RESPONSIVE BODIES: ROBOTS, AI, AND THE QUESTION OF HUMAN DISTINCTIVENESS

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Abstract.   In this article, we argue two points in relation to the challenge to human distinctiveness emerging as artificial intelligence systems and humanlike robots simulate various human capabilities. First, that, in the context of theological anthropology, it is advisable to respond to this challenge by turning toward the human body. Second, following this point, we propose the responsive body hypothesis, suggesting that what makes us distinct from androids are capacities that rise from and depend on our responsive bodies.

Keywords: artificial intelligence; embodiment; ethics; human distinctiveness; imago Dei; robots; responsive body; theological anthropology

INTRODUCTION

Is there *really* anything special about humankind? Most of us intuitively share such an inkling, that there must be something unique about us, yet defining exactly what that is proves extremely difficult. The quest to identify *what*, if anything, makes us distinct from the rest of the natural world has occupied our greatest thinkers since ancient times. The most persistent answers have revolved around rationality, morality, self-awareness, consciousness, or souls. All of which have been tied in some form to the notion of imago Dei, an elusive but deep-seated notion in the Judeo-Christian tradition. In more recent parts of our history, an array of developing sciences has informed and shaped our conception of the human condition, oftentimes contesting traditional beliefs. The Copernican, Darwinian, and Freudian revolutions, for example, have challenged us to significantly revise how we think about human identity (Mazlish 1967; Floridi 2014). At its best, theological anthropology has been able to draw from interdisciplinary discourse to deepen our self-understanding and reformulate accounts of human distinctiveness.[1]

A particular and novel challenge to human identity has been growing out of information and computer science since the 1950s, as artificial

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intelligence (AI) systems began to mimic certain functions of our intelligence with which we have sometimes identified human distinctiveness, such as solving mathematical problems, playing chess, or, more recently, conversing in natural language (Sobieszek, and Price 2022). Not only can many of the cognitive operations we traditionally think about as hallmarks of human minds be simulated and automated, but today AI systems also solve tasks too complex for human minds. And as AI systems increasingly move into the physical world, often made in our likeness, several theologians have speculated whether such androids carry the *imago Dei* too (Foerst 1998; Midson 2013; O'Donnell 2018). Indeed, if our intellectual capacities have been the metrics by which we have identified human uniqueness against the animal kingdom, discovering that AI systems seemingly outperform us in some of those very capacities should make us reevaluate our ideas about what really is distinct about us. In other words, with AI and robots we have what Philip Hefner has called a "technological mirror" (2002), against which theology might reflect, revise, and refine its views about what defines human beings.

Interestingly, when considering human nature against AI systems, what we begin to see, is that what is unique about us is in fact less about pure rationality and more about intellectual capacities rooted in our living, breathing, and sensing bodies. The paradox in AI research first captured by Hans Moravec (1988) illustrates this point well: Cognitive operations that are hard for human minds are surprisingly easy for computers to simulate and, reversely, sensorimotor function that we find trivially easy are very hard for machines to do. We understand, navigate in, and respond to our environment and beings in it so effortlessly, that we barely even notice it. Unlike robots, we master even very diverse and changing environments shaped by social cultural factors. This paradox has convinced many researchers working on AI and robots that bodies are crucial for making sense of one's world, indeed for truly understanding it.

Our bodies, therefore, seem increasingly to be the object of interest in exploring human distinctiveness. Indeed, as philosophers such as Hubert Dreyfus (1992), Mark Johnson (2017), and Thomas Fuchs (2021) have argued, we have minds that understand and experience the world as meaningful *because* we are embedded as bodies within it. This trajectory coincide with turns toward embodiment, or corporeality, across a multitude of disciplines that explores the many ways our bodies shape fundamental aspects of being human (Sheets-Johnstone 2015).[2] This is especially true in embodied cognitive science that increasingly emphasize that understanding and reasoning arise from bodily experiences and interactions with the world (Visala 2016). This turn is prevalent in theology too, and among theologians working at the intersection of theology, science, and technology and exploring what is distinctively human against

the backdrop of AI and robots, a momentum seems to be building in the direction of embodiment.

Emphasizing creaturehood and embodiment is, as we will argue below, a prudent move for theological discourse on the question of human distinctiveness in relation to AI and robots. Theologians who share this assumption often draw from and root their responses in the doctrines of creation, incarnation, and redemption to give an account of humankind as created in the image of a God who incarnated as a human being, and that sharing human nature with Christ is vital for redemption and participation in the life of God. Hence, our living bodies must play a crucial role as we consider human identity vis-à-vis humanlike robots. However, there is a tendency among authors to be satisfied with reiterating theological appraisals of embodiment without providing much detail as to what this entails.

