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Extraterrestrial and Other to Humans Unobservable and Incomprehensible Forms of Cognition and Morality: An X-risk or AN X-opportunity?

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Abstract: This paper explores whether extraterrestrial or other forms of cognition and morality that are unobservable and incomprehensible to humans constitute an existential risk (X-risk) or an existential opportunity (X-opportunity) for humanity. It is being argued that the human epistemological apparatus is fundamentally limited, rendering certain forms of life—both extraterrestrial and potentially terrestrial—imperceptible and incomprehensible (which is also a novel solution to the Fermi paradox that we propose). By integrating philosophical reasoning with empirical insights from (astro)biology, the paper examines the potential implications of interacting with such entities. It will be concluded that extra-terrestrial or other sentient forms of cognition and morality could represent both a risk and an opportunity, with the likelihood of a favorable outcome increasing in correlation with scientific progress and cognitive and moral enhancement of humanity.

Keywords: X-risk; X-opportunity; epistemological limitations; philosophy; (astro)biology; Fermi paradox

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1. Human Epistemological Limitations

In Rakić (2024) it has been argued that all existing resolutions to the Fermi paradox are in their essence anthropocentric. It proposed a non-anthropocentric solution to the Fermi paradox: the 'lasting human epistemological limitations solution'. This resolution to the Fermi paradox acknowledges that human epistemological capacities are limited to the degree that not only extraterrestrial forms of life may be unobservable to the human perceptive apparatus, but that universes may exist around humans with forms of life, inorganic matter or entities of any other type that humans are incapable of perceiving.

Using the conclusions from Rakić (2024) in this paper we will discuss the issue of whether extra-terrestrial or other sentient forms of cognition and morality are an X risk for humanity or possibly even an opportunity for humans to become cognitively and morally enhanced. A distinction between extraterrestrial and "other sentient forms of cognition and morality" is based on the following: it is possible that sentient non-extraterrestrial intelligence exists, but that humans lack the perceptive apparatus to notice it; this intelligence may even be superior to human intelligence - the intelligence of the *homo sapiens*.

In line with this direction of thought, the basis of the proposal of the solution to the Fermi Paradox in Rakić (2024) was the argument that human epistemological capacities are highly limited, even to the extent that humans may be surrounded by beings that even live around them, while they do not, and (still?) *cannot*, observe their existence.

This means that the epistemological limitations of humans extend beyond the confines of extraterrestrial life to encompass forms of intelligence that might exist right here on Earth, yet remain imperceptible to us due to our limited sensory and cognitive apparatus.

The epistemological limitations of the human cognitive apparatus, which hinder the detection of certain life forms, underscore the importance of biological research into extremophilic organisms on Earth. Such research not only broadens our understanding of life but also raises questions about how adaptability and complexity in biological systems could serve as a model for identifying undiscovered forms of intelligence and morality, whether terrestrial or extraterrestrial. For instance, studying the biochemical properties of extremophiles highlights the capacity of life to thrive under conditions far beyond human expectations, urging us to rethink anthropocentric assumptions about habitability.

As we explore these limitations, we begin to see the potential for forms of cognition and morality that do not align with human experience. This epistemological framework not only shapes our understanding of imperceptible entities but also aligns with the adaptive potential demonstrated by extremophile ecosystems, which thrive under conditions previously deemed uninhabitable.

Both super-intelligent extraterrestrial civilizations and non-extraterrestrial super-intelligent entities may exist in forms that are fundamentally imperceptible to humans.Moreover, beings that are unobservable to humans do not have to be super-intelligent beings that have taken the form humans cannot perceive. They may have always had such a form. There is no reason to accept the anthropocentric scenario that they have taken this form in order to deceive humans or at least to become undetectable to humans.

