skepticism about the transhumanist's rather optimistic anthropology (Peters 2011, pp. 78–82). For the 'Transhumanist FAQ', so long as humans apply reason, they can make the correct ethical decisions regarding enhancements. Given their more pessimistic anthropology, Christian theologians are typically also skeptical of the claim that humans can effect their own salvation (a modern form of Pelagianism) and instead insist that salvation requires divine initiative and intervention (which does not necessarily preclude human cooperation in salvific activity) (Waters 2011, p. 171). In summary, transhumanism as a normative ideology has some radical divergences from Christian theology in terms of its conception of human lack, human competence to engage in ethical self-modification, and the desiderata of human enhancement.

At first glance, the insight that humans are already transhuman might suggest that theologians should side with the techno-optimists. However, once we separate out the descriptive claim that humans are natural-born cyborgs from the normative dimensions of the transhumanist vision, it becomes clear that the former does not necessarily blunt the theological critiques that typically target the latter. The insight that humans are natural-born cyborgs does not automatically settle the debates between techno-pessimists and techno-optimists. Nor does it provide a concrete answer to the ethical questions around whether particular enhancements should be pursued or avoided.

The purpose of this essay, then, is not simply to add a new argument or a new piece of evidence to the theological case for or against transhumanism. Nor is it to stick another pin into the wide spectrum of nuanced views between these two poles, which seek to acknowledge both the potential as well as the dangers of transhumanism. Instead, I want to propose that a 4E perspective can make a significant contribution to the debate by questioning some of the ways in which the debate has been framed. It is that task to which we now turn.

7. The Mapping Problem: Squaring Theological Anthropology with Natural-Born Cyborgs

Although the descriptive claims of distributed enhancement do not offer easy solutions to ethical and theological questions surrounding transhumanism, neither are they completely orthogonal to theological deliberations. In this concluding section, I shall argue that a shift from an organism-bound to a distributed view of enhancement reframes the theological debate in notable ways. As was observed above, transhumanism typically assumes an organism-bound view of enhancement. Theological responses to transhumanism, including those that take issue with it, often mirror that assumption (e.g., Butler 2020, p. 19). By challenging that assumption, a scaffolded view of cognition significantly shifts the terrain of the debate.

To prime our thinking about this reframing, consider the following analogy. As Darwin's theory of evolution slowly gained ascendency, it created a number of 'mapping problems' between biology and theology (Jong 2017): how could the evolutionary view of human origins be squared with various theological commitments or assumptions related to anthropology? For example, are humans unique or exceptional, as is implied by their creation in the 'image of God', when evolutionary theory demonstrates a biological continuity between humans and their evolutionary ancestors? Can a human fall be held responsible for natural evils if widespread animal suffering pre-dates the arrival of humans in evolutionary history (Southgate 2008)? Although many would argue that these questions do not pose insurmountable difficulties, they nevertheless challenge theologians to debate and articulate how a theological metanarrative can be mapped onto evolutionary history, or how a theological anthropology maps onto a biological one.

In the epilog to his book *The Phenomenon of Man*, Teilhard de Chardin (1959, pp. 291–99) attempts such a mapping exercise between Christian theology and his own interpretation of human evolutionary history (and indeed broader timescales still). However, Teilhard wishes to preserve a notion of the '"superiority" of man' (1959, p. 164), and subsequently, he focuses on consciousness and self-reflective thought as the advent of his 'noosphere'. Distributed cognition, however, takes a far broader view of human cognition.

I want to suggest that a shift from organism-bound to distributed enhancement—with religious practices included—similarly generates a number of 'mapping problems' (though perhaps not on the same scale as evolutionary theory). At stake in this mapping problem is not our biological continuity with other animals, but rather our continuity with the cognitive technologies which we have shaped and which have shaped us. I propose that these mapping problems reframe the debate in several ways: (1) the long history of human distributed enhancement emphasizes continuity narratives of technological enhancement; (2) identifying humans as natural-born cyborgs challenges the notion of a static human nature or some kind of pre-technological essential core to human nature; and (3) the status of religious practices as potential enhancements makes it difficult for theologians to reject transhumanism *in toto* and, conversely, difficult for transhumanists to reject religion *in toto*.

7.1. Back to the Past

The assertion that humans are natural-born cyborgs disabuses us of the notion that human enhancement is a genuinely novel and unprecedented phenomenon. Looking beyond organism-bound enhancement to a distributed view emphasizes that the relatively recent technologies that tinker directly with the biological organism are not different in kind from the enhancements achieved through equipping humans with better cognitive tools or placing them in more conducive cognitive niches. Instead, humans have long been in the enhancement game.