We aim to address this shortcoming by contributing some wider interdisciplinary texture about how our responsive bodies give rise to human distinctiveness. We draw from a range of disciplines such as embodied cognitive science, neuroscience, and phenomenology to articulate how our distinctive human abilities are deeply rooted in our bodies.[3] Humans experience, understand, and relate to the world through responsive bodies in ways that make us fundamentally unlike robots. And by exploring how our bodies enable these aspects of human existence, we might glean what makes human beings distinct. To motivate and lay down some steppingstones for this account, we will argue the first point through "Moving Toward the Body" and "The Body in Theological Responses" sections, namely, that it is advisable for theological anthropology to focus on the body when accounting for human distinctiveness in the face of AI and robots. In "Moving Toward the Body" section, we trace the critique of AI research that has contributed to the embodied turn across a wide range of disciplines, and in "The Body in Theological Responses" section, we trace how theologians have identified the value of our creaturely bodies and explored their role for what is distinctly human.

Moving toward the Body

Computer science was from its very infancy steeped in idealized accounts of the rational human being in the tradition of Plato and Descartes, but also going back to Aristotle's notion of humankind as a reckoning animal. Indeed, before computers *computed*, humans did, and the "thinking machine" was essentially a way to automate and amplify this treasured capacity for rational and logical reasoning. Building on Boole's *Laws of Thought* (1854) that describe cognitive operations as calculation of logical symbols, computers were anticipated in classical AI as a medium that in principle could simulate every aspect of human intelligence (McCarthy, Minsky,

and Rochester 2006). That is, on this computational view, it was believed that all facets of intelligence were reducible to information processing, to factual knowledge and formal rules for reasoning about them.

Despite the successes of classical AI in devising very competent and useful systems for a wide variety of computational tasks, the failure to produce human-level intelligence that can operate across contexts strongly suggests that this is not how human minds work. That the computer metaphor of the mind is unfitting. Rationality in terms of formal reasoning might be part of our distinctive cognitive capacities but it is neither the most significant aspect about humankind, nor fundamental to how we are able to understand the world and act intelligently in it. What *is* fundamental, as already Hubert Dreyfus protested against classical AI (1992), is our embodied forms of knowing and relating to the world.

The crux of Dreyfus critique, following especially Heidegger, is that there are two distinct forms of intelligence, namely knowing that and knowing how, and that the computational view treats them backward. Knowing that is taken as fundamental to all forms of knowing how, which means that anything from playing chess, to riding a bike or calming down an angry teenager are seen simply as problems of complexity of knowing that. But in reality, Dreyfus contends, it is the other way around: we derive knowing that from knowing how. Our knowledge about the world stem from our bodily interactions with it, from pre-conceptual experience about how things work and are affected by our actions. It is situated and arises from our active participation in the world. This idea was in fact already anticipated in the writings of Hans Moravec, a highly influential figure in the AI research community:

> Encoded in the large, highly evolved sensory and motor portions of the human brain is a billion years of experience about the nature of the world and how to survive in it. The deliberate process we call reasoning is, I believe, the thinnest veneer of human thought, effective only because it is supported by this much older and much more powerful, though usually unconscious, sensorimotor knowledge. (Moravec 1988, 16)

This idea that unconscious or implicit, practical knowledge is what enables living bodies to act intelligently in the world runs across Dreyfus' work. The general and domain-flexible intelligence found in humans stem from everything we have learned about the world, implicitly or explicitly. Which means that formalizing and representing all that as symbolic information is an insurmountable if not infinite task; one could never gather enough facts about the world and devise formal rules for manipulating them to understand why certain words in a specific tone accompanied by certain gestures at a specific point in time mean that the teenager is angry, appalled, or ashamed.

To understand any given situation, and thus act appropriately and successful in relation to it, means understanding the context (Bryson 2018). But since contexts are inherently indeterminate, they cannot be formalized, and this is a big hurdle for AI systems in the real world. This is known as the "frame problem" and is essentially about determining what is relevant to the meaning of any situation. "Framing" something amounts to identifying the appropriate context within which to understand a given phenomenon and doing so involves determining what is relevant to its meaning. The fact that we go about our day to day lives and successfully operate within vastly different contexts and thus continually get this "framing" correct must mean that we somehow shortcut this potentially infinite task. We get by, presumably, because we utilize "various speedy heuristics and cognitive frameworks" rather than calculating the endless possibilities (Visala 2016).

We are able to get this framing correct, Dreyfus believed, because our bodies situate and embed us intimately within the world; nothing is ever context-free for us, for the world is one in which we already have a stake, a vested interest as sociobiological beings needing to survive and thrive. And insofar as we must act to satisfy these inescapable interests, we are shaped in and through the way pursuing them relates us to and positions us within the world (Susser 2013, 281). That we understand the world at all is possible because certain parts of it is meaningful to our interest. Relevance, therefore, is determined for us, pre-reflexively, relative to our naturally vested interests in the world. And our sensorimotor apparatus organizes and structures the environment into context-dependent facts that are relevant and accessible to the needs and purposes of the human organism (Dreyfus 1992, 234). In other words, we understand the world not through a "computer-like process" but as "a lifelike process anchored in the living body" (Di Paolo, Buhrmann, and Barandiaran 2017, 20). And, as indicated in the Moravec-quote above, our experience with the world solidifies over time to know-how, which in turn allow us to frame situations correct and thus act prudently in them. In summarizing Dreyfus' position, Daniel Susser writes that:

> [T]he body is what makes it possible to discover at any given moment that certain parts of the world are relevant to our interests or that they aren't, indeed to have interests at all. Our bodies embed us in a world of meaningful relations, make those relations matter to us, enable us to understand them (and ourselves in relation to them), and guide our activities in and through them. (Susser 2013, 282)

That bodies are not in the way of intelligence, as Dreyfus continually argued, but rather indispensable for how we understand, experience, and make meaning of our world is an awareness increasingly realized across diverse fields of research, such as phenomenology, psychology, neuroscience,

and particularly in cognitive science. Especially with the emergence of the 4E paradigm that stresses the *embodied, embedded, enactive*, and *extended* nature of human cognition. Notable scholars such as Mark Johnson (2017) and Thomas Fuchs (2021) draw from these fields to present compelling accounts of the centrality of body for anything human; vital for how we know, experience, understand and make meaning of the world.

Quite concretely, our sensorimotor apparatus constraints what segments of the world we can perceive and understand, in so far as they are meaningful and accessible for us to interact with. And, because we are biological beings, we are embedded in the world in a certain way that at every giving moment makes certain parts of it relevant for us to thrive, biologically, psychologically, socially. Our relation to the world is shaped by our organismic needs to interact with it to survive and thrive. In other words, our knowing the world is shaped in countless pre-reflexive ways, both by what we can sense and how our motor functions allow us to interact with the world, but just as fundamentally by our biological, social, and emotional *need* to understand it. This means that our cognition is always *motivated* cognition and thus explainable in terms of motive forces of being a living organism needing to survive and grow in its environment (Johnson 2017).

Knowing is thus an activity or process that occurs as we respond to our environment, not about having a stable set of propositions about the world expressed in semantic symbols and rules for manipulating them. This presents a fundamental and persistent problem to any AI system, including newer large language models. As the frame problem and related symbol grounding problem demonstrate, an AI will never come to grasp the meaning of a symbol referring to some state of affair in the world, because it can only "understand" it by recourse to other equally ungrounded symbols (see, e.g., Harnad 1990; Lumbreras 2022). Without an experiencing body with fundamental interests in the world, *really* understanding facts and relations in it seems impossible.

We shall return to this below, but for now note that these growing insights about how bodies are fundamental to all facets of intelligence were a significant reason AI research turned toward bodies. For example, Rodney Brooks believed that the kind of flexible intelligence found in humans and animals was possible to achieve only if AI was submitted to similar bodily constraints and learning processes to natural intelligence. He consequently steered MIT robotics laboratories in the 1990s toward biomimetic "embodied AI". Brooks, and many with him, abandoned the logic-bound and in-flexible centralized processing methods endemic in traditional AI in favor of decentralized and distributed models closer to natural intelligence. Brooks and colleagues would map sensor inputs directly to motor outputs without any symbol manipulation or "centralized cognition" (Husbands 2021).

Although the so-called "New AI movement" spawned from this paradigm is still active and influential, the process of producing more complex robot behavior with distributed rather than centralized cognition is evidently very slow. Because, today, many robotics projects resort to some form of hybrid model in which robots and complex algorithms like large language models are merged.[4] Undoubtedly influenced by this view that bodies are something intelligence *requires*, a necessary feature which must somehow be involved for an agent to be intelligent (Susser 2013, 285). If, as a result, humanlike robots indeed begin to understand and act intelligently in our world, this would certainly intensify the challenge of AI for human distinctiveness. However, these attempts seem to miss the larger point in the tradition after Dreyfus, namely that bodies *are* intelligent; that intelligence and bodies develop inseparably in the world. Intelligence without a living body is, to invoke the flavor of Fuchs, a contradiction in terms (2021, 38); without a body with intrinsic interest or stakes in the world there is no intelligence.

Based on the above, we think it is unlikely that robots could have such an intimate and embedded relation to the world necessary for what is sometimes termed "strong" intelligence. At least in the foreseeable future on the current technological trajectory. If our creaturely needs and interests result in a *knowing how*-relation to the world, without which *knowing-that* is unattainable, how could a machine without such needs and interest ever come to truly understand the world? Without having a living body embedded in the world, how could the range of mental states that humans have, such as intentions, emotions, or even conscious experience develop in an AI system? We cannot, however, argue this point in more detail here since the aim of this article is to articulate how human beings are distinct, not whether robots could ever develop the full range of human intelligence and mental life. Consequently, what we will argue is that human distinctiveness arises from our embedded and responsive bodies. Toward this end, we trace in the following how theological responses to robots have begun to explore the role of our creaturely bodies for what is distinctly human.