Unobservable beings need therefore not be super-intelligent entities that deliberately assumed imperceptible forms. Instead, they may have inherently existed in such forms, independent of any intent to deceive or avoid detection by humans. This challenges the anthropocentric assumption that their imperceptibility to humans is purposeful, as a number of proposed solutions to the Fermi paradox assert (see Rakić 2024).

The argument based on lasting human epistemological limitations is herewith far from exhausted. Entities that have never been perceived by humans because of lasting human epistemological limitations, may namely exist in dimensions humans are incapable of accessing. These entities may even be less or far less intelligent than humans. They may not even be sentient, residing around humans, but be undetectable to us. Humans may have never had the capacity to notice such entities.

A significant number of humans believe that they are the most intelligent beings that have been encountered until now (i.e, encountered by humans). That is a highly biased anthropocentric assumption. For example, what can we conclude about organisms that immediately surround humans? Bugs or worms do not perceive humans as humans perceive themselves. They may experience the consequences of human behavior. Humans can kill them, but bugs or worms will not understand how the lives of their killed kin have been ended. Bugs or worms will experience the consequences of human behavior, but they are unlikely to ever acquire the capacity to perceive humans as they are (or as humans perceive themselves).

Other more advanced organisms than worms or bugs, or artificial entities (possibly certain types of AI), are likely to be capable of observing humans, but in a way that is unknown to humans. How do dolphins or whales perceive humans? How can humans obtain an insight into their perceptive apparatus? We still do not know it.

It is therefore not only feasible that for humans unobservable extraterrestrial life exists, but that also in their immediate vicinity organisms live (or even inorganic entities exist) that humans cannot perceive. Similar to a worm or bug that does not perceive humans, but only experiences the consequences of human actions, humans may not have the cognitive apparatus necessary to notice the existence of certain entities around them. Humans may only experience the consequences of the behaviour of such entities, but not their existence. Furthermore, humans might not even experience the consequences of the behavior of these organisms. As a matter of fact, in certain cases they may experience them and in other cases not.

Some forms of life surrounding humans can be cognitively more advanced than humans, while some other organisms humans cannot observe may even be less cognitively advanced than humans. Both types of organisms can exist on our planet, but they can also be for humans unobservable extraterrestrial forms of life.

Furthermore, humans may not perceive a variety of phenomena around them that are not living beings. Back to the bug, this time an imaginary bug: this form of life may, for example, be able to perceive space in one dimension only; another, cognitively more advanced bug, may perceive space in two dimensions. Humans perceive space in three dimensions, but it is possible that additional dimensions of space exist.

This assumption does however not end there. Humans perceive time in one dimension only.That is a straight line that humans perceive only in one direction: the past. Humans have a conception of the future, but they do not know what will happen in the future. It is entirely feasible however, that the other direction of time already exists – that the future is in a universe that surrounds humans, but that humans cannot perceive it.

It is also possible that, similar to the space that humans perceive, time also has three (or more) dimensions. Humans cannot even imagine how the two (or more) additional dimensions of time would 'look like'. In that respect, humans resemble the bug that perceives space in one dimension only. It has almost certainly no conception whatsoever of how three-dimensional space may look like.

If time itself can operate in multiple dimensions, then the potential for super-intelligent beings existing outside our perceptual scope becomes even more plausible. Just as higher-dimensional time could elude human understanding, so too might beings that operate in these realms, transcending our current notions of intelligence and existence.

These considerations of higher dimensions of space and time echo the epistemological questions posed by Kant over two centuries ago. Just as Kant theorized that our perception of space and time is shaped by inherent limitations, modern physics and systems biology push the boundaries of this understanding, suggesting that time and space themselves may be far more malleable and complex than our current cognitive frameworks allow.

Not being able to perceive other possibly existing dimensions of time, humans have developed the notion of space-time, its curvature and the concept of an endless curvature of space-time in the middle of a black hole – from which a new universe may develop, or has developed, via a wormhole. Other universes humans do not perceive. They can even be around us. In such universes more developed beings than humans may reside. They may be super-intelligent[1].

