

THE MIND'S EYE: DE-MYSTIFYING CONSCIOUSNESS

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Abstract: The field of consciousness studies has been an area of active research for well over a century. Perhaps more than any other field, it has proven to be a magnet for numerous disciplines: from philosophy and religion to neuroscience and psychology, to social sciences and more. Even quantum physics has claimed to offer important insights that explain the mystery of subjective experience. Today, consciousness studies are a thriving area of research with numerous theoretical perspectives to its credit. Yet the “hard problem” of subjective experience remains unsolved. There is still no general theory of consciousness that would synthesize the extensive aggregation of theoretical perspectives and empirical facts.

The article offers an explanation for this obvious anomaly. It argues that the failure of one of the most active fields of inquiry is a result of the dominance of the anthropocentric tendency in consciousness studies. The article starts by offering a critical overview of the prevalent theoretical approaches in the field. It tries to show the pervasive influence of anthropocentrism. The article also outlines a new perspective that escapes this insidious influence. The focus of the new perspective is not on specific functions and aspects of consciousness, as in all currently dominant approaches, but on the process that has been involved in their formulation. The focus offers a possibility to view consciousness from the perspective that does not rely on mental constructs created by humans. The perspective also offers a critically informed point of observation that does not depend on human choices.

Key words: Consciousness, theories of consciousness, the “hard problem,” functions of consciousness, anthropocentrism, animal consciousness, equilibration/computation, and the process of creation.

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Introduction

“There are many wonders and none is more surprising than humanity.”¹ This opening line from the “Ode to Man” written about 441 BC by Sophocles for his famous tragedy *Antigone* captured what has been and remains one of the most enduring fascinations of the human race—its fascination with the human mind. This fascination is not specific to some time period, race, or culture. It is truly universal.

Consciousness has been and remains the mysterious source of this fascination. It holds the key to understanding the relationship between the mind and body, or more broadly the mind and matter. Thomas Nagel has noted: “Consciousness is what makes the mind–body problem really intractable.”² Our relationship with nature vitally depends on the solution of the problem of consciousness.

Consciousness has been the subject of numerous books, academic and non-academic articles, and countless research projects and conferences. Yet today we are not much closer to solving this mystery than we were in the past. The seemingly endless quest for understanding consciousness has even become a source of despair. Some prominent contributors to consciousness studies—Thomas Nagel, Colin McGinn, and David Chalmers among them—have expressed serious doubts as to whether humans are cognitively capable of understanding the subjective experience, or what Chalmers calls “the hard problem.”

The importance of the problem of consciousness is hard to overestimate. After all, consciousness is an essential part of our personal lives. Without consciousness there would be no civilization. A solution of the problem of consciousness will have important consequences for the survival of our civilization, as well as our personal wellbeing and fulfillment.

There is no shortage of theories of consciousness. They represent a huge and rich diversity of views and opinions. Yet despite the accumulated knowledge and numerous theoretical perspectives, we still do not have a general theory of consciousness that would provide a definitive explanation consciousness. We still do not understand the nature of consciousness—the essential function or functions that make consciousness what it is; nor do we know how consciousness originated. Only a comprehensive general theory of consciousness can resolve these issues.

Before engaging these issues directly, the article will provide an overview and a critique of the dominant theoretical perspectives on consciousness. Following the critique, the article will outline a new and comprehensive approach toward the problem of consciousness. This approach follows from the recognition of the evolutionary origin of consciousness. Consequently, it focuses on the process that propels the evolution. The article will demonstrate links between several important functions and features of consciousness and aspects of the process that propels the evolution in general. A general theory needs a general point of observation. The process that makes the evolution possible can provide such transcendent point of observation and can serve as the foundation for a general theory of consciousness.

The article will also raise an important ancillary issue that, the article will show, is the most significant obstacle that prevents the formulation of a general theory. This issue transcends consciousness studies but its relevance to the field is unquestionable. All current theories of consciousness use a common approach. They try to identify specific aspects or features that, in their view, define consciousness. The selection of the foundation for their theoretical perspectives definitely represent a human and, therefore, subjective choice. Thus, subjectivity enters their theoretical thinking and makes agreement among them very difficult and even impossible.

The article identifies this phenomenon as anthropocentrism—that is, the tendency to view reality from a perspective that relies on mental construct created by humans and on

human choices. Anthropocentrism is not specific to consciousness studies. It is a much broader phenomenon that affects many fields. Transcending anthropocentrism is extremely important, both for consciousness studies and for many other fields—protection of the environment is perhaps the most obvious one.

Viewing consciousness through the prism that is neither a human creation nor a result of human choice is the way to transcend anthropocentrism. Such non-anthropocentric perspective will serve as a good foundation for a theory of consciousness that will be objective, general, and non-arbitrary.

The Main Theoretical Perspectives in Consciousness Studies

The modern field of consciousness studies offers a broad array of very diverse perspectives. In their very thorough and comprehensive study that has assessed 1130 articles on consciousness, Davide Sattin and his co-authors have identified twenty-nine different models that describe a variety of heterogeneous perspectives on consciousness. A detailed discussion of all these models is beyond the scope of this article. The study of Sattin and his colleagues does an excellent job and there is no need to duplicate their work in these pages.³ A brief overview of the main theoretical perspectives will be quite sufficient.

The most popular perspective in consciousness studies is one that focuses on establishing neural correlates of consciousness. It is not really a theory, but rather an approach and a method. It originated back in the 1950s and from the very beginning relied heavily of neuroscience.⁴ In a nutshell, this approach pursues identifying one-to-one correspondences between specific parts of the brain architecture and various manifestations and aspects of consciousness. The idea is that correlations between specific phenomena of consciousness and neural activity in the brain will eventually lead to the formulation of a general theory.

Although efforts to establish neural correlates of consciousness (NCC) have provided much factual material that shows, their contribution to our general understanding of consciousness has been modest. As Michael Graziano has summarized, NCC studies “play to our intuitions, but don’t actually explain anything.”⁵ However, despite its shortcomings, this approach certainly remains a valuable source of information in consciousness studies. For this reason, it still commands a great deal respect and attracts many followers. According to Sattin et al., NCC studies remain most referenced in the literature on consciousness.⁶

There has been a recent attempt to modify this approach with a view towards formulating a general theory of consciousness. Anil Seth, a British neuroscientist, who is instrumental in promoting this variety of NCC, calls it the predictive processing approach (PPA). PPA is a response to the admission of the intractability of what Chalmers and many others call the “hard problem of consciousness.” Where Chalmers sees the “hard problem,” Seth sees “the real problem.” His focus is on explaining, predicting, and

controlling various properties of consciousness as “physical processes in the brain and body.” According to Seth,

The real problem isn't a completely new way of thinking but, for me, putting things in terms of explanation, prediction and control has helped to crystallise what a successful science of consciousness should look like, since these are the criteria that are applied in most other fields of science.⁷

Although Seth's approach to NCC certainly has innovative features, it still remains to be seen whether this new variety will be more successful in leading to the formulation a general theory of consciousness than the more traditional one.

There are other perspectives in consciousness studies that try to overcome the shortcomings of the strictly empirical approach and formulate a general theory of consciousness. These perspectives focus primarily on some specific functional aspects of consciousness that, in their view, define consciousness and try to formulate a general theory of consciousness. They offer their explanations of what consciousness is and how it originated. The evolutionary focus is a characteristic feature of these contributions. The origin of consciousness, as well as its connections to and its place in the evolution, are popular themes in these studies. Although this direction in consciousness research has produced a multitude of new theories—too many to cover in this article—several major theoretical perspectives stand out in this group. My reason for singling them out is their particular interest in integrating contemporary perspectives and formulating a general theory of consciousness.

Global workplace theory, or GWT, is one perspective that has a strong appeal and a sizable following. Its main idea is that consciousness fundamentally serves the coordinator that makes cognitive content globally available for various mental operations. According to GWT, the brain is the site where all kinds of information—both the information that comes from outside the brain through senses and the information that is generated internally—compete for attention. Winners in this competition become globally accessible throughout the brain. As a result, the brain becomes aware of this information and is able to process it on a deeper level.⁸

Integrated information theory (IIT), developed by Giulio Tononi, Christof Koch and others, focuses on integration as a defining feature of consciousness. According to this theory, experience has certain essential intrinsic properties integrated in the subject's consciousness. The brain links and coordinates various disconnected scraps of information. Consciousness is a result of reflection on the outcome of the integration of large amounts of information obtained through experience.⁹

The higher order thought theory, or HOT, is yet another influential perspective. Its central focus is on the reflective function of consciousness. Proponents of HOT argue that consciousness is essentially a level of organization that reflects the information generated by sense stimuli in the brain. Thus consciousness, in their view, is the re-representation of mental constructs in the brain on this higher reflective level.¹⁰

Attention Schema Theory (AST) is another variety that emphasizes the reflective function of consciousness. The starting point of this theory is a simple fact that the brain is required to handle huge amounts of information that flow through it. There is no way that the brain can give equal attention to all this information. For this reason, in the course of the evolution the brain developed a capacity for discrimination. It selects and processes, or reflects, on some tranches of information and not others. Consciousness is a result of this selective capacity for reflection.¹¹

These theoretical perspectives certainly do not exhaust the list of other candidates that are proposed as the defining feature or features of consciousness. Some researchers see cognition, or sentience, as a distinct possibility;¹² others emphasize intentionality and unlimited associative learning;¹³ still others offer their own choices. The list of possibilities is extensive. The sheer number of the proposed possibilities is disorienting as one finds hard to combine them into a comprehensive interpretation.

Chasing after the evolutionary origin of the proposed definitive functions and features of consciousness the proponents of these possibilities find consciousness in the most unusual and unexpected places. In addition to other primates, researchers associate the origin of consciousness with mollusks, insects, plants, and even individual cells.¹⁴ And the list does not end there. Some generalists regard consciousness as a property of life in general not just some species.¹⁵ There are even those who posit the existence of a “proto-consciousness field” that extends through all of space, adding another dimension to the already prevailing confusion.¹⁶

This brief recapitulation of some of the most popular theories of consciousness certainly is not an exhaustive coverage of the richness and diversity of the field of consciousness studies. The omissions are too many to recount. For example, it offers little on efforts to connect theory of consciousness with quantum physics—an area that attracts a great deal of attention. The purpose of the above account is to give a very general idea, not a detailed examination. However, even this brief account shows the main directions of research. Although the empirical approach remains popular, the growing preoccupation in the field is with the functional aspects of consciousness. One important reason for this preoccupation is that many see that the focus on functional aspects offers some, however rudimentary, possibilities for formulating a general theory.

Michael Graziano and his co-authors, for example, suggest that a possibility for formulating a general and comprehensive theory exists and the functional approach may very well be the way. They, among others, understand that many important current theories in the functional approach represent “interlocking perspectives on the same underlying mechanism” and argue in support of strengthening connections among these perspectives. In their contribution on the standard model of consciousness, they offer the following observation:

Contrary to the platitude that science does not yet understand consciousness, we suggest that a subset of theories and ideas already point

toward a core explanation. We may now have a “standard model” of consciousness—a family of theories that cohere and provide a working, mechanistic, scientifically meaningful, and even artificially buildable understanding of consciousness.¹⁷

A general theory of consciousness would certainly be a very welcome development in consciousness research. Such theory will help to streamline and coordinate diverse theoretical and empirical contributions. As a result, energies and efforts of many researchers will complement each other in a common enterprise. Graziano and his co-authors definitely have a point but they may overstate the current state of consciousness studies. However welcome the intuitions about commonalities, interlocking features, and possibilities of bridges among current theories may be, however intriguing the suggestion that they point to a underlying common mechanism is, they still do not amount to a general theory.