The Body in Theological Responses

As we now begin to look at the body in the theological tradition, a few things become immediately clear. First, that there is no lack on discourse about the human body, historically and contemporary. For this reason, it would be wrong to talk about a *turn* to the body as a novel development, but there is quite a noticeable shift toward a more favorable view of the body.[5] This relates to the second point, namely that Christian theology has had a rather ambivalent relation to the body, with long stretches of its tradition nurturing a dualistic view of human beings as body and soul, beginning under the influence of Plato and Augustine, culminating with

Cartesian mind-body dualism. Generally, in such accounts bodies always come out on the bottom, while the distinctive features and true identity of a human person is to be found in a pure mind or soul. Such dualistic views have been repeatedly refuted, criticized not least in liberation, feminist, and eco theology for the harmful effects of denigrating not just human creaturehood, but the material, natural world more broadly. Books such as *I am my Body: A Theology of Embodiment* (Moltmann-Wendel 1995) and *Our Bodies are Selves* (Hefner, Pederson, and Barreto 2015) seem to capture the reorientation in recent years concerning the human body. In any case, it seems safe to say that theological anthropology has pivoted toward more holistic accounts of the human being as an integrated psychosomatic unity and sought to recover the meaning and value of our creaturehood.

This pursuit of salvaging the meaning and value of embodiment has found a very concrete outlet within the broader context of this article, theology at the intersection of science and technology, namely in relation to the so-called "technological singularity" and transhuman ideology. Technophiles and optimists such as Hans Moravec (1988), Ray Kurzweil (2000), Randal Koene (2013) to name a few, all have contributed, in one way or another, to the idea that the ultimate benefit of developing AI and robots is about enhancing or transcending human nature. Or indeed merge human existence into it, potentially via mind-uploading scenarios, that we might outlive our problematic bodies. In this way they have effectively offered a secular-technological eschatology rivalling traditional Christian hope.

Theologians critiquing this position, such as Brent Waters (2011), Leandro Gaitán (2019), and Jason Eberl (2022), typically employ a strategy whose first step is to point out that these secular eschatologies rest on mind-body structures handed down to them through the Western-Christian tradition (i.e., that the true, inner person is a separate thing from the body, and that this disembodied essence needs saving from the finite and corruptible flesh). Only, and this is usually the second step, this dualistic premise underlining the whole project smacks of heretical ideas, beginning with Manichean loathing of the body, Gnostic privileged wisdom, or Pelagian belief in self-perfection (Waters 2010). Consequently, there are good theological reasons to renounce and resist the transhuman narrative. Third, and this is our main point, these critics ultimately present a theological counternarrative in which the body is considered essential through the doctrines of creation, incarnation, and redemption.[6]

We briefly highlight this discussion because it demonstrates how theologians have already moved responses to AI and robots toward embodiment as they identify the value of bodies. God not only created humans as part of a natural world he deemed good, but God also incarnated as a human being. In Christ, God became human to restore our relationship, to offer salvation, and it was as human that Christ conquered death. The

incarnation thus offers a strong reaffirmation of human creaturehood, and it is through Christ that we take part in the life of God and live out the call to love the neighbor in the community of believers, the body of Christ. And it by sharing human nature with Christ that we are redeemed. This is what the early church believed and handed down in the apostolic creed: *carnis resurrectionem*, the resurrection of the *body*.[7] Eschatological hope thus encompasses human bodies.

In this way, theological responses to AI as an enhancing or salvific enterprise have brought the body into the limelight as a vital aspect of being human. And further discussion about what bodies mean for human distinctiveness has branched out from this groundwork as several authors address the limits of human mortality and finitude that inevitably comes with creaturehood. R. J. Russell has drawn from the theology of Paul Tillich and Reinhold Niebuhr to suggest that "embodiment is a virtue, its denial the root of sin". As Russell sees it, "being bodily, being a psychosomatic unity, is a blessing, to use theological language, because it is the key to language, to meaning, to understanding, to the power of speech, ultimately to participating in the incarnate Logos" (1992, 254). More recently, but in a similar vein, Michael Burdett and Victoria Lorrimar has argued that "finitude is not disadvantageous," but rather "conditions the best things in human life" (2019, 246). The urgency that comes with leading finite lives in vulnerable bodies foster our need for relationships, sense of beauty and virtue, and ultimately the quest for meaning. The idea of consenting to finitude and embodiment, often explicitly motivated in the doctrine of the incarnation, runs through a lot of recent articles, monographs, and handbooks addressing the uniquely human in the face of AI and robots, such as Brent Waters (2010), Craig Gay (2018), Serrano and Cesaris (2021), and Hinsdale and Okey (2021).

In this way, theological responses to AI and robots have increasingly shifted toward anthropological questions of identity and distinctiveness. Many have consequently turned to the notion of *imago Dei*, and this has yielded a plethora of accounts of how humans image God and whether that extends to humanoid robots. Yet it seems many prefer to emphasize the relational aspect of the *imago Dei* (e.g., Herzfeld 2002; Dorobantu 2020). This idea follows a more general trend in theological anthropology that views human beings as fundamentally defined through its relations (Shults 2003; Jenson 2007). According to David Kelsey, for example, this means that the human being is "centered outside itself in the triune God in regard to its being, value, destiny, identity, and proper existential orientations to its ultimate and proximate contexts" (2009, 893). As images of a triune God who fundamentally is persons-in-relation, we are created to relate, and we continually become who we are by responding to the relations we are placed in.