[1] We are indebted to an anonymous reviewer who pointed to the issue of human and extraterrestrial intelligence having fundamentally different axiological systems that make it difficult to judge each others` values, as well as fundamentally different

More than 100 years after Kant's death, a number of theoretical physicists and philosophers have arrived at a better understanding of Kant's epistemology, that is, at a better comprehension of the role of Kant's a priori forms of apperception: new concepts of space and time have been developed. Kant's notions of a priori forms of apperception, notably time and space, have been revolutionized in theoretical physics and philosophy. The relativity of time, the conception that time even does not exist, the replacement of time and space with space-time, the curvature of space-time, the concept from quantum physics that the same particle can exist at the same time at different locations, and the notion that the curvature of space-time in the middle of a black hole is unlimited and that this provides the opportunity for the development of a new universe, are immense breakthroughs in human thought.

2. Are Extraterrestrial and Other Entities Humans are Unaware of a Likely X-risk or an X-opportunity?

The previous chapter serves, among else, as a background for answering the central question of this article: are extraterrestrial and other to humans fundamentally incomprehensible forms of cognition and morality an X-risk for them or a new opportunity, even an X-opportunity?

The following four options underly the previous question:

1. Organisms that are cognitively more advanced than humans, but which are morally underdeveloped in comparison to humans.

2. Organisms that are cognitively less advanced than humans, but which are morally superior to humans.

3. Organisms that are both cognitively and morally less advanced than humans.

4. Organisms that are both cognitively and morally more advanced than humans.

Additionally, entities that are unobservable to humans do not have to be sentient beings or even organisms. This possibility is however of no help to finding an answer to the key question that is being asked in this article. Hence, the focus will be on the four mentioned options, all of them dealing with living organisms or other sentient entities.

1. Sentient entities that are cognitively more advanced than humans, but that are morally underdeveloped in comparison to humans are an obvious danger to humanity. Moreover, there does not seem to be much humans can do in order to protect themselves from such beings. The only protection can come from externalities, such as this type of extraterrestrial intelligence not being sufficiently developed to harm humans. For example, it can lack the means to reach the Earth (in whatever form), it might lack the

language structures that challenge each other`s communication and comprehension. For example, Nicholas Agar's discussion of radical human enhancement in his 2010 book *Humanity's End* advances a conjecture about this species-relativism of values: what if radical enhancement produces posthumans whose values are fundamentally different from ours? Could there be a sense that is not relative in which posthuman values are better or worse than ours (see Agar 2010)? In addition, would we be even able to communicate with intelligent extraterrestrials whose languages are different in their fundamentals from ours? The Sapir-Whorf hypothesis and discussions in cognitive science and linguistics about how language structures thought offers valuable insights into this issue.

means to observe humans or it may not be interested in harming humans. Obviously, a combination of these possibilities might also be in play.

The option that intelligence superior to humans does not exist is practically zero if the Universe is so tremendously large that it approaches infinity. In such an infinity it is almost certain that intelligence superior to human intelligence does exist. Its likelihood is close to 1. A number of solutions to the Fermi paradox deals with this issue, while the proposal that attempts to resolve it in a radically non-anthropocentric manner is relevant to option 1 and option 4 (see Rakić 2024).

If this type of immoral cognitively superior intelligence comes into contact with humans, it is possible (but not necessary) that it would not hesitate to cause harm to humans, either for their own rational benefit or for a sadistic enjoyment of evil, in this case of harming humans for the sake of causing harm to them. Hence, this type of sentient beings are the most serious danger to humans: it is more likely that they will come into contact with humans than humans or to humans inferior beings with them, and if they do come into contact with us their intentions might very well be malevolent toward us.