The minimum requirement for such theory is a common point of observation of the phenomenon of consciousness. All current theories and models offer their unique perspectives that are ultimately based on mental constructs created by those who formulate these theories and the choices they make. The fact remains that all current theories of consciousness, to one degree or another, are exclusionary, subjective, and ultimately arbitrary. They have no common point of observation, which makes a general theory of consciousness elusive.

Defining Consciousness

The problems in consciousness studies discussed above are critical. Any further advance in the field depends to solving these problems. Definition of consciousness is a good starting point.

Current Definitions

There is no shortage of definitions of consciousness. They vary in their degree of sophistication and comprehensiveness. The most going, and perhaps the least useful definition describes consciousness as “sentience or awareness of internal and external existence.”¹⁸ The definition provided by the Oxford Dictionary is useful but limited. According to this definition, consciousness is “the state of being awake and aware of one's surroundings.”¹⁹ Attempts to provide a comprehensive definition are not particularly successful. The definition that tries to be inclusive and describes consciousness as “the totality of one's thoughts, feelings, and impressions; conscious mind” ends up being too vague and confusing.²⁰ Christof Koch, a prolific scholar on the subject, is eloquently but short on substance: “Consciousness is everything you experience. It is the tune stuck in your head, the sweetness of chocolate mousse, the throbbing pain of a toothache, the fierce love for your child and the bitter knowledge that eventually all feelings will end.”²¹

Perhaps somewhat more successful are definitions that point to the protean functional multiplicity of consciousness. For G. Vithoukas and D. F. Muresanu, consciousness is “the function of the human mind that receives and processes information, crystallizes it and then stores it or rejects it with the help of . . . the five senses, the reasoning ability of the mind, imagination and emotion, and memory.”²² Boris Kotchoubey, of the University of Tübingen in Germany, imaginatively describes consciousness as behavior that emerges “on the interface between three components of animal behavior: communication, play, and the use of tools” and is “controlled by the brain.”²³

Quite a few definitions recognize the futility of trying to define consciousness. *The Stanford Encyclopedia of Philosophy* points to the diversity of meanings of consciousness that defies a strict definition:

The words “conscious” and “consciousness” are umbrella terms that cover a wide variety of mental phenomena. Both are used with a diversity of meanings, and the adjective “conscious” is heterogeneous in its range, being applied both to whole organisms—creature consciousness—and to particular mental states and processes—state consciousness.²⁴

Grant Currin largely projects a similar view in his contribution to *Live Science*. He writes:

Scientists and philosophers still can't agree on a vague idea of what consciousness is, much less a strict definition. One reason for that is that the concept is used to mean slightly different things.²⁵

A Working Definition

Considering the wide-spread admission that the current definitions consciousness are not satisfying, focusing attentions on functions, particularly those functions that researchers consider primary, may prove to be a productive approach. As has already been indicated, many current theoretical perspectives use the functional approach. The main thrust of these contributions is to determine the definitive feature or features of consciousness.

The most popular theoretical perspectives that have been discussed earlier identify several important functions of consciousness: information processing, integration of information, reflection, regulation, and cognition. One can subdivide these main functions into several groups based on some underlying commonality.

One group is information processing and integration of information. Information processing involves computation that many theories of consciousness emphasize as an important, if not the most important, operation performed by the human mind.²⁶ Computation is essentially a form of equilibration. Integration is another operation that represents a form of equilibration. Bringing together various sub-systems (mental objects

or operations) requires establishing connections, sharing properties, and developing a common mechanism of regulation. All these operations rely on equilibration.

Reflection and regulation are also two related functions. The capacity of consciousness to reflect and regulate other mental operations indicates that it represents a level of organization that is more powerful than any other level of mental organization. This power certainly relates to processing and integration. Equilibration that is involved in both processing and integration creates new and more powerful levels of organization. This power makes possible to reflect on and regulate mental operations on which consciousness supervenes. Consciousness actually represents the most powerful level of organization since it is capable of reflecting and regulating all mental operations, including its own. It is capable of creating an infinite number of cascading new and increasingly more powerful levels of organization nested in each other *matryoshka* style.²⁷

Finally, there is the cognitive function of consciousness. This function makes possible to acquire and store knowledge about reality. The role of the cognitive function is hard to overestimate. This function constantly expands ways in which we interact with reality and makes our relationship with reality more variegated and flexible. The more variegated and flexible our relationship with reality is, the better we can adapt to it and the better we can conserve ourselves and sustain our civilization.

All consciousness functions complement each other. Equilibration/computation create radically new and increasingly more powerful levels of organization that give rise to new forms, i.e., new knowledge. Reflection and regulation would be impossible without the emergence of new levels of organization. Reflection and regulation play an essential role in equilibration/computation. Thus all functions of consciousness are intimately related to each other in one integral whole—consciousness. All functions of consciousness are interrelated. Through their interrelationship all consciousness functions sustain each other. None of them is primary to or more important than others. They are equally important.

Based on the above, this article proposes the following working definition of consciousness: Consciousness represents the most powerful level of mental organization. It is capable of creating an infinite number of new and increasingly more powerful levels of organization, which makes consciousness capable of reflecting on and regulating all mental operations, including those that are performed by consciousness.

Anthropocentrism in Consciousness Studies

The above definition of consciousness has important advantages in comparison with other definition. It is short, concise, and describes consciousness as a unique phenomenon that represents the most powerful level of organization of reality. The emphasis on the enormous power of consciousness raises one important question. If consciousness is so powerful, why have we so far failed to harness this enormous power

and formulate a general theory of consciousness? This failure cannot be a function of time. Although the field of consciousness studies is relatively new, it has already been in existence for many decades, which should be sufficient for formulating one or even several theories. There seems to be some intrinsic obstacle that prevents us from using the enormous power of our consciousness. The answer to the question seems obvious. We have failed to harness the power of consciousness. This outcome can only be due to the fact that we view consciousness from limiting perspectives: specific functions and features; and these are limited by their nature. We need to view consciousness from a position that would include and transcend all these perspectives.

Consciousness and the Process of Creation

As has been explained earlier, consciousness involves equilibration that creates new and increasingly more powerful levels of organization. The capacity is not unique to consciousness. It is a general characteristic of the evolution as a whole. Consciousness is the only phenomenon in nature that has this capacity. All other levels of organization give rise to only one level that emerges from it. Other than the evolution itself, consciousness is the only phenomenon that can produce an infinite number of new and increasingly more powerful levels of organization.

In many ways, consciousness reflects the most important and unique feature of the evolution. Yet the evolution transcends consciousness. The evolution has produced consciousness, not the other way around. It transcends human existence and consciousness. Therefore, only the process of evolution offers a view that is comprehensive and at the same time offers a critical distance from which to observe consciousness.

As has been explained elsewhere, the evolution is a universal process.²⁸ Its roots are in the very nature of the universe. Our universe is unique. It is all there is. Nothing can come into it for the outside, because there is no outside; and nothing can disappear from it because there is nowhere to disappear. Everything must be conserved. Conservation is ubiquitous throughout our universe. It is fundamental to all levels of organization that exist in the universe and to the universe itself. All scientists recognize the law of conservation as one of the most important laws of nature.

Resources are essential for conservation; and resources are always limited. Therefore, conservation requires access to new resources. Only the creation of new and increasingly more powerful levels of organization offers new possibilities and access to new resources. Thus, conservation involves the process of creation. Together they propel the evolution, for what is the evolution if not a cascade of new and increasingly more powerful levels of organization nested in each other *matryoshka* style.

The connection that exists between the evolution as a universal phenomenon and consciousness does not mean that consciousness is also a universal phenomenon—i.e. that it is intrinsic to the universe, as argued the proponents of panpsychism. Similarities

and parallels do not imply identity. As a product of the process of creation that underlies the evolution, consciousness represents only a part of the whole and cannot be identical to the whole. The view that attributes consciousness to the universe posits the product of the evolution as its source. There is no rational justification, nor empirical support for this view.²⁹ Consciousness is not in any way primary to the process that has created it.

Anthropocentric Consciousness

As the above shows, consciousness is a product of the process of creation. All essential functions and operations performed by consciousness—such as, equilibration/computation, the creation of new levels of organization, and knowledge acquisition—have their origin in specific aspects of the process of creation. Given the importance of the process of creation for the existence and functioning of consciousness, the fact that current theories of consciousness do not discuss the process of creation comes as a surprise. In general, one finds very few discussions of this process in other fields and disciplines as well. The fact is that there are very few systematic studies of the process of creation in general. As a result, we do not know much about it and understand it even less.³⁰

Margaret Boden, one of the pre-eminent researchers in the field of creativity, draws the following conclusion in her influential book:

Our ignorance of our own creativity is very great. We are not aware of all the structural constraints involved in particular domains, still less of the ways in which they can be creatively transformed. We use creative heuristics, but know very little about what they are or how they work. If we do have any sense of these matters, it is very likely tacit rather than explicit: many people can be surprised by a novel harmony, but relatively few can explicitly predict even a plagal cadence.³¹

The situation that Boden describes has not always been the case. In fact, many indigenous and ancient civilizations recognized the importance of the process of creation. For example, many pagan cultures recognized and venerated the creative powers of nature. However, they viewed them as largely inaccessible to human understanding. These powers were in the domain of gods.

The creative power of God is central to the Judeo-Christian tradition. Like pagan religions, the Judeo-Christian tradition recognizes God the Creator, but it also deems the process of creation as inaccessible to human understanding. Creation is a mystery that humans can approach only through faith, not reason. Despite the fact that pre-modern cultures recognized the centrality of creation in the cosmic order, they placed it outside the limits of human understanding.

The secular culture of modernity has marginalized religion. The mystery of creation has completely lost its appeal in the context of secularism and science with its emphasis on reason and rational analysis. Modern views and attitudes have reinforced the disregard of

the process of creation described by Boden. But this pattern has emerged much earlier. It has existed since humans began to walk the face of the earth. Early humans spontaneously and uncritically projected their own visions on reality. They did not grasp the fact that these visions are results of their own use of the process of creation. As a result of their projections, nature looked very much anthropomorphic.

This early experience established a pattern whereby the process we use in creating our views of reality, while in plain view, remained largely outside of our frame of vision. Humans have failed to recognize the importance of this process in their relationship with reality. As a result, human understanding of the process of creation has been and remains very limited.³²

Thus, one can see that our civilization has, for all practical purposes, ignored the process of creation. It has not devoted much time and energy to studying and understanding this process that has been and remains peripheral in the frame of our practical interactions with reality. The view of reality that does not recognize and embrace the central role of the process of creation in the evolution and in our own existence is profoundly flawed; it is inevitably subjective and arbitrary. As a result of the failure to recognize the centrality of the process of creation, the only choice that humans have is to observe reality through their own subjective prisms. The product of such observation is intrinsically anthropocentric.

The failure to embrace and integrate the process of creation into the field of consciousness studies shows that the approach characteristic for all theories of consciousness excludes a vital part of reality from its frame of vision. This failure dooms researchers to view consciousness through prisms that are intrinsically anthropocentric. In other words, they all view consciousness essentially from a human, or anthropocentric, perspective. This approach is subjective and arbitrary. It simply cannot produce a general, objective, and non-arbitrary view of consciousness. Such approach makes divisions and conflicts in scholarly interpretations inevitable; it makes a general theory of consciousness impossible. Thus, anthropocentrism is the principal reason why consciousness studies have failed to formulate a general theory of consciousness.