Theologians such as Herzfeld (2010) and Lorrimar (2019) further intersects relational accounts with embodied aspects of human existence. They both draw, for example, from embodied cognitive science to suggest our relations to the world are deeply shaped through the way our bodies modulate our understanding of it. So much so, that "a different body would mean we would experience a different world" (Herzfeld 2010). Herzfeld thus points out that our understanding of and relation to the world is deeply influenced if not in fact *constituted* by our concrete embodiment. In this article, we argue, on the back of these accounts, that such relations are only sustained in and through our shared bodily reality.

An example of how embodiment and relationality are held together in a view of *imago Dei* is found in J. Wentzel Van Huyssteen's 2004 Gifford Lecture on *Human Uniqueness in Science and Theology*. With interdisciplinary vigor, Huyssteen traces the quest for identifying human distinctiveness through its origins and development in theology and an array of natural sciences and compiles a remarkable amount of research to suggest that human uniqueness is firmly rooted in our embodied existence and evolutionary history. Through the works of theologians such as LeRon Shults, Philip Hefner, and especially Robert Jenson,[8] he finds modes of linking the *imago Dei* with embodied accounts of human beings (2006, 145ff). "To be in the image of God," Huyssteen writes, "is to be embodied before God." To be a human person is "to have a body, and as this embodied person to be open and available to God and to one another" (2006, 147). It is thus through our bodies that we relate to God and live out the call to love the neighbor. Giving an embodied account of *imago Dei* is therefore not only of importance for theological anthropology; it also pertains to ethics.

Huyssteen, however, neither relates his account explicitly to AI and robots, nor gives a more detailed description of *how* our bodies enable us to respond to God, world, or neighbor. We think both are important aims as AI systems move ever more convincingly into the physical world as humanoid robots.

The Responsive Body Hypothesis

Based on this motivation for why theological responses to AI and robots should turn toward the human body we offer further texture to this argument in the remainder of this article. Specifically, we will develop what we call the responsive body hypothesis. Recall that our aim here is to explore human distinctiveness in the robot-mirror, in the negative space, so to speak, between the full range of human abilities and what robots are actually capable of. If the body is what allows humans to cope with a world where embodied AI systems falter, it suggests we are fundamentally *unlike* them precisely on account of how our living bodies respond to the

world. Robots and AI systems struggle to understand the world and adapt to new situations precisely because they lack the responsivity that comes with being a body embedded in the world.

The notion of responsivity thus relates both to the discussion in "Moving Toward the Body" section about intelligence and bodies; that human beings understand the world and act appropriately within it on account of our living bodies. But also, to the aim set out in "The Body in Theological Responses" section to explore what human distinctiveness in terms of embodiment entails, and how our bodies enable us to respond to God, world, and neighbor. We saw above that Huyssteen, following Jenson, understands *imago Dei* as being embodied before God, and being open and available to the neighbor. He says further that: "What we find in a biblical notion of human uniqueness, and thus in a notion like the *imago Dei*, is a complex set of qualities, a specificity gained from being addressed by God's moral word, and the ability to respond" (Van Huyssteen 2006, 147). If *imago Dei* is linked to a divine mandate to *respond* to God by loving the neighbor, and that our bodily embeddedness in the world enables us to do so, it seems pertinent therefore to develop a fuller understanding of human responsivity. Keeping these aims of the previous sections in mind we stake out the responsive body hypothesis in the following in the interdisciplinary spirit of Van Huyssteen.

Beginning in ordinary experience, phenomenology in the tradition of Husserl and Merleau-Ponty understands the body as "the zero point, the absolute here, in relation to which every experienced object is oriented" (Zahavi 1994, 67). My body is something uniquely connected to me, and I experience it directly "as something subjectively accessible," which is present in perceiving, feeling, thinking and acting and which characterizes the way I am "in the world" (Gasser 2021, 331). Bernard Waldenfels has employed the notion of "Leibliches Responsorium" to describe that not only do we perceive and experience the world through our sensing bodies, but we also *respond* to the world in equally embodied ways.[9] We are "bodily anchored" in the world, and our relation to it is therefore, at bottom, a matter of bodily responses (Waldenfels 2000, 372). We are never in situations in which the body is not, and all the complex ways in which we engage the world is modulated by our bodily ability to respond.