In principle, there are three types of immoral reasoning and/or behavior we are aware of. First, people who believe that they act morally when they do not. This is a type of cognitive impairment, even if it is rooted in an uncritical judgment of oneself. Such people are by no means exceptional. In fact, they may very well be the majority in the world. This would imply that most of us have a type of cognitive impairment in their moral reasoning. They are the most difficult type of humans to change to the better, as they have convinced themselves that their actions are always or usually moral, even if it is obvious to others that they are not. Their uncritical approach to themselves makes it difficult to them to change to the better. Similar to the tremendous challenge to cure or even help a mentally ill patient who believes that she is healthy, a person who thinks that her actions are always or almost always moral, is an unlikely candidate for moral betterment. Second, some people know that they frequently do not act in line with what they think is morally right, they may even feel guilty about it, but they do not have the motivation to change their behavior. They "suffer" from the comprehension-motivation gap (Rakić 2017a, 2017b, 2018). Third, there are people who are evil for the sake of evil. They enjoy being evil. Their evil is doctrinal. If they cannot be God, being a devil is some compensation for their need to exercise power. Similar to the first type of people, they cannot be expected to change to the better (although for different reasons than people of "type 1") .

In option 1, extraterrestrial or other to humans unobservable intelligence can very well cause harm (including harm to humans) and choose evil for the sake of evil. Their power is not unlimited and if they consequently cannot be beings that are maximally powerful and maximally good, such as God is envisioned at least in the three major monotheistic religions currently acting on Earth, why not be an enormously powerful evil? All in all, option 1 is a significant X-threat to humans, if the intelligence we deal with in that option becomes sufficiently developed to come into contact with humans.

2. Sentient beings that are cognitively less advanced than humans, but which are morally superior to humans can only be envisioned as entities that act always or frequently in line with the moral principles according to which they believe they ought to act. As has already been pointed out, humans often fail to act in that manner. It hasbeen argued that this "comprehension-motivation gap" is the "greatest predicament of human moral existence" (see Rakić 2017a, 2017b, 2018).

If extraterrestrials or other to humans unobservable and incomprehensible entities that are morally superior to humans but cognitively inferior to them do exist, they do not pose a danger to humanity because of two reasons. First, because they are cognitively inferior to humans, they cannot have an impact on them, as they are highly unlikely to detect humans. Second, even if they would be able to come into contact with humans, their impact could only positively affect us (humans) as we could learn from them to act in accordance with how we believe is morally right to act. They would help us bridging the comprehension-motivation gap. Alternatively, humans would understand that the cognitive shortfalls of these entities disable them to understand correctly what is morally right and what is morally wrong and they would therefore not have an impact on superior human understanding of right and wrong. In that sense, such entities could benefit from humans.

In sum, possibility 2 is highly unlikely to have an impact on humans, and if it does, its impact could only be positive or neutral vis-a-vis human morality.

3. Sentient entities that are both cognitively and morally less advanced than humans pose an extremely minor danger to humans. First, their cognitive inferiority makes it highly unlikely that they will detect humans. Second, even if they detected humans (or humans detect them), their cognitive inferiority would makes it extremely difficult for them to cause any harm to humans. This applies both to harming humans with evil actions and to harming humans by serving in any way as moral examples to humans.

4. Sentient entities that are both cognitively and morally more advanced than humans can be both a threat and an opportunity to humans. Assuming that such entities are either extraterrestrial intelligence or to humansunobservable and incomprehensible terrestrial intelligence, they will be better able to detect humans and to come into contact with them.

Such entities can be good to humans for the sake of good. Being morally more developed than humans they can have an expanded circle of entities to which they apply their principles of superior morality. In line with Peter Singer's ethical concept of "expanding circles"of morally relevant entities (Singer 1981), it can be argued that the development of morality is marked by an ever expanding circle of entities to which moral principles apply: slaves, women, certain races or poor people had been excluded from this circle, but humanity made huge leaps forward in that regard. Nowadays animals have begun entering this circle. There are all reasons to believe that intelligence and morality that is superior to humans includes humans in its circle of beings to which moral principles apply and whose rights count. This implies that morally superior beings will not use humans as instruments - ranging from conducting experiments on them to using them for the purpose of entertainment.