Towards a General Theory of Consciousness

The explanation of the failure to formulate a general theory of consciousness that would be objective and non-arbitrary suggests the solution. If the source of the problem is anthropocentrism, the transcendence of anthropocentrism will provide the solution. The first step in this direction is to learn more about the process of creation and the way it operates.

As has been explained earlier, the process of creation originates in conservation. Conservation requires resources and the process of creation provides access to new resources. Gaining access to new resources requires new possibilities that are offered by new combinations generated by the process of creation. When particles combine into

atoms or when atoms form molecules, they acquire a broader range of possibilities, or degrees of freedom. By combining with each other they create new levels of organization that offer new possibilities and, thus, access to new resources—conditions that are essential for their conservation.³³ Inclusion plays an essential role in this process that sustains our universe and all that is in it.³⁴ Inclusion is not mere aggregation. Inclusion involves creating combinations that have greater combinatorial power than the entities that constitute them. The creation of combinations generates new levels of organization that offer more possibilities. This level of organization reflects and regulates the level that has emerged and the two form a system with a global regulatory level and the level of local operations.

The emergence of a new level of organization is not the end of the process of creation. The regulatory level also has to be conserved, which requires its equilibration with the level that has generated it. The equilibration of the two requires establishing connections among their operations on the basis of one-to-one correspondences. Such multiple connections activate operations on both levels and conserve them better.

Establishing such connections presents a problem. There is a certain asymmetry in the relations between two different levels of organization. While the global level of organization has access to the local level of organization, the local level does not have access to the global level. In order to provide such access, the asymmetry, or inequality, in their relations should give way to symmetry and equality.

In order to remove asymmetry, operations at the global level must be expressed in terms of operations at the local level of interactions. Such translation can only be performed at the global level. The very act of translation of global operations that makes them accessible to the local level of interactions creates a common frame in which both the local and the global level represent two particular cases. Being particular cases in a more general frame makes them in some sense equal and fully accessible to each other.

The integration of the two levels and the establishment of one-to-one connections result in complex changes. On one hand, the integration leads to differentiation of the global level and, on the other, it enriches the local level operations. The subsequent re-equilibration required by the conservation of these changes results in the emergence of a new and enriched global level of organization and the entire system enters a new cycle in its evolution. The process of creation that makes this evolution possible conserves the system by changing it and making it more powerful. Thus creation and evolution make conservation possible. What does not evolve begins to disintegrate.³⁵

The purpose of this brief and sketchy description of the way that the process of creation operates is not to provide a detailed account. One can find a more detailed and comprehensive discussion elsewhere.³⁶ The purpose is merely to outline the basic aspects of the process of creation and provide the basis for discussion of some familiar issues in consciousness studies from the perspective of the process of creation.

The “Hard Problem”

One of the main problems in consciousness studies is the problem of subjective experience, or what is known as the “hard problem.” David Chalmers, who has introduced the term, emphasizes that subjective experience is, arguably, the most difficult problem in consciousness studies, if not in all science. Unlike easy problems that, for Chalmers, are most problems in consciousness studies, the subjective experience “eludes conventional methods of explanation” whereby “a phenomenon is explained in terms of computational and neural mechanisms.”³⁷

Thus Chalmers states the conditions for solving the “hard problem”: the solution should explain subjective experience “in terms of computation and neural mechanisms.” The non-anthropocentric perspective outlined in this article observes these conditions. Computation is a form of equilibration. Equilibration plays a vital role in the creation of the level of mental organization that sustains consciousness. The equilibration that creates this level of organization involves neurons and neural circuits. These two features satisfy the conditions spelled out by Chalmers.

Also, by universal recognition, consciousness is the most powerful level of mental organization. It is the most powerful level of organization of reality in general. Its power is in the capacity to create an infinite number of new and increasingly more powerful levels of organization whereby each level reflects and regulates the level from which it has emerged. Consciousness thus is capable of reflecting on all mental operations, including its own. This capacity is the source of subjective experience.

As Chalmers suggests, “a theory of consciousness should take experience as fundamental.”³⁸ He makes this suggestion as a way of moving forward on the “hard problem” of consciousness. However, there is a problem Chalmers’s suggestion. Experience can never be fundamental because it is a result of the encounter between what experiences and what is experienced. A subjective experience can only be an encounter between consciousness and something else. There are many indications that most researchers, including Chalmers, see subjective experience as an encounter between consciousness and external objects.

Consciousness is part of the human mind sustained operations of neurons and neuronal circuits in the brain. The brain does not have any direct contacts with external reality. All its contacts are mediated. Therefore, subjective experience can only be the result of an encounter between consciousness and some other mental operation or construct in the brain.

The level of mental organization that sustains consciousness emerges from the level of mental organization that sustains permanent mental objects. Mental objects arise as a result of the combination of sensory-motor operations, which creates the level of mental organization that sustains permanent mental objects. The need to conserve mental objects triggers the process that combines them—a procedure that involves equilibration, or computation. The new level of organization that emerges as a result has sufficient

combinatory power to be able to reflect on and regulate all symbolic operations performed by the human mind. Its power is infinite because it can create an infinite number of new and increasingly more powerful levels of organization that reflect on and regulate the level of organization from which it has emerged. The most likely candidate for the level of mental organization upon which consciousness can reflect is the level of permanent mental objects, or mental constructs, that are creations of the human mind and, for this reason, are subjective.

The puzzle that perplexes Chalmers and others is this: How can an external object create a subjective experience? That is the crux of the “hard problem.” The above account makes clear that consciousness cannot reflect on external objects; it can only reflect on the level of organization that is proximate to it and that sustains mental constructs. The result of the encounter between subjective mental constructs and consciousness is what subjective experience is all about. There is no contradiction in this explanation between the world of external objects and the universe of subjective mental operations.

Mental constructs that exist in the brain represent the missing link in Chalmers’s perspective. This missing link is the real reason why Chalmers is puzzled by subjective experience, or the “hard problem,” and why he wants to recognize subjective experience as fundamental. Chalmers and others cannot analyze this experience since such analysis requires a position from which this experience can be observed. Since the process of creation has no role in the discussion of the “hard problem,” the only position from which Chalmers can observe subjective experience can only be subjective, which inevitably leads to what Luhmann calls “infinite regress.”³⁹ In a way, Chalmers recognizes the flaw in his perspective when he writes: “Of course, by taking experience as fundamental, there is a sense in which this approach does not tell us why there is experience in the first place.”⁴⁰ Chalmers’s confusion is a result of his implicit anthropocentrism; he does not know how to observe consciousness from a position that would not rely on constructs created or selected by humans. In a way, he says as much when he writes: “We know that a theory of consciousness requires the addition of something fundamental to our ontology, as everything in physical theory is compatible with the absence of consciousness.”⁴¹ This article fully concurs with Chalmers’s suggestion and offers the process of creation as the fundamental addition to our ontology that Chalmers considers essential for consciousness studies.

Cognition

Numerous researchers and lay individuals regard cognition, or knowledge acquisition, as the main function of consciousness. In a way, they see knowledge as the *raison d’être* of consciousness. This view originates in the recognition of the importance of knowledge in the contemporary civilization—a fact of life today that is impossible to deny. There is no doubt that the spectacular advances of our civilization are in no small degree due to the accumulation of knowledge. However, one cannot use this fact to draw the conclusion that accumulation and storage of knowledge is the main function of consciousness or the reason for its emergence. The important role of knowledge in our civilization is a

relatively recent phenomenon, while consciousness has been in existence for much longer.

This argument that knowledge acquisition is the main function of consciousness poses a problem. It implies that this function was the main reason why consciousness was selected for fitness. The conclusion that follows from this implication is that the evolution of the natural world somehow privileges knowledge and reason. Such conclusion suggests that consciousness may not be relevant exclusively to the human race; and that reason may actually be intrinsic to reality and the universe. It is worth pointing out that this suggestion creates a rather awkward situation. Modern science has done much to popularize the view of reality as chaotic, uncertain, and utterly devoid of any rational bias. This view of nature as irrational and chaotic does not sit comfortably with the argument that connects the evolution of nature with consciousness and, by extension, its attributes—reason, rationality, logic, and others. If consciousness is a product of random evolutionary processes, how can reason be one of its definitive features? The paradox is so compelling that modern theorists prefer to shrug it off, rather than deal with it, and take cover under the traditional dualism.

One should point out that the recognition of knowledge acquisition is the central and most important function of consciousness is not a product of an analytical examination; rather, it is a view accepted that is accepted as self-evident and obvious fact. As has been indicated earlier, indeed, one can see the important role that consciousness and knowledge acquisition play in our lives. However, there is nothing in this recognition that should suggest that knowledge acquisition is the main function of consciousness and, moreover, its *raison d'être*. The popularity and the uncritical acceptance of this recognition is a compelling reason to look into the nature of the relationship between knowledge and consciousness.

Before pursuing this matter any further, a clear understanding of what constitutes knowledge is in order. The most common definition associates knowledge with information, understanding, or skills acquired in the course of experience.⁴² This definition strikes one as merely a superficial description that has little explanatory power. A more philosophically inclined definition describes knowledge as “justified true belief.”⁴³ While the explanatory content of this definition certainly goes beyond a superficial description, it explains more the conditions for accepting knowledge as legitimate, rather than what knowledge actually is. It simply emphasizes that although knowledge is based on a belief—an irrational factor--in what reality may be like, this belief should be real in the sense that one should be sincere in accepting it. Another condition is that a belief, no matter how sincere, should pass the test of rational justification as a constraint on arbitrariness. Both definitions of knowledge cited above have shortcomings that make them inadequate.

For the purposes of this article, I want to propose a definition that avoids these shortcomings. In this definition, knowledge is a one-to-one correspondence between mental constructs in our mind and external objects. This definition is flexible and focuses on one essential feature of knowledge. Our mental representations of reality may

change, and so will the content of our knowledge. However, these changes will not affect the formal side of what constitutes our knowledge—the principle of correspondence.

Like the description that defines knowledge as “justified true belief,” the proposed definition also focuses on the subjective aspect of knowledge. However, it does not try to constrain this aspect by a qualification that has little substantive meaning—the requirement that one should sincerely believe in what one believes, which is a mere tautology. Rather, the proposed definition accepts the subjective aspect without any qualifications or excuses. Mental constructs are subjective and they play an important role in our perceptions and interpretation of reality.

Consciousness is a product of the evolution. The evolution is not about knowledge. As has been explained earlier, the evolution is about conservation and conservation involves the process of creation. As a product of the evolution, consciousness must also be primarily about conservation and creation.

The level of mental organization that sustains consciousness emerges from the level of organization that sustains mental objects, or mental representations of reality. These representations arise as a result of the conservation of sensory-motor operations. Conservation triggers the process that combines these operations into stable mental entities. The end result is permanent mental objects that represent the combinations of neurons and neural circuits associated with sensory-motor functions: visual, tactile, audio, olfactory, and gustatory. The operations that create permanent mental objects also need to be conserved. Interactions among these operations—their manipulation and equilibration—create a new and more powerful level of organization that reflects on and regulates the level of organization that sustains mental objects.