Maxine Sheets-Johnstone intersects phenomenology with biology and refer to "responsivity" as a "basic biological fact," indeed that "responsivity is a prime constituent in definitions of life" (2015, 219). The capacity to respond indicates, according to Sheets-Johnstone, that an organism is sentient and able to adjust and maintain itself through constant interactions with the environment. Plants, for example, bend and stretch toward sunlight and extend roots to find water. Bacteria move toward sugar nutrients and away from certain chemicals. That is, they survive and thrive by being sensitive and *responsive* to changing conditions, by moving on their own

accord toward more favorable ones in which to flourish. To distinguish between variable environmental conditions and thus pursue homeostasis, organisms must be able to sense and act dynamically in relation to the world. And with more complex sense modalities and motor functions come an increasing repertoire of responses by which an organism might satisfy its inherent needs, interests, and goals.

But responsivity is not only a mode of relation between the body as a whole and the external world. The internal milieu of more complex organisms like vertebrates is regulated by a central nervous system that integrates the older peripheral system spread throughout the body. For this reason, the organ that houses the central nervous system and thus does most of the coordination between sense modalities and motor functions, namely the brain, is deeply resonant with the whole body. Fuchs therefore prefers to think about the human brain as "an organ of resonance and relations" (2018). And emphatically *not* as a control center that computes sensor information to issue commands and produce mental representations of the world as is the case of robots (2021, 28). Fuchs employs a lot of neuroscientific research that demonstrate how neurological processes are widely distributed throughout the body. And, importantly, he finds that neurological activation in relation to bodily engagement with the world changes the synaptic connections and weightings of each neuron in the involved cortical networks. The same thing never happens twice in the brain. "Even the same neuron always reacts differently on repeated identical stimuli under identical experimental conditions" (Fuchs 2021, 25). In other words, the brain is reconfigured on every activation; it is not a stable structure, but a "plastic" and responsive organ, molded and shaped by the interactions between the entire body and its environment.[10] The ability of systems such as whole organisms to respond and regulate themselves in relation to new demands or constraints of the external world, that is, to self-organize, is oftentimes taken as a marker of intelligence (e.g., Brown 2010; Fuchs 2021, 131). And the human body exemplify this feature in abundance; it is constantly involved with ensuring optimal conditions in which to flourish.

Antonio Damasio has further argued that humans and other complex organisms pursue homeostasis through neurochemical response patterns relative to how the body fares and is being affected by the environment (2000). These response patterns regulate the internal milieu of the body to ensure the viability of the organism, and will, on occasions where needs go unsatisfied or changes in the environment threatens homeostatic equilibrium, give an affective incentive for the organism to respond appropriately. That is, on such occasion we then *feel* hunger, cold, exhaustion, pain, desires, and so on. There is thus an integral affective dimension to responsive bodies that both amplifies successful or "intelligent" engagements with the world. As Johnson sees it, "emotions are our most elementary way of

taking the measure of our current situation and responding to it" (2017, 32).

Emotions therefore play a significant role in how human bodies regulate and organize themselves in order that they operate successfully in the world in relation to their fundamental interests. But also, Damasio argues, this affective dimension induces a certain *Feeling of What Happens* (2000), as is also the title of his seminal book on the affective and neurophysiological bases of consciousness. Like Fuchs, Damasio argues that these vital and ongoing regulatory processes responsible for ensuring the viability of the organism also give rise to a felt self-awareness, a "core" or "primary" form of conscious experience (Damasio 2000, 16; Fuchs 2021, 27). Individual and qualitatively stronger forms of conscious experience mature in humans as we become aware of what interacting and responding to the world feels like. In addition to what we said above in "Moving Toward the Body" section—that knowing and understanding are processes fundamentally modulated by sensorimotor bodies that constrain and structure what segments of the world we can perceive and understand, in so far as they are meaningful and accessible for us to interact with in relation to our vested interests in the world—we add here that mental states like cognitive ones depend on responsive bodies in which they are intimately integrated. In the words of Johnson, "understanding, thinking, and reasoning grow from the patterns of our sensory, motor, and affective encounters with our surroundings" (2017, 222).

To briefly sum up, there is a fundamental responsivity underlining the way human bodies experience, understand, and relate to the world. If, as Van Huyssteen suggests, the *imago Dei* means being an embodied self with the duty and ability to respond to God's moral word, what the responsive body hypothesis adds is that the very fabric of our embodiment corresponds to this divine mandate. We exist as individual selves on account of sustained responsive interactions between our bodies and the world in which we are embedded. And it is in and through these bodies that we are capable of responding to the call to love the neighbor.

We are aware that this account leaves some unresolved issues and implications yet to be explored. We cannot address all of them within the confines of the present scope, but we briefly consider two immediately relevant ones. First, we accentuate the relationship between our hypothesis and relational accounts of human distinctiveness. And second, we indicate in a few more details how our bodies enable and modulate our responses to the neighbor.

Responsivity and Relationality

We suggested above, in the vein of Van Huyssteen, that accounting for human distinctiveness in terms of bodily responsivity connects to relational

accounts of *imago Dei*—the idea that we are created out of and for relationship with God and other people; that *relations* rather than cognitive particulars define us most fundamentally. But a strong emphasis on concrete bodily features may however seem to run against the grain of this idea. Because, if what is distinct or unique about humans trace back to the responsivity of the body, is that not ultimately a material rather than relational account?