What does endanger humans is that the cognitively and morally superior entities sacrifice humans if that is for whatever reason in their interest. Humans would in that case be defenseless. First, they are cognitively impaired, relative to the entities we discuss in this section. Second, if humans are aware that they are morally inferior, they would have a moral duty to accept the morally superior beings to continue to exist and, if necessary, to accept their own (human) demise. It is only to be hoped that such demise would be gradual and that existing human individuals would have the opportunity to continue to live without suffering in a dignified manner, which would mean that annihilation would not affect existing human individuals, but the human species in a gradual manner.

It is however also possible to imagine humans benefitting from entities that are cognitively and morally superior to them. For example, if factions of these entities are not

on friendly terms with each other, one faction could possibly use humans to help in harming the other faction. Humans could be given certain benefits for such a role, but it is still far from being an enviable situation. First, the faction that uses humans against another faction or factions can be defeated in its conflict. In that case humans might be punished by the victorious faction for supporting the defeated faction. Second, the "pro-human faction" may abort its initial decision to give humans privileges in exchange for their support. Reasons for such a decision may range from finding better ways to conduct the conflict, via the conflict coming to an end and humans being left without support as they would have become useless as a party in a conflict that has been resolved, to the faction that used humans to support it in its conflict having become victorious, rendering human support superfluous. Third, humans being aware of being instrumentalized as a means for ends of other sentient entities adversely affects the dignity of humans. Fourth, humans not knowing that they are being used as means for objectives of other intelligent entities is also a role that places humans in an undignified position.

Finally, coming back to the issue of rightful human extinction, it is possible that extinction is not extinction of the type how humans view it. It is possible to imagine that extinction is merely the adoption of an alternative form of existence. It might be possible to those who rightfully annihilate humanity to enable humans to exist in another dimension of space and especially time. Again, we do not know if dead people continue to exist as to humans unobservable entities around humans - either close to humans or far from them (whatever close and far might mean in this context). Similarly, annihilated human individuals or the annihilated human species (both in its current form) might be offered the opportunity by the entities that annihilated them in this form to continue to exist in another form. Or, such a scenario might be a natural scenario after the death of humans – a scenario living humans are unaware of.

In order to incorporate in our argument the importance of biological research into extremophilic organisms, as well as to make this line of thought more accessible to empirical reasoning, we will turn to several issues from the domain of (astro)biology: forms of life that are currently unobservable and incomprehensible to humans, yet about which some indirect knowledge can be inferred. This includes microbial extremophiles, whose biochemical adaptations provide insights into potential life in extraterrestrial environments.

3. Epigenetics, Biological Information, and Systems Thinking as Foundations for Understanding Different Forms of Life

Epigenetics has significantly broadened our understanding of how organisms interact with their environment. Two examples follow.

Example 1: Extremophile Microbial Ecosystems

Discoveries of extremophile microbial ecosystems thriving in inhospitable environments (Baross & Hoffman 1985), such as hydrothermal vents on Earth's ocean floors and hypersaline lakes, have revolutionized our understanding of life's adaptability. These organisms defy traditional assumptions about habitable conditions, relying on biochemical pathways such as chemosynthesis rather than photosynthesis. Systems biology has been instrumental in decoding the networked interactions within these ecosystems, showing how such organisms collaborate in nutrient cycles and energy flows. This systems-level perspective informs astro-biological efforts to model potential extraterrestrial ecosystems in environments like *Europa*'s subsurface oceans or *Enceladus*'s ice-covered seas. Understanding how biological systems dynamically adapt to

environmental extremes enhances our capacity to theorize about the survival mechanisms of both terrestrial and extraterrestrial life forms.