The already-transhuman picture is at odds with the way in which many debates surrounding transhumanism are framed as almost exclusively future-oriented. As we have already noted, Bostrom has little time for the question of whether humans are already transhuman and focuses his attention on technologies that are on the cusp of development and implementation. Donaldson (2018, p. 154) notes that 'there is a tendency to lapse into science fiction when talking about transhumanism and to forget that not only is there real science behind the projections but also real progress.' In addition to drawing us back to the present, I would add a need to draw us 'back to the past'—since the scaffolded view of cognition reveals examples of long histories of experimentation with enhancements. While the future implications of transhumanism are well worth critically evaluating, locking enhancement exclusively in the future risks significantly blinkering our perspective.

One of the ways in which going 'back to the past' can broaden our perspective is by weaving continuity narratives about past, present, and future enhancement (without denying the possibility of discontinuities along the way, as genuinely new implications of technology emerge). Such continuity narratives invite analogies (but not simple equivalences) with past examples of distributed enhancement. AI, for example, is poised to become a widely used cognitive technology that has the potential to transform the labor market. Such an upheaval, however, is not entirely unprecedented; other technological developments also had wide-ranging disruptive effects, such as those which were introduced by the Industrial Revolution or the advent of the printing press (e.g., Acemoglu and Johnson 2024). Continuity narratives invite us to learn from the past. Thinking through analogies will not simply reassure us that all modifications represent 'business as usual' and so we have nothing to fear; the Industrial Revolution led to many detrimental effects such as gruesome working conditions for laborers. Instead, it also furnishes us with cautionary tales about the potential impact of adopting modifications, which requires serious attention, as well as priming us to image alternative futures (Harari 2015, pp. 68–69).

In addition to inviting analogies with the past, continuity narratives also reframe the type of decision that enhancements pose. Framing enhancements as radically new gives the impression that we are at a novel decision point—a fork in the road—which forces us to choose between an embrace or a rejection of technological modifications. As Lorrimar (2022, p. 20) observes, this has been a common way of framing theological responses: 'many of the objections leveled at enhancement technologies frame them as a new and unprecedented threat in human history, requiring urgent action.' An already-transhuman picture, by contrast, sees each new potential modification as an incremental step down a path we have already spent a considerable time traveling along.

This is not to deny that the advent of new technologies may lead to modification opportunities that have some unprecedented aspects or that raise new ethical questions. However, it shifts the 'burden of proof' to the enhancement skeptics, who must now show how new enhancements are significantly different from the many enhancements that are already taken for granted and enjoy wide acceptance. Furthermore, the discontinuities of genuine novelty are located against the backdrop of a larger continuity narrative. Such a continuity narrative can go some way to defusing the fear associated with a step into a great unknown (Drees 2002).

One of the symptoms of a radical discontinuity narrative has been an ill-fated attempt to distinguish between therapy and enhancement. Those who have been critical of enhancement have been faced with the challenge of justifying that skepticism given the widespread use of medical technologies that cure illness and alleviate suffering. One strategy has been to draw a distinction between legitimate 'therapy' and illegitimate 'enhancement'. However, as critics have pointed out, this distinction is difficult to sustain (Burdett 2014b, pp. 7–10). For example, given the natural variation in human capabilities, does raising someone with average human eyesight to excellent eyesight count as a therapy or an enhancement? As Thweatt observes, there is a 'basic problem present in all bioethical debates regarding the line between "therapy" and "enhancement"—namely, that the line is fuzzy, shifty, ultimately arbitrary, and highly relative.' (Thweatt 2018, p. 200). By contrast, the continuity narrative makes sense of the difficulty involved in drawing this distinction; given that we are already heavily imbricated in technology, any difference between therapy and enhancement is only a difference in degree rather than a difference in kind. Therapy and enhancement are cut from the same cloth.

Finally, the future orientation of transhumanism meant that early theological engagements identified Christian eschatology as an obvious dialog partner (e.g., Burdett 2014a; Waters 2011). Broadening out the horizon of enhancement to the past also serves to broaden out theological overlap to include, for example, the way in which religious origin stories inform theological anthropology. It is to that theme which we now turn.

7.2. Cyborgs in the Garden

A second 'mapping problem' concerns human nature. There is a tendency to read the second Genesis creation narrative (Gen 2:4b–4) as implying that humans were originally created as pre-technological beings in the garden of Eden. Technology, in this view, is a later imposition on humanity that does not belong to its essential nature. Furthermore, the natural world as divinely given is static and fixed (Midson 2018, pp. 165–67).

The notion of a 'pure' pre-technological human set in a static natural world gives rise to the accusation that any modification to the fixed human form amounts to 'playing

God' (Drees 2002), especially among 'bio-conservatives' on the techno-pessimistic pole of theological responses to transhumanism. Humans, the argument goes, have no place in tinkering with the divinely ordained created order as this order represents divine intentions.