This description shows that the source of consciousness is conservation and the process of creation. Therefore, the main function of consciousness is also conservation and the creation of new and increasingly more powerful levels of organization. These new levels of organization give rise to new mental possibilities and new mental objects. The process enriches our mind. The enriched mental environment can establish more one-to-one correspondences with the external reality. This expansion is at the heart of what we call knowledge acquisition.⁴⁴

Thus we can see that knowledge acquisition is not the main function of consciousness. The main function of consciousness is conservation via creation of new and increasingly more powerful levels of organization. Knowledge is at best a mere by-product, albeit a welcome one, of this process. Indeed, human civilization has enormously benefited from its accumulation of knowledge. This success motivates a self-conscious and intentional pursuit of knowledge. However, this fact in no way diminishes the significance of the real causes of knowledge production—conservation and the process of creation. On the contrary, by understanding these real causes we can make our knowledge production more efficient than it is today.

Morality and Moral Sentiment

One of the least investigated and understood aspects of human consciousness is our capacity for moral sentiment and morality. Indeed, much has been written on this subject but most of what has been written deals with philosophical and social aspects of morality.⁴⁵ The problem of the origin of morality and its connection to the evolution remains unsolved and remains a debated issue.⁴⁶ We also do not understand the connection between the emergence of consciousness and the rise of moral sentiment.⁴⁷

As has been mentioned on several previous occasions, the process of creation combines objects, or subsystems. The result of these combinations is the emergence of a new level of organization. This new level of organization is more than just an aggregation of entities that constitute it. The process of creation generates combinations of these entities that conserve their main features and properties. Although they become part of a new whole, these entities preserve their autonomy and their basic functions. A cell does not cease to be a cell when it becomes part of a multi-cellular organism. The creation of combinations does not violate the principle of autonomy. Moreover, the creation of more powerful levels of organization requires conservation of the autonomy of entities that constitute such new level. In order to perform their function, combinations must preserve and enrich constituents by retaining their essential properties; otherwise combined parts will not enrich the whole by new possibilities offered by the combination of their properties. Thus, conserving autonomy is the essential aspect of the process of creation.

The level of organization that sustains consciousness reflects this fundamental aspect of the process of creation. This reflection gives rise our moral sentiment, for what is a moral sentiment if not a recognition of autonomy, both human and non-human? The environmental movement deserves a special recognition for bringing to our attention the awareness of the need for observing even the autonomy of non-human entities.

Aesthetic Sensibilities

Another relatively under investigated topic in consciousness studies is the sense of beauty, or aesthetic sentiment. The source of aesthetic sensibilities is still a much-debated subject. Numerous studies show that a sense of beauty and harmony does not pertain exclusively to humans. The behavior of many animals reveals some specific forms of aesthetic predisposition. Consequently, the roots of aesthetic sensibilities reach far into the evolution of the animal world and possibly even beyond. Since the process of creation extends well beyond the human realm, the focus on this process offers an important insight that benefits consciousness studies.

Practically all definitions associate beauty with pleasure, or the enjoyment we feel when we experience gratification.⁴⁸ Aesthetic experience is a form of gratification. Therefore, the search for the source of aesthetic experience morphs into the search for the source of gratification and its connection with pleasure.

A familiar scene makes a good starting point in this inquiry. Many of us have seen infants who smile when they see the face of their mother. The smile is an obvious indication of experiencing pleasure. What causes this pleasure? Perhaps the most obvious explanation seeing mother's face is the cause of pleasure. However, this explanation explains little. One can venture a conjecture that the face is familiar and that is why it brings a smile. A counter case confirms the conjecture. An unfamiliar face or object may cause fear, rejection, or may even bring the child to tears. But why should familiarity give pleasure? What is being satisfied, or gratified, in this case?

When a child interacts with reality, he or she uses internal constructs, or operations that sustain these constructs, that make perception and interpretation of reality possible. These operations, just as much else in this world, require conservation. In order to conserve operations, they have to be enacted, or triggered into action. The more an operation is enacted, the longer it stays active, and the better it is conserved. Operations are proactive. They seek whatever they can find to become activated. Finding something—an internal state, an external object or phenomenon—that brings an operation into action, satisfies this important condition of conservation. In other words, the affirmation of operation gratifies the need to be conserved; and gratification is the source of pleasure.⁴⁹ A brief recapitulation reconstructs the causal sequence: The child has an image of his/her mother in the brain. This image is sustained by the functioning of neuronal circuits. The operations performed by these neuronal circuits require conservation. In order to be conserved, the circuits and their operations need to be activated. The sight of mother's face activates the circuits. It affirms the operations that the circuits perform and thus gratifies the circuits. The end result is the gratification of the functional operations and a sense of satisfaction or pleasure.

Many researchers have emphasized the pleasure and its counterpart displeasure as means of optimizing human behavior. The mental pathways that use these means are characteristic features of consciousness.⁵⁰ Michel Cabanac even goes so far as to argue that emotions associated with pleasure and displeasure led to decision-making and thus were the first signs of the emergence of consciousness. In his view, the experience of pleasure and displeasure was the principal reason why consciousness “was selected and maintained through natural selection.”⁵¹ The arguments presented in this work certainly do not deny the relevance of pleasure and pain to human consciousness. However, Cabanac's emphasis on their exceptional role in the rise of consciousness is an unjustified exaggeration that represents a typical example of using one particular function—in this case, emotions—as the defining aspect of consciousness.

Finding a trigger that activates mental operations—whether by accident or by intention—is a creative process since it generates a link that did not exist before it was established. The emergence of something that was not there before it has emerged is a standard definition of creation. Therefore, by establishing new contacts in new combinations, the process of creation makes conservation possible; it affirms or gratifies its own function creation and conservation. The affirmation of the essential function is the source of gratification, or pleasure, that gives rise to enjoyment. As a phenomenon of

consciousness, aesthetic experience represents a reflection of this essential aspect of the process of creation.

One should emphasize that the aspect of novelty is very important for our aesthetic experience. The pleasure we derive from encountering familiar forms is not as intense than the encounter with novelties. Moreover, the pleasure of seeing familiar forms loses its intensity with time and iteration. Novelty reinvigorates a sense of gratification associated with the emergence of something new. This fact is just as true for artistic activities as it is true in science, technology, or other venues. Thus, the ultimate source of pleasure and gratification is the emergence of a new and more powerful level of organization because it conserves the level from which it has emerged and its operations.

The discussion of aesthetic experience reveals the connection between the process of creation and the emotional sphere. Indeed, aesthetic experience does not exhaust a wide range of emotional responses that humans can experience. The range of emotional responses that human can demonstrate is very broad. It includes positive responses, negative responses, and everything in-between. Although the rise of the capacity to experience emotions has more proximate links to physiological and neural operations, its ultimate roots are in conservation and the process of creation. As the level of mental organization that reflects and regulates all mental operations, consciousness ultimately integrates all emotional responses in humans. As important aspects of human consciousness, our emotions, our sense of beauty and aesthetic sensibilities ultimately owe their existence to conservation and the process of creation; they are reflections of important features of this process in human consciousness

Reflection and Regulation

Reflection is the function that is most frequently associated with consciousness. The association is so common that in everyday speech the word “reflection” is used as a substitute for “consciousness.” Yet, reflection as an operation is much broader than consciousness. Reflection is widespread in nature. One can find this operation at all levels of organization of reality: from particles and atoms to planet, stars, and galaxies.

Reflection is an important aspect of the process of creation, which explains its ubiquity in natural phenomena. This article has repeatedly pointed to the close connection between conservation and the process of creation. The conservation drive engenders the process that creates new levels of organization that are more powerful than those from which they have emerged. This greater power is due to the fact that the process of creation combines entities and their properties rather than simply adds them up. Combinations are not mere aggregations; they are more than the sum total of subsystems that constitute them. Each new level of organization contains all the subsystems of the level from which it has emerged; in this sense, the former is a reflection of the latter.

The fact that reflection is an important aspect of the process of creation explains the ubiquity of reflection in nature. As has been shown elsewhere, all levels of organization

of reality owe their existence to the process of creation. For this reason, reflection is part of all phenomena that exist in nature, including consciousness.

The way consciousness operates bears the closest resemblance to the process of creation. Consciousness is the only system in nature that fully embodies the process of creation. Like this process, consciousness can create an infinite number of new and increasingly more powerful levels of organization. No other system, no other level of organization that exists in nature has such capacity.

Consciousness emerges from the level of mental organization that sustains permanent mental objects. Consciousness reflects on the interactions that occur at this level of organization. The drive to conserve permanent mental objects leads to the emergence of the new level of organization that gives rise to powerful symbolically coded operations.

Neurons and neuronal circuits sustain these coded operations. Their number is enormous and the number of combinations that they can create is even greater; in fact, it is practically infinite. Since operations of consciousness involve neurons and neuronal circuits, consciousness can also create an infinite number of new levels of organization capable of performing symbolically coded operations. Moreover, the creation of these new levels of organization does not change the physical substratum of consciousness. They will all use neurons and neuronal circuits. Consciousness will use the same number of neurons; only the number of combinations and connection among them will grow. Considering the fact that consciousness has an important social aspect that fosters cooperation among individual consciousnesses, the number of possibilities can grow exponentially. Like the process of creation, consciousness offers a possibility of reflection upon reflection, or infinite reflection.

Regulation and reflection always go together. Each new level of organization is not a mere repetition of the level from which it has emerged. It is not a mere aggregation of operations sustained by the level that preceded it. Its emergence involves creating combinations of these operations. The conservation of the newly created entities requires regulation. Thus, regulation and reflection complement each other in the process of creation.

Regulation is a vital function of consciousness. As the most powerful level of mental organization, consciousness regulates all mental operations. Since consciousness can create infinite number of new levels of mental organization that perform symbolically coded operations, consciousness can regulate all levels of mental organization that it creates—that is consciousness regulates its own operations.

Intentionality and Attention

Intentionality has attracted much attention among researchers in consciousness studies. Most contributions deal with intentionality primarily as a subject in psychology. Some, however, view intentionality in evolutionary terms. They consider intentionality as the

critical factor that led to the rise of consciousness. In their provocative study, Simona Ginsburg and Eva Jablonka argue that the emergence of consciousness was primarily due to intentionality combined with unlimited associative learning, or UAL⁵²

Purposefulness and goal-directedness are common ways to characterize intention. Intention is about something. Alex Byrne has used this quality (he calls it “aboutness”) in the way he describes intentionality:

This—rather vaguely characterized—phenomenon of "aboutness" is called *intentionality*. Something that is about (directed on, represents) something else is said to "have intentionality," or (in the case of mental states) is said to be an "intentional mental state."⁵³

Intention contains a contradiction. It combines freedom and necessity. On one hand, intention represents an internal determination to act in a certain way. In other words, intention is a self-determined action. As an act of self-determination, it is certainly free as it represents a subjective and voluntary choice. Charles Turner, for example, emphasizes the connection between intention and freedom when he writes:

The principle of intentionality treats intentions as controlling what happens, not causally, but by the agent's power to act. The notion of free will has to do with an agent controlling as a sort of first cause, rather than being modeled as a link in a chain of causes.⁵⁴

On the other hand, intentionality is a form of determination; and determination is generally associated with necessity, albeit in this case the necessity that is internally motivated.