If life can emerge and persist in such extreme conditions on Earth (Rothschild & Mancinelli 2001), it increases the likelihood of and expands the potential for its existence in analogous extraterrestrial environments, supporting the argument that our epistemologicallimitations have constrained the search for alien intelligence.This insight reinforces the argument that epistemological limitations are not mere theoretical abstractions but have concrete implications for how we design tools and methodologies to detect and interpret extraterrestrial life. Understanding extremophiles broadens the conceptual framework for identifying life forms that challenge anthropocentric assumptions.

Including epigenetics in this discussion underscores a critical dimension of the argument: the complexity and adaptability of life systems challenge simplistic, anthropocentric views of intelligence and cognition. Epigenetics reveals that organisms are not static entities defined solely by genetic inheritance but are dynamic systems, capable of responding to their environments in ways that extend beyond traditional genetic frameworks. This adaptability offers a glimpse into how life forms—potentially including extraterrestrial or currently imperceptible terrestrial life—could exist and evolve outside conventional scientific paradigms.

It highlights the role of heritable changes in gene expression that do not involve alterations to the DNA sequence, influenced by factors such as behavior, stress, and ecological conditions. This "epigenetic turn" underscores the complexity of life systems and has challenged traditional dichotomies in evolutionary biology between "ultimate" and "proximate" causes.

Astrobiology greatly benefits from the insights provided by epigenetics, as it broadens the scope of what constitutes 'life'. Epigenetic adaptability implies that extraterrestrial organisms might thrive in conditions that defy terrestrial models. This interplay between genetic and epigenetic factors underscores the role of adaptability in life systems, hinting at possible evolutionary trajectories for extraterrestrial intelligence.

For instance, heritable gene expression changes could facilitate survival in volatile environments such as those on Mars or Europa, where traditional genetic theoretical frameworks would fail. Recognizing such adaptive processes expands the range of environments considered habitable and compels the development of tools to detect these epigenetic signatures in extraterrestrial contexts (Schulze-Makuch & Irwin 2008).

Systems biology further complements this perspective by providing a framework to examine life as an interconnected network of dynamic interactions. By moving beyond a reductionist focus on individual components, systems biology allows us to explore emergent properties of life that may defy human comprehension. This integrative approach is particularly relevant to the study of life forms that do not conform to established biochemical or morphological expectations, highlighting the need for interdisciplinary methods in addressing epistemological limitations when searching for or conceptualizing alternative intelligences (Walker & Davies 2013).

Systems biology provides a critical lens through which we can examine these phenomena. By focusing on networks and interactions rather than isolated components, systems biology emphasizes the dynamic, emergent properties of living systems. This perspective suggests that life cannot simply be reduced to its molecular basis; instead, it

must be understood as a network of interactions shaped by both genetic and epigenetic factors.

Similarly, systems biology offers a transformative approach to understanding alien life. By emphasizing the emergent properties of complex networks, it provides a means to conceptualize life forms that operate beyond the constraints of terrestrial ecosystems. This perspective enables astrobiologists to theorize how silicon-based or quantum informational life might function, emphasizing the interconnectivity of molecular systems rather than their individual components. Such models are indispensable for interpreting signals or phenomena that traditional reductionist methods might overlook. The moral implications of such discoveries suggest that life, in all its forms, evolves within a spectrum of cognitive and ethical possibilities that challenge anthropocentric biases.

While epigenetics provides insight into the ways in which organisms can adapt and evolve beyond genetic inheritance, systems biology offers a broader perspective on how these interactions shape the complex dynamics of living systems. Together, they underscore the potential for life forms to function in ways that are beyond human comprehension, further complicating our search for alien intelligence.

Jablonka and Lamb's work(Jablonka & Lamb 2005), exemplifies this integrative approach, proposing a framework that encompasses genetic, epigenetic, behavioral, and symbolic inheritance systems. This model supports the idea that living systems can adapt across multiple generational levels through mechanisms far more nuanced than classical genetics alone.These insights suggest that life beyond Earth might not conform to terrestrial life patterns of carbon-based biochemistry or DNA-RNA-protein systems.