Interpreted charitably, the 'playing God' objection might be understood as a symbolic way of warning against human hubris. Religious mythologies and science fiction narratives alike are replete with tales that warn of the results of humans hubristically reaching beyond their station, from the tower of Babel to Icarus to Prometheus to Frankenstein. Such cautionary tales seem apt in light of the Christian theological anthropology sketched above, which sees humans as fallible and limited, at best unable to see the unintended consequences of their actions and at worst capable of harboring malign intentions. However, if the accusation of 'playing God' moves beyond a symbolic warning against hubris to a draconian prohibition against any form of technological enhancement, then a mapping problem arises.

Insofar as the concept of 'playing God' is premised on humanity as originally pre-technological, it comes into conflict with the view that humans are natural-born cyborgs. A distributed view of enhancement suggests that technological modification reaches far back into evolutionary history. As natural-born cyborgs, we are technological beings to the core who are already defined by the many extra-somatic modifications of our cognitive tools and niches. Hence, technological enhancements are not a foreign imposition on human nature, but rather an expression of that nature.

It is worth interrogating the concept of 'nature' in the term 'natural-born cyborgs', given the ambiguity inherent in the term (McGrath 2006, pp. 81–133). In theological terms, 'nature' might denote (among other things) something's typical mode of being *or* its essence. For example, a theologian might talk about 'sinful human nature' to identify the pervasiveness of a sinful state in humanity. Conversely, a theologian might claim that 'sin is unnatural', to articulate the thought that sin is parasitic on humanity, and not a part of its essential or true nature according to divine intention.

One theological response, then, would be to pursue something like the normative-descriptive distinction outlined above. As an empirically based claim, the position that we are natural-born cyborgs can only ever be descriptive: affirming that we have been technological for a long time does not imply that, normatively speaking, we are essentially technological. It is possible, this position might contend, that there was a pre-technological human in evolutionary history that represents our essential nature (and has since been corrupted). However, such a claim nevertheless assumes a particular evolutionary history vis à vis technology, and thus a mapping problem remains. Even granting the difficulties in pinpointing the beginning of humanity in evolutionary history, it is uncontroversial that tool use—and therefore some degree of technological imbrication—extends back to our pre-human evolutionary ancestors (Harari 2015, p. 152). There was, therefore, no time when humans were not technological.

The notion that humans have a plastic rather than a static nature has already received some attention in theology. For example, theologians have responded to the challenges that biogenetics poses to Christian theology's interest 'in a stable, fixed, and clearly demarcated human nature' (Tanner 2010, p. 363). Similarly, Hefner's (1993) theological anthropology of humans as created co-creators takes bio-cultural evolution seriously in attempting its mapping exercise (cf. Lorrimar 2022). These projects, and the debates they have spawned, provide helpful models for the kind of mapping exercise required when humans are placed within long evolutionary histories of distributed enhancement.

Furthermore, some theological anthropologies have dealt explicitly with the claim that we are already transhuman (e.g., Midson 2018; Thweatt-Bates 2016). Although these accounts sometimes make passing reference to Clark's contention that humans are natural-born cyborgs (Midson 2018, pp. 123–26; Thweatt-Bates 2016, pp. 20–21), they typically take as their starting point Haraway's (2013) feminist use of the cyborg as a figure which overcomes nature/culture binaries in her 'Cyborg Manifesto'. Given that Clark reaches a similar conclusion, albeit by a different route, there is much to be gained from these theological grapplings with a technologically imbricated humanity. For example, Thweatt proposes a reading of the Genesis account in which Eve and Adam are already cyborgs in the garden (Thweatt-Bates 2016, pp. 172–73). Such a reading presents one potential solution to our mapping problem.

Focusing on Clark's account of natural-born cyborgs supplements these already rich theological explorations of cyborg anthropologies. For one, it provides an empirical foundation for understanding humans as cyborgs, whereas Haraway's account uses the cyborg as more of a symbolic figure to think through an ideological critique. Thus, Clark also provides a clearer view of how distributed enhancement is mapped onto evolutionary history. Finally, Clark's work is replete with examples in which cognition is productively understood as scaffolded. It thus provides concrete instances of what might count as a distributed enhancement and thereby paints a more detailed picture of our cyborg instantiations. In a previous section, this specificity allowed us to identify religious practices as enhancements; it is to this case that we now turn.

7.3. Religious Practices as Enhancements

As was argued above, taking a distributed view of enhancement makes for a compelling case for counting religious practices as enhancements. If religious practices are themselves considered a species of enhancement, this insight creates another mapping problem for theological attempts to reject modifications *in toto*.

Insofar as theologians are attached to the religious communities that they represent (and critique), they are already part of communities that engage in cognitive modification. Hence, theologians are not outsiders to the transhumanist project of modification, able to render a detached assessment at arm's length (Garner 2011). Instead, they are already 'playing the enhancement game', and are themselves products of the cognitive technologies they rely on and the cognitive niches bequeathed by their cultural inheritance. There is no 'view from technological nowhere'.