The process of creation displays a very similar inner duality. This process originates in conservation that owes its existence to the unique nature of our universe. In other words, conservation is a spontaneous expression of the essential and unique nature. Indeed, conservation is determined by the nature of the universe. As a determination it is necessary. However, conservation also represents a spontaneous expression of the nature of the universe that is not determined by some external factors, or what we usually associate with necessity. Thus, one can view the process of creation as a necessity but as an expression of inner nature it is also a spontaneous and unforced act; and we usually associate spontaneity with freedom.

There is an obvious parallel between intention, or intentionality, as an act of consciousness and the process of creation. As an act of consciousness, intention reflects the duality of the process of creation that was involved in the rise of consciousness.

Like many other phenomena, consciousness is also subject to the law of conservation; its operations have to be conserved. Conservation of operations requires their activation. Activation can be spontaneous or induced. Intentionality is a selective activation of neuronal operations. The act of selection is an induced act. However, as an act of

conscious selection it is induced internally, from within consciousness and, in this sense, represent a free act of self-determination for the purpose of conservation.

Intention is a deliberate decision to act. The imperative to act goes back to conservation: operations that are to be conserved must be enacted. Intention is also a purposeful action. In other words, the decision to act is motivated by the need to conserve particular mental objects and neural circuits that sustain them. It is a choice and, therefore, is a free act. The capacity to act in freedom and make choices has its roots in the process of creation that allows the kind of determination that has no external cause; the duality of the process of creation creates a possibility of choice as an act of self-determination that entangles freedom and necessity seamlessly combined.

Like intentionality, attention also remains a contentious issue. Researchers still debate what the cause of attention is and how one can improve the capacity to selectively concentrate on some objects or features, and sift out others.⁵⁵

Attention and intentionality have a lot in common. Like intentionality, attention also reveals a capacity to select. While in the case of intentionality the focus is on what to conserve, in the case of attention, selectivity relates more directly to processing. Processing and conservation are closely related. Indeed, processing leads to conservation and conservation is impossible without processing. So the difference is more in emphasis, rather than in substance.

Attention involves the selection of a particular object to be processed by the brain. Consciousness regulates neuronal operations, including processing, or computing. As the level of mental organization that reflects on and regulates processing, consciousness certainly is more powerful than basic processing functions and it is capable of choosing how processing should be applied. As a function of consciousness, attention involves internal determination. This fact of internal determination relates attention to the process of creation.

Consciousness is a global level of organization. As a global level of organization, consciousness controls and regulates all mental operations. Its functions, such as intention, attention, and perception also have a broad distribution and can access and activate different parts of the brain.⁵⁶ As Steven Yantsis observes, “neurons (and thus neural networks, and the brain as a whole) are subject to contextual modulation of their function.”⁵⁷

Consciousness and Nature

The above discussion shows that many important functions of consciousness originate in the process of creation and, for this reason, can be observed throughout nature. As has already been mentioned, many researchers have drawn the conclusion that the phenomenon of consciousness is not limited to humans and that other species also have

some rudimentary form of consciousness. Some even claim that consciousness is a property intrinsic to the universe as a whole.

All these claims result from a methodological approach that is widely respected in the scientific community and that can be described as atomistic. The idea is to identify one or several functions as fundamental to consciousness and then locate these functions outside the human realm. The fact that this methodology is widely accepted and that it involves empirical observations explains why these claims of broader relevance of consciousness have gained traction in the scientific community. They have merited special entries in various encyclopedias⁵⁸ and have been the subject of numerous scholarly books and articles.

The proponents of wider relevance of conscious experience represent a broad range of views on the subject.⁵⁹ The most numerous group among them are researchers who restrict this idea to the animal kingdom, with some internal variations. But there are also those who extend the existence of consciousness to all life forms, including bacteria and plants.⁶⁰ Arthur Reber, for example, has named cognition, or sentience, as the fundamental function of consciousness. He argues that sentience is a “primitive of life” that emerged in the first living entities that appeared on our planet.⁶¹ Simona Ginsburg and Eva Jablonka chose the combination of intentionality and unlimited associative learning (UAL) as their “primitives” and also locate them in some very early life forms.⁶²

The idea of animal consciousness has also gained political support from the growing movement of environmental, species protection, and animal rights activists who have much influence on the scientific community. The idea has inspired the *Declaration on Consciousness* issued in 2012 by an international group of prominent cognitive neuroscientists, neuropharmacologists, neurophysiologists, neuroanatomists, and computational neuroscientists. In part, the *Declaration* states:

The absence of a neocortex does not appear to preclude an organism from experiencing affective states. Convergent evidence indicates that non-human animals have the neuroanatomical, neurochemical, and neurophysiological substrates of conscious states along with the capacity to exhibit intentional behaviors. Consequently, the weight of evidence indicates that humans are not unique in possessing the neurological substrates that generate consciousness. Nonhuman animals, including all mammals and birds, and many other creatures, including octopuses, also possess these neurological substrates.⁶³

Studies in animal consciousness have grown into a wide field of research.⁶⁴ In his review of *The Evolution of the Sensitive Soul: Learning and the Origin of Consciousness*—a book written on the subject of animal consciousness by Simona Ginsburg and Eva Jablonka—Jonathan Birch, a very prolific contributor on the subject, writes:

This is an exciting moment for animal consciousness research, with an interdisciplinary community of researchers starting to coalesce in a way

reminiscent of the early days of the science of human consciousness. This emerging field needs foundational work: it needs people to put forward big ideas about the markers of consciousness and its distribution in the natural world.⁶⁵

Few, if any, contributors to this line of research claim that animal consciousness is similar to human consciousness. Rather, they argue that consciousness has many levels—from primary to more advanced. Jonathan Birch and his co-authors, for example, argue that there are several different forms (they call them dimensions) of conscious experience—most of them in non-human vertebrates.⁶⁶ In their book entitled *The Ancient Origin of Consciousness: How the Brain Created Experience*, Todd Feinberg and Jon Mallatt maintain that consciousness in its primary form emerged very early in the evolution and has subsequently morphed into what they define as “sensory consciousness and “phenomenal consciousness”—all of which are different from self-consciousness and reflective consciousness in humans.⁶⁷

Finally, there is a small but respected group of thinkers who attribute consciousness to the entire universe.⁶⁸ This perspective—often referred to as panpsychism—has found sympathizers and converts even among established scientists.⁶⁹ Panpsychism appears in many guises. Its fundamental belief is that psyche, or soul, is everywhere—from plants and animals to atoms, fields, and even particles. Its proponents often refer to Integrated Information Theory, or IIT, as the foundation of their perspective. Some contributors go so far as to argue that consciousness is an intrinsic and irreducible fact of reality and that “the sooner researchers accept this fact, the faster our understanding of consciousness will progress.”⁷⁰

The variety of theoretical perspectives on consciousness creates confusion. The number of definitive features of consciousness that researchers view as primary is quickly proliferating. The focus of the search ranges from sensory systems⁷¹ to attention mechanism, to the sense of self, or some combination of these.⁷² Therefore, there is a need to bring clarity into this confusion.

Consciousness is a product of the evolution. The fact that consciousness has many features in common with other phenomena in nature should hardly come as a surprise. However, consciousness is certainly more than any of its individual features or even their sum total. Identifying consciousness with some allegedly definitive features or even a group of features is an unfortunate strategy that cannot possibly lead to success. Consciousness represents a distinct level of mental organization that includes many properties that belong to levels of organization that preceded the rise of consciousness but that also has its own specific quality. The level of organization that gives rise to consciousness can generate an infinite number of new and increasingly more powerful levels of mental organization; and all of them are part of consciousness. The reason for this infinite power is the fact that the human brain offers infinite possibilities. The 86 billion neurons in the human brain (a huge number!) can establish an infinite number of connections and can form an equally infinite number of neural circuits. Considering the fact that humans are social creatures and can form social networks, the number of

possibilities in creating new levels of mental organization, either individually or collectively, is literally endless.

As has been argued earlier, the first step the emergence of consciousness is the creation of permanent mental images that arise as a result of conservation and equilibration of sensory-motor operations. Mental images, even permanent mental images may exist in other animals. But no animal has the capacity to stabilize these mental images that is even distantly comparable to that of the human brain. This stability is a product of the systematic manipulation and combination of these images. Manipulations and combinations of mental images create new entities that conserve the properties of mental images. The result is the emergence of new and increasingly more powerful levels of organization. The ultimate outcome of this process is the establishment of the level of mental organization that sustains consciousness.

Consciousness is the most powerful level of mental organization. It is capable reflecting on and regulating all mental operations, including its own. It is capable of generating an infinite number of new and increasingly more powerful levels of organization. That is the source of power of human consciousness. No animal brain has this kind of power.

Searching for roots of consciousness and its connections with the evolution is a legitimate scientific enterprise. However, using the word consciousness in relation to non-human forms of life or to non-life is utterly misleading. Such efforts empty consciousness of any meaning: consciousness appears to be everywhere and, thus, nowhere. As a result, reality appears in a logocentric guise—the culmination of anthropocentrism.

Concluding Remarks

Again, the intention of the preceding discussion is not to provide a detailed examination of various perspectives and views on important functions of consciousness. Such examination is certainly beyond the scope of this article. The purpose is merely to show all these functions have their origin in the process of creation. Approaching the problem of consciousness from perspectives that focus on individual functions give a partial view of consciousness and, consequently, cannot serve as the basis for a general theory of consciousness. Since all these functions originate in the process of creation, one can be perfectly justified in using the process of creation as the main organizing principle of the general theory of consciousness.

Several reasons support this argument. First, the process of creation is inclusive. The theory based on the process of creation will include all theories of consciousness since the process of creation is the source of all theories—present, past, and future. Also, the process of creation is not a product of human consciousness and does not rely on human constructs that inevitably bear a mark of subjectivity. Finally, the theory based on the process of creation will be critically informed. As has been shown elsewhere, the process of creation operates on maintaining the permanent balance between equilibration/computation and the production of disequilibrium, or radical novelty.

Equilibration and the production of disequilibrium proceed hand-in-hand, complementing each other: as equilibrium grows, so does disequilibrium. The balance between equilibrium and disequilibrium offers a point of observation that does not rely on a human choice and make an objective observation possible. Thus, using the process of creation as the main organizing principle provides the foundation for a general, non-anthropocentric, and objective theory of consciousness.⁷³

Conclusion

Consciousness is the defining feature of the human race. It represents the most powerful level of organization of reality. This power is the key to the survival of humanity and its civilization. However, the enormous power of consciousness can be seductive. It entices humans to view reality through the prism of human consciousness thus placing humans in the center of all that exists and create the illusion of an anthropocentric world.

Anthropocentrism is not a result of some deliberate action. Rather it represents a flaw in our understanding of our relationship with reality—a failure to recognize that no matter how powerful our consciousness is, it is only one aspect of reality, albeit the most important one for us. Consciousness is a powerful creator. But it is also a creature engendered by the process that is central to all that exists. As this article has argued, the source of this process is the very unique nature of our universe with conservation as its fundamental condition of existence. Conservation requires creation of new and increasingly more powerful levels of organization, which leads to the evolution.

Consciousness is one of the products of this evolution. As such, it inherits the properties of the evolution and the process of creation that propels this evolution. The simple fact is that consciousness has not created this process; on the contrary, this process has created consciousness. Consciousness uses this process to conserve itself. Conservation is its main function. Humans can realize the infinite power of their consciousness only if they recognize and embrace its true source, if they become truly self-conscious. The attainment of this self-consciousness will put at our disposal the enormous power of the process that is the source of everything that exists, including our consciousness.