Example 2: Exoplanet Biosignature Diversity

The recent characterization of thousands of exoplanets has introduced a paradigm shift in astrobiology, emphasizing the need for non-traditional biosignatures. Planets like TRAPPIST-1e and LHS 1140b, located in their stars' habitable zones, challenge Earth-centric models of life due to their distinct atmospheric and surface conditions (Meadows 2017). Advances in systems biology have enabled predictive models that integrate planetary chemistry, energy availability, and biological processes to hypothesize alternative life-supporting systems. For example, silicon-based life or life relying on sulfur-rich metabolic pathways might thrive in conditions entirely different from Earth's (Seager, Schrenk & Bains 2012).

These discoveries also underscore the importance of novel frameworks in resolving the Fermi paradox, as they provide tools to conceptualize and detect life forms that transcend human perceptual and cognitive boundaries.

Epigenetic and systems biology perspectives provide a new dimension to understanding moral development through the lens of evolution. Adaptive mechanisms that enable survival in extreme conditions suggest that morality could be viewed as an evolutionary strategy, adaptable to different ecological and social environments. This hypothesis extends to astrobiological investigations, where the moral codes of unknown civilizations might be shaped by their environments and survival needs, potentially differing from human standards, yet not necessarily in a negative sense.

Non-anthropocentric approaches to the search for extraterrestrial life could involve exploring alternative molecular systems, such as silicon-based life or quantum mechanical informational processes. Additionally, they challenge us to develop tools that move beyond traditional biosignatures to detect such life forms.

4. Dimensions of Space and Time: Limits of Human Perception and The Potential of Dimensional Realities of Life That are Unknown to Humans

The concept of space and time as fixed entities has been fundamentally revised by theories in modern physics. For example, the previously addressed curvature of space-time introduced by general relativity and the multi-dimensional possibilities explored in quantum mechanics provide a framework for thinking about higher-dimensional realities. However, systems biology and the philosophy of biology add a valuable dimension to this discussion: how such higher-dimensional realities might relate to life itself.

We previously argued that higher-dimensional life forms might operate in realms inaccessible to human perception and understanding. For example, they could exist in temporal frameworks that allow for bidirectional or non-linear time. This would be analogous to how bugs, worms, ants or otherrelatively simple organisms experience and process the world around them: their limited sensory apparatus prevents them from perceiving the human scale of existence, even though humans are a dominant force in their environment.

Instead of delving into speculative string theory, a more grounded approach involves examining how systems biology integrates temporal dynamics into its models. The feedback mechanisms and multi-scale interactions that define living systems might hint at how complex life adapts to—and potentially thrives in—dimensions beyond our current comprehension. For example, epigenetic modifications might operate differently in these contexts, offering new pathways for the emergence and evolution of life.

By taking cues from developmental systems theory and the concept of downward causation (in which higher-order system properties influence lower-level processes), we can speculate about how higher-dimensional beings might organize their existence. By bridging these perspectives, humans can reframe the search for alien intelligence as not only a scientific challenge but also an ethical opportunity to redefine our place within the Universe.

Considering the potential existence of extraterrestrial or terrestrial but imperceptible forms of life imposes an ethical responsibility to expand human understanding through an interdisciplinary approach that integrates philosophical, biological, and technological methods. If humans remain confined to their epistemological boundaries, they risk overlooking not only potential threats but also opportunities that such entities might bring, both in terms of moral progress and a broader understanding of life and the Universe.

This approach not only aligns with theoretical biology but also ensures that discussions remain rooted in *both* empirical and philosophical frameworks. Future advances in areas such as quantum biology or synthetic life engineering may further erode anthropocentric biases, providing empirical evidence that human-centric models of cognition and morality are insufficient to encompass the diversity of potential life forms and intelligences.