In his account of "nonreductive human uniqueness" (2010), Warren Brown addresses this issue by emphasizing the embodied nature of humans and our cultural and social embeddedness at the same time. He argues that whatever is unique about humans can neither be explained by referring to some metaphysical substance, nor is it reducible to material bases such as neurobiology since we share most of our anatomical structure with other primates yet have evolved in vastly different ways from the rest of the animal kingdom, cognitively, culturally, morally. And as we increasingly discover that abilities such as meta-cognition, planning, and altruism that we previously thought exclusive to humans have some rudimentary manifestation in apes, it is untenable, Brown argues, to say that our very minimal neurological advantage alone is what constitutes human distinctiveness. Also, because tracing human distinctiveness to something *inside* the head of individuals seems like a holdover from Cartesian inwardness. Instead, he suggests that "our uniqueness emerges in the interaction between all of the internal cognitive particulars and the external context of interpersonal and social relationships, as well as the culture in which we live" (Brown 2010, 108). And in a more recent article, he adds that we are "constituted by the impact of our unique history of interactions with others" (2017, 872).

The import for what we suggest is that even though human distinctiveness traces back to is enabled through the responsivity of the human body, without the scaffolding of the natural and cultural world we would not have developed the defining qualities we in fact have. These "emergent qualities" would not have developed without our cultural evolution as Van Huyssteen writes (2006, 38). So, rather than being some internal or material quality, what is distinct about humans emerge *outside* or *in-between* individuals; it is *extrinsic*, to invoke the flavor of Kelsey (2009), continually brought forth as we respond concretely to one another within the ultimate context of relating to God. Or, in the words of Kelly Oliver, "we become subject or selves by virtue of our responsivity […] we are responsive beings whose very existence is dependent upon others" (2018, xx). On this outlook, humans are interdependent beings, and it is through our responsive bodies that we uphold the relationships we live by. So, before closing, we briefly consider how our bodies enable us to do so.

Responding to the Other

We noted above that a certain affective dimension to human existence arises from the ongoing regulatory processes between body and world. And while these affective response patterns may have emerged to guide the body in relation to the environment, this fundamental affective quality plays a central role in social cognition as well, when we respond to other beings in the world. We recognize the joy in a smile, the suffering in tears, or the shame in a blush without actively or formally reasoning about the person's behavior, but directly through "the resonance of our own body" (Fuchs 2021, 87). What is known as mirror neurons are obviously involved in this process by activating the nervous systems that correspond to the bodily composure, gestures, and facial expression we observe in another person. But the way our bodies enable us to know the state of author bodies goes beyond just mirroring or state matching. Expressions of anger, for example, evoke in the perceiver bodily processes such as flinching and tensioning of muscles making ready for fight or flight. That is, in such cases *contrasting* bodily impressions feed into the perception of a person as angry (Fuchs 2021).

In most of our encounters in everyday life, we obtain a significant amount of information through the responsivity of our bodies that is indispensable for understanding and interacting successfully with others. That is, we sense and feel the other person through the resonance of our own bodies rather than deliberating consciously about the matter. This might, of course, come later as we try to understand the reason behind the anger of another person and what our best response might be. But even here, in devising the most prudent ways of responding, our bodies are intimately involved; the know-how obtained from our own experience with the world informs our response. Our bodies are thus concretely involved as we respond to other people. Both by allowing us to sense and attune to the other in spontaneous and nonconscious ways, but also by shaping our very responses.[11]

DISCUSSION AND CONCLUSION

We find, then, in the robot mirror that human distinctiveness arises from our responsive bodies as we relate to our proximate and ultimate contexts. Unlike robots, the responsivity of our living bodies enables us to *experience* the world, which in turn permits us to understand and respond to the beings we share it with. And as responsive beings we become distinct individual selves over time through our embodied relationships.

Robots like Sophia (Hanson Robotics), Optimus (Tesla), or Atlas (Boston Dynamics) might have bodies in the sense that they have sensors, actuators, and limbs by which they may register and act on the world in exceedingly impressive ways. And, yes, robots may eventually outpace

us in discrete sensorimotor areas like AI systems have outsmarted us in some cognitive respects. Yet without bodies that have fundamental interests in and affective relations to the world, it is difficult to see how robots could develop the kind of intelligence and mental qualities humans have on account of our responsive bodies. Nothing suggests robots derive any phenomenal experience from their interactions with the world the way humans do, nor do they need to in order to be effective and do many things better than humans. Emotional AI algorithms may, for example, discern the emotional state of people from the patterns of facial expressions better than humans, but that does not mean robots fitted with such algorithms feel anything.

But if Damasio is correct that "the feeling of what happens" is indispensable for knowing and understanding, indeed for there to be a mind at all, we find it extremely unlikely that AI systems could attain the distinctive qualities humans have by means of an affective and responsive body, such as intuition, empathy, experiencing, knowing, and so on. Although we cannot say with absolute certainty that robots will never attain something similar, perhaps on some yet unknown technological trajectory, we do maintain that what makes humans distinct from robots now and in the foreseeable future are relations and qualities that stem from and depend upon our responsive bodies.