This article has shown how various operations and functions of consciousness reflect specific aspects of the process of creation. Processing information, or computation, is one of the most important functions of the human mind and consciousness. Equilibration is the operation that plays a critical role in the process of creation. The analogy with the process of creation explains how computation in the brain leads to the creation of radical novelties—a phenomenon certainly deserves more attention than it has had so far.⁷⁴ Reflection and regulation are two other important functions of consciousness that the article traces to the process of creation. In addition, the article has demonstrated the relationship between the process of creation and the two important spheres of our consciousness--morality and aesthetic values. Finally, the article has addressed two other popular subjects in consciousness studies--intentionality and attention—and explained the way they connect to the process of creation. There are certainly much more to

consciousness than what has been covered in this relatively short piece. Further exploration may reveal more connections between consciousness and the process of creation.

Despite many achievements, current theoretical perspectives on consciousness have failed to produce a general theory of consciousness. Our understanding of consciousness is fragmented and confusing. The main reason for this state of affairs is the continued survival of anthropocentrism in consciousness studies. We can formulate a general theory of consciousness only if the approach we adopt will allow viewing consciousness from a position that includes all theoretical perspectives and, at the same time, transcends all of them. There is only one perspective that makes such view possible. It is the perspective that recognizes the centrality of the process of creation and focuses on this process as its main organizing principle. The process of creation is the source of all perspectives—past, present, and future. Therefore, the general theory of consciousness organized around the process of creation will offer a truly comprehensive and, consequently, objective view of consciousness. Such theory will be critically informed since the process of creation offers a point from which one can critically observe the process itself without falling into infinite regress and without having to rely on subjective human constructs and choices.⁷⁵

Consciousness is a rich subject. Its exploration will undoubtedly continue well into the future. The field is now at a critical stage when much empirical material has been accumulated and it needs ordering and streamlining. The adoption of the non-anthropocentric perspective will help in accomplishing this task. It will provide a boost to the entire field of consciousness studies. This perspective does not deny the validity of empirical and theoretical work that has been done so far and that has certainly enriched and will continue to enrich our understanding of the baroque architecture of consciousness. The non-anthropocentric perspective will provide an inclusive and cooperative environment that is the best guarantee of taking consciousness studies well beyond its current limitations.

ENDNOTES

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- ¹ Sophocles, *Antigone*, line 333 (Ode I), <https://quotepark.com/quotes/1925744-sophocles-numberless-are-the-worlds-wonders-but-none-more/>.
- ² Thomas Nagel, “What is it like to be a bat?” *Philosophical Review*, vol. 83, no. 4 (1974), pp. 435–450, p. 435; Jonathan Farrell, “Higher-Order Theories of Consciousness and What-It-Is-like-Ness,” *Philosophical Studies*, vol. 175, no. 11 (November 2018), pp. 2743–61, <https://doi.org/10.1007/s11098-017-0980-8>
- ³ Davide Sattin, Francesca Giulia Magnani, Laura Bartesaghi, Milena Caputo, Andrea Veronica Fittipaldo, Martina Cacciatore, Mario Picozzi, and Matilde Leonardi, “Theoretical Models of Consciousness: A Scoping Review,” *Brain Sciences*, vol. 11, no. 535 (April 24, 2021), pp. 1-58, p. 53.
- ⁴ See, for example, U. T. Place, “Is consciousness a brain process?” *British Journal of Psychology*, vol. 47 (1956), pp. 44–50; J. J. C. Smart, “Sensations and brain processes,” *Philosophical Review*, vol. 68 (1959), pp. 141–156, doi: 10.2307/2182164.
- ⁵ Michael Graziano, “Most Popular Theories of Consciousness Are Worse Than Wrong,” *The Atlantic*, March 9, 2016, <https://www.theatlantic.com/science/archive/2016/03/phlegm-theories-of-consciousness/472812/>.
- ⁶ Davide Sattin, et al., “Theoretical Models of Consciousness,” p. 53.
- ⁷ Anil Seth, “Illuminating Consciousness,” *New Scientist*, vol. 251, no. 3350 (September 4, 2021), pp. 44–48, [https://doi.org/10.1016/s0262-4079\(21\)01565-7](https://doi.org/10.1016/s0262-4079(21)01565-7).
- ⁸ See B. J. Baars, *A cognitive theory of consciousness* (New York, NY: Cambridge University Press, 1988); S. Dehaene, C. Sergent, and J. P. Changeux, 2003 “A neuronal network model linking subjective reports and objective physiological data during conscious perception,” *Proceedings of National Academy of Sciences*, vol. 100 (2003), pp. 8520-5; Christof Koch, “What Is Consciousness?” *Nature* 557, no. 7704 (May 9, 2018), pp. S8–12, <https://doi.org/10.1038/d41586-018-05097-x>.
- ⁹ G. Tononi, “Consciousness as Integrated Information: A Provisional Manifesto,” *Biology Bulletin*, vol. 215, no. 3 (2008), pp. 216–242; Giulio Tononi, “The Integrated Information Theory of Consciousness: An Updated Account,” *Archives Italiennes de Biologie*, vol. 150, no. 2/3 (2012), pp. 56–90, <https://doi.org/10.4449/aib.v149i5.1388>; Giulio Tononi and Christof Koch, “Consciousness: Here, There and Everywhere?” *Philosophical Transactions: Biological Sciences*, vol. 370, no. 1668 (2015), pp 1–18; Christof Koch, “What Is Consciousness?” *Nature*, vol. 557, no. 7704 (May 9, 2018), pp. S8–12. <https://doi.org/10.1038/d41586-018-05097-x>

¹⁰ Jonathan Farrell, “Higher-Order Theories of Consciousness and What-It-Is-like-Ness.” *Philosophical Studies*, vol. 175, no. 11 (November 2018), pp. 2743–61, <https://doi.org/10.1007/s11098-017-0980-8>.

¹¹ T. W. Webb and M. S. A. Graziano, “The attention schema theory: A mechanistic account of subjective awareness,” *Frontiers in Psychology*, vol. 6 (2015), doi:10.3389/fpsyg.2015.00500; M. S. A. Graziano, *Rethinking consciousness: A scientific theory of subjective experience* (New York: Norton, 2019); M. S. A. Graziano and S. Kastner, “Human consciousness and its relationship to social neuroscience: A novel hypothesis,” *Cognitive Neuroscience*, vol. 2 (2011), pp. 98–113, doi:10.1080/17588928.2011.565121; M. S. A. Graziano and M. M. Botvinick, “How the brain represents the body: Insights from neurophysiology and psychology,” in W. Prinz and B. Hommel, eds., *Common mechanisms in perception and action: Attention and performance* (Oxford: Oxford University Press, 2002), pp. 136–157; Michael Graziano, “What Is Consciousness?” *New Scientist*, vol. 243, no. 3248 (September 21, 2019), pp. 34–37. [https://doi.org/10.1016/s0262-4079\(19\)31774-9](https://doi.org/10.1016/s0262-4079(19)31774-9).

¹² Arthur S. Reber, *The First Minds: Caterpillars, ‘Karyotes, and Consciousness* (Oxford: Oxford University Press, 2018).

¹³ Simona Ginsburg and Eva Jablonka, *The Evolution of the Sensitive Soul: Learning and the Origins of Consciousness* (Cambridge, MA: MIT Press, 2019).

¹⁴ Donald Mender, “Other Minds: The Octopus, the Sea, and Deep Origins of Consciousness,” *Journal of Consciousness Studies*, vol. 25, no. 3/4 (March 2018), pp. 242–49; Arthur S. Reber, *The First Minds: Caterpillars, ‘Karyotes, and Consciousness* (Oxford: Oxford University Press, 2018); Arthur S. Reber and František Baluška, “Cognition in Some Surprising Places,” *Biochemical & Biophysical Research Communications*, vol. 564 (July 30, 2021), pp. 150–57, <https://doi.org/10.1016/j.bbrc.2020.08.115>.

¹⁵ Gargi Mitra-Delmotte, “Consciousness: A Direct Link with Life’s Origin,” (accessed June 9, 2019), https://www.academia.edu/5992837/Consciousness_A_Direct_Link_with_Lifes_Origin.

¹⁶ Gregory Matloff, “Can Panpsychism Become an Observational Science?” *Journal of Consciousness Exploration & Research*, vol. 7, no. 7 (August 7, 2016), <https://jcer.com/index.php/jcj/article/view/579>.

¹⁷ Michael Graziano, Arvid Guterstam, Branden J. Bio, and Andrew I. Wilterson, “Toward a Standard Model of Consciousness: Reconciling the Attention Schema, Global Workspace, Higher-Order Thought, and Illusionist Theories,” *Cognitive Neuropsychology*, vol. 37, no. 3/4 (June 5, 2020), pp. 155–72, pp. 168–69. <https://doi.org/10.1080/02643294.2019.1670630>.

-
- ¹⁸ Wikipedia, <https://en.wikipedia.org/wiki/Consciousness>.
- ¹⁹ Oxford Dictionary, <https://www.lexico.com/en/definition/consciousness>.
- ²⁰ Your Dictionary, <https://www.yourdictionary.com/consciousness>
- ²¹ Christof Koch “What Is Consciousness?”
- ²² G. Vithoulkas and D. F. Muresanu, “Conscience and Consciousness: A Definition,” *Journal of Medicine and Life*, vol. 7, no. 1 (March 15, 2014), pp. 104–8; p. 104
- ²³ Boris Kotchoubey, “Human Consciousness: Where Is It From and What Is It For.” *Frontiers in Psychology*, vol. 9 (2018), p. 567, <https://doi.org/10.3389/fpsyg.2018.00567>.
- ²⁴ *Stanford Encyclopedia of Philosophy*, <https://plato.stanford.edu/entries/consciousness/>. See also, D. Rosenthal, “Two concepts of consciousness.” *Philosophical Studies*, vol. 49 (1986), pp. 329–59; R. Gennaro, R. 1995. *Consciousness and Self-consciousness: A Defense of the Higher-Order Thought Theory of Consciousness*. (Amsterdam and Philadelphia: John Benjamins, 1995); P. Carruthers, *Phenomenal Consciousness*. Cambridge: Cambridge University Press, 2000).
- ²⁵ Grant Currin, “What is Consciousness,” *Live Science*, July 26, 2020, <https://www.livescience.com/what-is-consciousness.html>.
- ²⁶ Shimon Edelman, *Computing the Mind: How the Mind Really Works* (Oxford: Oxford University Press, 2008); Jerry Fodor, *The Mind Doesn't Work That Way: The Scope and Limits of Computational Psychology* (Cambridge: The MIT Press, 2001), <http://mitpress.mit.edu/catalog/item/default.asp?ttype=2&tid=8561&mode=toc>; Ray S. Jackendoff, *Consciousness and the Computational Mind* (Cambridge, MA, USA: A Bradford Book, 1987); J. H. van Hateren, “A Theory of Consciousness: Computation, Algorithm, and Neurobiological Realization,” *Biological Cybernetics*, vol. 113, no. 4 (August 2019), pp 357–72, <https://doi.org/10.1007/s00422-019-00803-y>; Majid Beshkar, “The QBIT Theory of Consciousness,” *Integrative Psychological & Behavioral Science*, vol. 54, no. 4 (December 2020), pp. 752–70, <https://doi.org/10.1007/s12124-020-09528-1>; David Davenport, “Computationalism: Still the Only Game in Town,” *Minds & Machines*, vol. 22, no. 3 (August 2012), pp. 183–90, <https://doi.org/10.1007/s11023-012-9271-5>.
- ²⁷ Gennady Shkliarevsky, “Science and Its Discontents: Is There an End to Knowing?” *Systems Research and Behavioral Science*, vol. 30, no. 1 (2013), pp. 43–55. <https://doi.org/10.1002/sres.2127>.