5. Conclusions

Extraterrestrial or terrestrial intelligence that humans are incapable of perceiving might possibly be both a threat/risk and an opportunity to humans. It is highly likely that it will *not* be either a threat/risk or opportunity in case we assume otions 2 and 3: organisms that are cognitively less advanced than humans, but which are morally

superior to humans *and* organisms that are both cognitively and morally less advanced than humans (see the beginning of the previous chapter).

Option 2 is highly unlikely to come to fruition. It is difficult to imagine that entities cognitively inferior to humans will acquire the capacity to establish contact with humans. If humans have not succeeded in communicating with extraterrestrial or other to humans unobservable intelligence that is superior to humans for such a long time, the likelihood of to humans inferior intelligence succeeding in communicating with humans is extremely low. It is possible that humans succeed in establishing such communication at some point, but their cognitive superiority will protect them against cognitively inferior entities. Hence, even if such entities are morally inferior to humans, they do not pose a threat that is even close to being likely.

Option 3 is as unlikely to occur as option 2 - also because extraterrestrial or other to humans unobservable intelligence that is cognitively inferior to humans can hardly be considered, even with a significant stretch of imagination, as being capable of establishing communication with humans. Their moral superiority to humans does not change anything in this argumentation. It can only be added that morally superior entities that would in some hardly imaginable manner come into contact with humans do not pose an X-risk or lesser danger to humans, because they are morally superior to humans, and even if their moral superiority would lead them to consider sacrificing humans for whatever reason, their cognitive inferiority would protect humans from them.

Options 1 and 4 (organisms that are cognitively more advanced than humans, but which are morally underdeveloped in comparison to humans *and* organisms that are both cognitively and morally more advanced than humans) are potential X-threats to humans, because in both cases we deal with intelligence that is cognitively superior to human intelligence, which means that they can come into contact with humans and pose a threat to them with their cognitive superiority. Even if humans were the ones to establish communication with such entities, they would still pose a potential X-threat or lesser danger to humanity.

Option 1 is especially dangerous, because the moral inferiority of such beings make them likely candidates for inflicting harm on humans. Such harm can consist of sacrificing humans, using humans as slaves of various types or treating them as means of entertainment (beings with laughable, weird or/ and disgusting physical or mental proclivities that are fun to display). Humans would have the chance to be used as allies of certain factions within groups of such cognitively superior and morally inferior entities, but such alliances are potentially shortlived and in other ways not a favorable perspective for humans, as has been previously discussed.

Possibility 4 is the most likely one and can bring humans both significant benefit and harm. Humans cannot control this possibility coming to fruition, apart from the fact that scientific advance lowers the likelihood of an adverse outcome for humans. The reasons for that are the following: the cognitive (and possibly moral) superiority of extraterrestrial or other intelligence may become less pronounced, so that humans would be better protected; such intelligence might be less inclined to harm beings that are cognitively and morally closer and better understandable to them; humans might be better able to control if, when and how to establish communication with them.

All in all, what humans ought to do is enhance their abilities of perceiving and understanding those entities that are still unobservable and incomprehensible to them. This includes investing resources in science: astrophysics, space exploration and astrobiology in particular. Its importance has been showcased in the sections on

astrobiology in the previous chapter. Moreover, humans should do whatever they can to enhance themselves cognitively and morally, both via traditional paths and in safe pharmacological and other neuro-stimulative ways. Only then will they be able to come into contact with extraterrestrial or other currently unobservable and incomprehensible entities, understand them, protect themselves against them and learn from them to become additionally cognitively and morally enhanced. It is however highly likely that some entities that are *fundamentally* unobservable and incomprehensible to humans will retain such a status, no matter how much humans advance cognitively or develop AI that is superior to human intelligence. Nonetheless, scientific advances and cognitive and moral enhancement will lower X-risks to humans. We have attempted to present a number of essential reasons supporting this argument.

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