The immediate theological import was already anticipated by Dreyfus when he wrote that, "what distinguishes persons from machines, no matter how cleverly constructed, is not a detached, universal, immaterial soul but an involved, situated, material body" (1992, 236). Or, in the terminology of our hypothesis, humans are distinct from robots on account of a responsive body. It is precisely in these finite and embedded bodies we partake in the life of the incarnate God; it is through our responsive bodies we are drawn into relationship with God and called to love the neighbor. And these relations are in turn what makes us distinct, individual selves.

But even if human distinctiveness is thus "safe" in relation to human-like robots, what it means to be human might still be affected by them. To the extent robots proliferate as social nodes in our societies, they simultaneously co-constitute the proximate social contexts within which we respond. And, provided that human distinctiveness is shaped by our responses to situations and agents within our environment, such environments increasingly composed of robots and other AI systems will likely affect human existence over time. This remains a critical issue even if the upshot of the present hypothesis suggests that human distinctiveness is not at stake.

Notes

1.   In the context of this article, we prefer the more value-neutral term "distinctiveness" over "uniqueness," even if we use the latter interchangeably whenever we discuss literature whose authors use this term. The term "uniqueness" has some cultural baggage similar to "exceptionality" that we want to avoid, such as justifying human superiority in relation to the natural world.

2.   In the remainder of this article, we shall prefer the term "embodiment" over "corporeality" even if understand some readers might object to term, insofar as it preserves dualist overtones, that is, that human persons *live in* bodies as opposed to *being* bodies.

3.   For example, in the celebrated *Embodied Mind, Meaning, and Reason* (2017), Mark Johnson strings together insights from cognitive science, neuroscience, and philosophy to argue a grand narrative of how our bodies gives rise to understanding and shapes our minds. That embodiment thoroughly conditions the human experience is also argued by Thomas Fuchs in the *Ecology of the Brain* (2018) and *In Defence of The Human Being* (2021).

4.   Such as Google's recent PaLM-SayCan-platform (Ahn et al. 2022).

5.   This shift is greatly influenced and connected to the major predicaments of our time, the ecological crisis and COVID-19 pandemic. Both crises have exposed that, for all our cultural sophistication and technological power, we are nonetheless biological organisms enmeshed in and dependent upon a natural world that we have become increasingly estranged from. Numerous authors therefore set out to reconsider our relation to the natural world, materiality, and indeed our own living bodies.

6.   An argument from the doctrine of ecclesiology could conceivably be added to the list by emphasizing, like Lorrimar does, "the role of bodily practices, such as the movements associated with particular liturgies, in shaping the way we think and feel about matters of faith" (2019). She does, however, not pursue this possibility since her interest lies elsewhere.

7.   We should note, however, that the biblical authors and Church Fathers also generally viewed the body as a problem, the source or root of sin. Matt Jenson writes that "the knee-jerk reaction of intelligent men of Augustine's day, including *both* Platonists and Manichees, would be to blame the body". They might debate on how we got these unhelpful bodies (was there a fall of the soul into a crassly embodied state, as in Plotinus, or did an evil counter-deity create our bodies to entrap the seeds of the divine, as in Mani?), "but they would quickly agree that our bodies are things to escape, denigrate, maybe at best to begrudgingly tolerate" (2007, 15). And though views of the body have changed significantly in theological discourse, a certain ambivalence toward the body persists insofar as the natural proclivities of living, finite bodies tend toward self-preservation, or self-interest, resulting too often in a denial of the other, in the theological vocabular, toward sin.

8.   Robert Jenson has contributed a compelling *embodied* account of the notion of *imago Dei* in his *Systematic Theology* (1999, 58ff).

9.   Waldenfels here uses the term *Leib* which in German (and continental philosophy broadly) carries connotations of the lived or experience body, sometimes contradistinguished from the term *Körper* which is typically understood more in physical or biological terms. A similar distinction is found in French, where, for example, Merleau-Ponty [1945] (2013) also distinguishes between *chair* and *corps* with the former as limited to a biological concept.

10.   An obvious consequence from the fact that brains are not static or stable structures but constantly changing and evolving organs, is that the whole idea that brains can be "scanned" for uploading purposes as briefly mentioned above is impossible, as there is never a point in time when brains are not responding to changes in homeostasis or environment. Minds are simply not extricable from their "biological hardware".

11.   That these bodily response patterns are deeply ingrained and intuitive to humans is amply demonstrate in human-robot interaction studies. These studies find that robots with an animal or humanlike appearance and behavior successfully activate these spontaneous responses and, consequently, that people tend to empathize with robots in supposedly painful or pleasurable conditions (Balle 2021). These considerations obviously lie beyond the present scope but are important components if we proceed to consider the impact of robots on human existence more broadly.

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