-
- ²⁸ Gennady Shkliarevsky, “Conservation, Creation, and Evolution: Revising the Darwinian Project,” *Journal of Evolutionary Science*, vol. 1, no. 2 (September 25, 2019), pp. 1–30. <https://doi.org/10.14302/issn.2689-4602.jes-19-2990>.
- ²⁹ Gennady Shkliarevsky, *The Civilization at a Crossroads: Constructing the Paradigm Shift* (Raleigh, NC: Glasstree Publishing, 2017), pp. 148-154, https://www.researchgate.net/publication/318431832_The_Civilization_at_a_Crossroads_Constructing_the_Paradigm_Shift.
- ³⁰ Gennady Shkliarevsky, “Understanding the Process of Creation: A New Approach.” *Management: Journal of Sustainable Business and Management Solutions in Emerging Economies*, vol. 22, no. 3 (October 31, 2017), pp. 1–13, <https://doi.org/10.7595/management.fon.2017.0021>
- ³¹ Margaret Boden, *The Creative Mind: Myths and Mechanisms*, 2nd ed. (London, New York: Routledge, 2004), p. 246.
- ³² Shkliarevsky, “Understanding the Process of Creation.”
- ³³ Gennady Shkliarevsky, “The Universal Evolution and the Origin of Life,” SSRN Scholarly Paper, Rochester, NY: Social Science Research Network, April 11, 2021. <https://doi.org/10.2139/ssrn.3824365>.
- ³⁴ Shkliarevsky, Gennady. “Revising the Cosmic Story.” *ArXiv:2012.12749 [Physics]*, December 23, 2020. <http://arxiv.org/abs/2012.12749>.
- ³⁵ Gennady Shkliarevsky, “Conservation, Creation, and Evolution: Revising the Darwinian Project,” *Journal of Evolutionary Science*, vol. 1, issue 2 (2019): 1-30. <https://openaccesspub.org/journal/jes/current-issue>
- ³⁶ Shkliarevsky, “Understanding the Process of Creation.”
- ³⁷ David J. Chalmers, “The Problem of Consciousness,” *Discusiones Filosóficas*, vol. 12, no. 19 (December 2011), pp. 29–59, pp. 29-30.
- ³⁸ Chalmers, David J. “The Problem of Consciousness.” *Discusiones Filosóficas* 12, no. 19 (December 2011): 29–59, p. 44.
- ³⁹ Niklas Luhmann, *Social Systems* (Stanford: Stanford University Press, 1995).
- ⁴⁰ Chalmers, “The Problem of Consciousness,” p. 45.
- ⁴¹ Chalmers, “The Problem of Consciousness,” p. 44.

⁴² *Oxford Dictionary*,
<https://www.oxfordlearnersdictionaries.com/us/definition/english/knowledge>.

⁴³ *Stanford Encyclopedia of Philosophy*, <https://plato.stanford.edu/entries/knowledge-analysis/#KnowJustTrueBeli>.

⁴⁴ Shkliarevsky, “Science and Its Discontents.”

⁴⁵ Melanie Killen, Aline Hitti, Shelby Cooley, and Laura Elenbaas, “Morality, Development, and Culture,” in *Handbook of Advances in Culture and Psychology*, vol. 5 (New York: Oxford University Press, 2015), pp. 161-220, <https://doi.org/10.1093/acprof:oso/9780190218966.003.0004>; William Lane Craig and Walter Sinnott-Armstrong, *God?: A Debate Between a Christian and an Atheist* (Oxford: Oxford University Press, 2004); Pauline Sanchez, “The Origins of Morality,” *Dialogue & Nexus*, vol. 4, article 6 (2017).

⁴⁶ Chris Heathwood, “Could Morality Have a Source?” *Journal of Ethics & Social Philosophy*, vol. 6, no. 2 (2012); Emily Esfahani Smith, “Is Human Morality a Product of Evolution?” *The Atlantic*, December 2, 2015. <https://www.theatlantic.com/health/archive/2015/12/evolution-ofmorality-social-humans-and-apes/418371/>; Judith M. Burkart, Rahel K. Brügger, and Carel P. van Schaik, “Evolutionary Origins of Morality: Insights From Non-Human Primates,” *Frontiers in Sociology*, vol. 3 (2018), <https://doi.org/10.3389/fsoc.2018.00017>; Michael A. Tomasello, *Natural History of Human Morality* (Cambridge: Harvard University Press, 2016), <https://doi.org/10.5860/choice.197473>; Shkliarevsky, Gennady. “The Origin of Morality and the Making of the Moral Predicament,” SSRN Scholarly Paper, Rochester, NY: Social Science Research Network, October 31, 2021. <https://doi.org/10.2139/ssrn.3953715>.

⁴⁷ Patricia S. Churchland, *Conscience: The Origin of Moral Intuition* (New York: Norton, 2019).

⁴⁸ See Cambridge Dictionary <https://dictionary.cambridge.org/us/dictionary/english/pleasure>

⁴⁹ Jean Piaget, *The Origins of Intelligence in Children* (Madison: International Universities Press, Inc., 1998), pp. 127-42.

⁵⁰ Michel Cabanac, Arnaud J. Cabanac, and André Parent, “The Emergence of Consciousness in Phylogeny,” *Behavioural Brain Research*, vol. 198, no. 2 (March 17, 2009), pp. 267–72, p. 267, <https://doi.org/10.1016/j.bbr.2008.11.028>.

⁵¹ Cabanac, et al., “The Emergence of Consciousness in Phylogeny,” p. 268.

⁵² Ginsburg and Eva Jablonka, *The Evolution of the Sensitive Soul*.

⁵³ Sahotra Sarkar and Jessica Pfeifer, *The Philosophy of Science: An Encyclopedia* (New York: Routledge, 2006), p. 406.

⁵⁴ Charles K. Turner, “A Principle of Intentionality,” *Frontiers in Psychology*, vol. 8 (2017), p. 8, <https://www.frontiersin.org/article/10.3389/fpsyg.2017.00137>.

⁵⁵ Diego Fernandez-Duque, “Cause and Effect Theories of Attention: The Role of Conceptual Metaphors,” *Review of General Psychology*, vol. 6, no. 2 (2002), pp. 153-65.

⁵⁶ See, for example, Rockefeller University, “A Surprising New Source of Attention in the Brain.” *News* (blog), December 19, 2019, <https://www.rockefeller.edu/news/26994-new-attention-area-in-brain-discovered/>.

⁵⁷ Steven Yantis, “The Neural Basis of Selective Attention,” *Current Directions in Psychological Science*, vol. 17, no. 2 (2008), pp. 86–90, p. 86, <https://doi.org/10.1111/j.1467-8721.2008.00554.x>.

⁵⁸ Colin Allen, “Animal Consciousness,” *Stanford Encyclopedia of Philosophy*, <http://plato.stanford.edu/entries/consciousness-animal/> (accessed July 7, 2012).

⁵⁹ Helen S. Proctor, Gemma Carder, and Amelia R. Cornish, “Searching for Animal Sentience: A Systematic Review of the Scientific Literature,” *Animals: An Open Access Journal from MDPI*, vol. 3, no. 3 (September 4, 2013), pp. 882–906, <https://doi.org/10.3390/ani3030882>.

⁶⁰ William B. Miller, Jr., “The First Minds: Caterpillars, 'Karyotes and Consciousness: A Review,” *Philosophical Psychology*, vol. 34, no. 2 (February 2021), pp. 322–25, <https://doi.org/10.1080/09515089.2020.1849599>; Gargi Mitra-Delmotte, “Consciousness: A Direct Link with Life’s Origin,” https://www.academia.edu/5992837/Consciousness_A_Direct_Link_with_Lifes_Origin; Peter Stone, “From Bacteria to Bach and Back by Daniel Dennett,” *Philosophy Now*, issue 129, https://philosophynow.org/issues/129/From_Bacteria_to_Bach_and_Back_by_Daniel_Dennett, (accessed July 7, 2019); Reber, *The First Minds*; Simona Ginsburg and Eva Jablonka, “Are Your Cells Conscious?” *The American Journal of Psychology*, vol. 133, no. 1 (2020), pp. 117–21, <https://doi.org/10.5406/amerjpsyc.133.1.0117>; Ginsburg and Jablonka. “The First Minds: Caterpillars, 'Karyotes, and Consciousness.” *American Journal of Psychology* 133, no. 1 (Spring 2020): 117–21. <https://doi.org/10.5406/amerjpsyc.133.1.0117>; Giorgio Vallortigara, “The Rose and the Fly: A Conjecture on the Origin of Consciousness,” *Biochemical and Biophysical Research Communications*. Rethinking Cognition: From Animal to Minimal, vol. 564 (July 30, 2021), pp. 170–74, <https://doi.org/10.1016/j.bbrc.2020.11.005>.

⁶¹ Reber, *The First Minds*.

-
- ⁶² Ginsburg and Jablonka, *The Evolution of the Sensitive Soul*.
- ⁶³ “The Cambridge Declaration on Consciousness,” 2012, <https://fcmconference.org/img/CambridgeDeclarationOnConsciousness.pdf>.
- ⁶⁴ Helen Proctor, Gemma Carder, and Amelia R. Cornish, “Searching for Animal Sentience: A Systematic Review of the Scientific Literature,” *Animals: An Open Access Journal from MDPI*, vol. 3, no. 3 (September 4, 2013), pp. 882–906, <https://doi.org/10.3390/ani3030882>.
- ⁶⁵ Birch, Jonathan. “In Search of the Origins of Consciousness,” *Acta Biotheoretica*, vol. 68 (September 26, 2019), pp. 287–94, p. 293, <https://doi.org/10.1007/s10441-019-09363-x>.
- ⁶⁶ Jonathan Birch, Alexandra K. Schnell, and Nicola S. Clayton, “Dimensions of Animal Consciousness,” *Trends in Cognitive Sciences*, vol. 24, no. 10 (October 2020), pp. 789–801, <https://doi.org/10.1016/j.tics.2020.07.007>.
- ⁶⁷ Todd E. Feinberg and Jon M. Mallatt, *The Ancient Origins of Consciousness: How the Brain Created Experience* (Cambridge: MIT Press, 2016); Todd E. Feinberg and Jon Mallatt, “The Nature of Primary Consciousness. A New Synthesis,” *Consciousness and Cognition*, vol. 43 (July 2016), pp. 113–27, <https://doi.org/10.1016/j.concog.2016.05.009>.
- ⁶⁸ Corey S. Powell, “Is the Universe Conscious?” NBC News <https://www.nbcnews.com/mach/science/universe-conscious-ncna772956> (accessed August 21, 2021); John S. Torday and William B. Miller, “The Cosmologic Continuum from Physics to Consciousness,” *Progress in Biophysics & Molecular Biology*, vol. 140 (December 2018), pp. 41–48. <https://doi.org/10.1016/j.pbiomolbio.2018.04.005>; *Psychology Today*, “Is the Universe Conscious?” Accessed June 23, 2017. <http://www.psychologytoday.com/blog/the-nature-nurture-nietzsche-blog/201004/is-the-universe-conscious>.
- ⁶⁹ Koch, “What Is Consciousness?” <https://doi.org/10.1038/d41586-018-05097-x>; Gregory L. Matloff, “Can Panpsychism Become an Observational Science?” *Journal of Consciousness Exploration & Research*, vol. 7, no. 7 (August 7, 2016), <https://jcer.com/index.php/jcj/article/view/579>; Torday and Miller, “The Cosmologic Continuum from Physics to Consciousness.”
- ⁷⁰ Bernardo Kastrup, “Consciousness Cannot Have Evolved,” *IAI TV - Changing How the World Thinks*, February 5, 2020, <https://iai.tv/articles/consciousness-cannot-have-evolved-auid-1302>.
- ⁷¹ Feinberg and Mallatt, *The Ancient Origins of Consciousness*.