Some theological responses to transhumanism have argued that the kinds of modification that transhumanism proposes do not necessarily contribute to the theological goals of religious life. For example, Donaldson (2018) argues that simply increasing the raw computing power of the brain cannot resolve questions like how logical inconsistencies should be resolved; thus there is no 'outrunning faith'. Although he leaves open the possibility that some enhancements may provide greater resources to fulfill good intentions, he strikes a pessimistic tone: 'ultimately, however, cognitive enhancements may make no significant difference in whether one does or does not become a Christian or whether one attempts to become more Christ-like' (Donaldson 2018, p. 164). Even if one finds this suggestion plausible from an organism-bound view of enhancement, the case is far less clear once one recognizes religious practices as enhancements. These practices clearly have the capacity to shape their participants (Smith 2009), and can thus contribute to transformational projects such as sanctification or divinization. To draw on the examples of practices described above, the social bonding achieved through participation in religious rituals is clearly relevant to notions such as unity in ecclesiology.

If recognizing religious practices as enhancements prevents theologians from rejecting all forms of modification, it also cuts the other way, preventing transhumanists from rejecting all aspects of religion. As has already been noted, Bostrom's strand of transhumanism is usually promoted as avowedly non-religious, and protagonists often reject comparisons between transhumanism and religion. The rhetoric often employed by this brand of transhumanism, casts religion as antithetical to the project (Bostrom 2003, pp. 45–46).

However, if religious practices can function as enhancements, on what basis should they be excluded from the transhumanist project? DeSteno's (2021, pp. 11–15) analogy between 'bio-prospecting' and his own project of 'religio-prospecting' is salient here. Pharmaceutical companies, he observes, already engage in widespread 'bio-prospecting', which involves collecting plants from all over the world and testing whether they have chemical compounds that could be incorporated into therapeutic drugs. By analogy, he understands his project as 'religio-prospecting': scouring the various religious traditions of the planet in search of practices that might have beneficial effects. Transhumanists readily embrace the potential of using pharmaceutical compounds to enhance human capacities; so why not similarly embrace religious practices that have been found to confer benefits?

Granted that religious traditions need not be adopted as complete packages. The existence of religious practices that count as human enhancements does nothing to compel transhumanists to adopt a particular religious outlook. As DeSteno (2021, pp. 187–94) observes, religious practices can sometimes be beneficial even in the absence of accompanying doctrinal systems. While he suggests that immersing oneself in religious communities that 'double down' on their traditional practices is one way of reaping the benefits of such practices, he also acknowledges that secularized versions of particular rituals can exploit some of the same mechanisms. The point here then is not that transhumanism must embrace religion, but the more modest observation that it seems strange to rule out religious practices if one is truly interested in pursuing all forms of beneficial human enhancement.

In conclusion, the insight that we are natural-born cyborgs by virtue of our many extant cognitive technologies—religious practices among them—does not erase some of the core Christian theological objections to transhumanist values and goals. Nor does it provide any cut-and-dried answers to which modifications should be pursued in which contexts. It does, however, significantly reframe the starting point of the conversation. Theologians deliberate from a starting point in which we are already deeply ensconced in cognitive technologies including religious practices. This starting point shifts the terrain of the conversation between theology and transhumanism, and poses the question of 'what can be learnt from the experiences of our existing distributed enhancements, including the religious ones'?

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Notes

1. A further question one might pose is whether pilot training, though clearly slower and more effortful, nevertheless also counts as a kind of low-bandwidth and gradual enhancement. I take up this point below when considering the relationship between humanism and transhumanism.
2. There is an analogy here between the Inga and Otto examples described in [Clark and Chalmers (1998)]. In that article, the authors argue for a parity principle: if biological memory and external memory can serve the same cognitive function, then both should equally be considered as belonging to the mind.
3. Other versions of transhumanism which Thweatt identifies, such as Donna Haraway's conception of the cyborg, are more amenable to the suggestion that we are already transhumanist, which I discuss below.

[4] It also adds a second definition which is less salient here: 'The study of the ramifications, promises, and potential dangers of technologies that will enable us to overcome fundamental human limitations, and the related study of the ethical matters involved in developing and using such technologies.'

[5] I use the term 'candidate' deliberately here, to acknowledge that the purpose of the following criteria aim to pick out which technologies are *involved* in modifying cognition. For them to genuinely be an *enhancements*, they also need to be modifications which are *good*. Hence, the implicit value judgment inherent in the term enhancement raises vexed ethical questions about which modifications are beneficial and for whom (individual, society, ecosystem?). While such a larger ethical deliberation is beyond the scope of this article, it is—caveat emptor—crucial for any ethical judgements about particular modifications.

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