⁷² Julian Jaynes, *The Origin of Consciousness in the Breakdown of the Bicameral Mind* (Boston: Houghton Mifflin, 1977); Graham Little, *The Origin of Consciousness* (Northcote: Self Help Guides Limited, 2014); Andrea Cavanna, “The Origin of Consciousness and Beyond,” *Frontiers in Psychology*, vol. 5 (November 26, 2014), <https://doi.org/10.3389/fpsyg.2014.01385>.

⁷³ For a detailed discussion of anthropocentrism and its perils see Gennady Shkliarevsky, “Living a Non-Anthropocentric Future,” SSRN Scholarly Paper. Rochester, NY: Social Science Research Network, September 29, 2021. <https://doi.org/10.2139/ssrn.3933108>.

⁷⁴ Gennady Shkliarevsky, “Understanding the Process of Creation: A New Approach.”

⁷⁵ Gennady Shkliarevsky, “The Paradox of Observing.”

REFERENCES

- “The Cambridge Declaration on Consciousness,” 2012,
<https://fcmconference.org/img/CambridgeDeclarationOnConsciousness.pdf>.
- Allen, Colin. “Animal Consciousness.” *Stanford Encyclopedia of Philosophy*,
<http://plato.stanford.edu/entries/consciousness-animal/> (accessed July 7, 2012).
- Baars, B. J. *A cognitive theory of consciousness*. New York, NY: Cambridge University Press, 1988.
- Beshkar, Majid. “The QBIT Theory of Consciousness.” *Integrative Psychological & Behavioral Science*, vol. 54, no. 4 (December 2020), pp. 752–70,
<https://doi.org/10.1007/s12124-020-09528-1>.
- Birch, Jonathan, Alexandra K. Schnell, and Nicola S. Clayton. “Dimensions of Animal Consciousness.” *Trends in Cognitive Sciences*, vol. 24, no. 10 (October 2020), pp. 789–801, <https://doi.org/10.1016/j.tics.2020.07.007>.
- Birch, Jonathan. “In Search of the Origins of Consciousness.” *Acta Biotheoretica*, vol. 68 (September 26, 2019), pp. 287–94, <https://doi.org/10.1007/s10441-019-09363-x>.
- Boden, Margaret. *The Creative Mind: Myths and Mechanisms*, 2nd ed. London, New York: Routledge, 2004.
- Burkart, Judith, Rahel K. Brügger, and Carel P. van Schaik. “Evolutionary Origins of Morality: Insights From Non-Human Primates.” *Frontiers in Sociology*, vol. 3 (2018),
<https://doi.org/10.3389/fsoc.2018.00017>.
- Cabanac, Michel, Arnaud J. Cabanac, and André Parent. “The Emergence of Consciousness in Phylogeny.” *Behavioural Brain Research*, vol. 198, no. 2 (March 17, 2009), pp. 267–72,
<https://doi.org/10.1016/j.bbr.2008.11.028>.
- Cambridge Dictionary <https://dictionary.cambridge.org/us/dictionary/english/pleasure>
- Carruthers, P. *Phenomenal Consciousness*. Cambridge: Cambridge University Press, 2000.
- Cavanna, Andrea. “The Origin of Consciousness and Beyond.” *Frontiers in Psychology*, vol. 5 (November 26, 2014), <https://doi.org/10.3389/fpsyg.2014.01385>.
- Chalmers, David J. “The Problem of Consciousness.” *Discusiones Filosóficas*, vol. 12, no. 19 (December 2011), pp. 29–59.
- Churchland, Patricia S. *Conscience: The Origin of Moral Intuition*. New York: Norton, 2019.

-
- Craig, William Lane, and Walter Sinnott-Armstrong. *God?: A Debate Between a Christian and an Atheist*. Oxford: Oxford University Press, 2004.
- Currin, Grant. “What is Consciousness.” *Live Science*, July 26, 2020, <https://www.livescience.com/what-is-consciousness.html>.
- Davenport, David. “Computationalism: Still the Only Game in Town.” *Minds & Machines*, vol. 22, no. 3 (August 2012), pp. 183–90, <https://doi.org/10.1007/s11023-012-9271-5>.
- Dehaene, S., C. Sergent, and J. P. Changeux. “A neuronal network model linking subjective reports and objective physiological data during conscious perception.” *Proceedings of National Academy of Sciences*, vol. 100 (2003), pp. 8520-5.
- Edelman, Shimon. *Computing the Mind: How the Mind Really Works*. Oxford: Oxford University Press, 2008.
- Farrell, Jonathan. “Higher-Order Theories of Consciousness and What-It-Is-like-Ness.” *Philosophical Studies*, vol. 175, no. 11 (November 2018), pp. 2743–61, <https://doi.org/10.1007/s11098-017-0980-8>.
- Feinberg, Todd E., and Jon M. Mallatt. *The Ancient Origins of Consciousness: How the Brain Created Experience*. Cambridge: MIT Press, 2016.
- Feinberg, Todd E., and Jon Mallatt. “The Nature of Primary Consciousness. A New Synthesis.” *Consciousness and Cognition*, vol. 43 (July 2016), pp. 113–27, <https://doi.org/10.1016/j.concog.2016.05.009>.
- Fernandez-Duque, Diego. “Cause and Effect Theories of Attention: The Role of Conceptual Metaphors.” *Review of General Psychology*, vol. 6, no. 2 (2002), pp. 153-65.
- Fodor, Jerry. *The Mind Doesn't Work That Way: The Scope and Limits of Computational Psychology*. Cambridge: The MIT Press, 2001. <http://mitpress.mit.edu/catalog/item/default.asp?ttype=2&tid=8561&mode=toc>.
- Gennaro, R. *Consciousness and Self-consciousness: A Defense of the Higher-Order Thought Theory of Consciousness*. Amsterdam and Philadelphia: John Benjamins, 1995.
- Ginsburg, Simona, and Eva Jablonka. “Are Your Cells Conscious?” *The American Journal of Psychology*, vol. 133, no. 1 (2020), pp. 117–21, <https://doi.org/10.5406/amerjpsyc.133.1.0117>;
- Ginsburg, Simona, and Eva Jablonka, *The Evolution of the Sensitive Soul: Learning and the Origins of Consciousness*. Cambridge, MA: MIT Press, 2019.

-
- Ginsburg, Simona, and Eva Jablonka. "The First Minds: Caterpillars, 'Karyotes, and Consciousness. A Review." *American Journal of Psychology* 133, no. 1 (Spring 2020), pp. 117–21, <https://doi.org/10.5406/amerjpsyc.133.1.0117>.
- Graziano, M. S. A., and M. M. Botvinick. "How the brain represents the body: Insights from neurophysiology and psychology." In W. Prinz and B. Hommel. Eds. *Common mechanisms in perception and action: Attention and performance*. Oxford: Oxford University Press, 2002. Pp. 136–157.
- Graziano, M. S. A., and S. Kastner. "Human consciousness and its relationship to social neuroscience: A novel hypothesis." *Cognitive Neuroscience*, vol. 2 (2011), pp. 98–113, doi:10.1080/17588928.2011.565121.
- Graziano, M. S. A. *Rethinking consciousness: A scientific theory of subjective experience*. New York: Norton, 2019.
- Graziano, Michael, Arvid Guterstam, Branden J. Bio, and Andrew I. Wilterson. "Toward a Standard Model of Consciousness: Reconciling the Attention Schema, Global Workspace, Higher-Order Thought, and Illusionist Theories." *Cognitive Neuropsychology*, vol. 37, no. 3/4 (June 5, 2020), pp. 155–72, <https://doi.org/10.1080/02643294.2019.1670630>.
- Graziano, Michael. "Most Popular Theories of Consciousness Are Worse Than Wrong." *The Atlantic*, March 9, 2016, <https://www.theatlantic.com/science/archive/2016/03/phlegm-theories-of-consciousness/472812/>.
- Graziano, Michael. "What Is Consciousness?" *New Scientist*, vol. 243, no. 3248 (September 21, 2019). Pp. 34–37, [https://doi.org/10.1016/s0262-4079\(19\)31774-9](https://doi.org/10.1016/s0262-4079(19)31774-9).
- Heathwood, Chris. "Could Morality Have a Source?" *Journal of Ethics & Social Philosophy*, vol. 6, no. 2 (2012), <http://www.psychologytoday.com/blog/the-nature-nurture-nietzsche-blog/201004/is-the-universe-conscious> (accessed June 23, 2017).
- Jackendoff, Ray S. *Consciousness and the Computational Mind*. Cambridge, MA, USA: A Bradford Book, 1987.
- Jaynes, Julian. *The Origin of Consciousness in the Breakdown of the Bicameral Mind*. Boston: Houghton Mifflin, 1977.
- Kastrup, Bernardo. "Consciousness Cannot Have Evolved." *IAI TV - Changing How the World Thinks*, February 5, 2020, <https://iai.tv/articles/consciousness-cannot-have-evolved-auid-1302>.

-
- Killen, Melanie, Aline Hitti, Shelby Cooley, and Laura Elenbaas. "Morality, Development, and Culture." In *Handbook of Advances in Culture and Psychology*, vol. 5. New York: Oxford University Press, 2015. Pp. 161-220, <https://doi.org/10.1093/acprof:oso/9780190218966.003.0004>.
- Koch, Christof. "What Is Consciousness?" *Nature*, vol. 557, no. 7704 (May 9, 2018), pp. S8–12, <https://doi.org/10.1038/d41586-018-05097-x>.
- Kotchoubey, Boris. "Human Consciousness: Where Is It From and What Is It For." *Frontiers in Psychology*, vol. 9 (2018), , <https://doi.org/10.3389/fpsyg.2018.00567>.
- Little, Graham. *The Origin of Consciousness*. Northcote: Self Help Guides Limited, 2014.
- Luhmann, Niklas. *Social Systems*. Stanford: Stanford University Press, 1995.
- Matloff, Gregory L. "Can Panpsychism Become an Observational Science?" *Journal of Consciousness Exploration & Research*, vol. 7, no. 7 (August 7, 2016), <https://jcer.com/index.php/jcj/article/view/579>.
- Mender, Donald. "Other Minds: The Octopus, the Sea, and Deep Origins of Consciousness," *Journal of Consciousness Studies*, vol. 25, no. 3/4 (March 2018), pp. 242–49.
- Miller, William B., Jr. "The First Minds: Caterpillars, 'karyotes and Consciousness. A Review." *Philosophical Psychology*, vol. 34, no. 2 (February 2021), pp. 322–25, <https://doi.org/10.1080/09515089.2020.1849599>.
- Mitra-Delmotte, Gargi. "Consciousness: A Direct Link with Life's Origin," (accessed June 9, 2019), https://www.academia.edu/5992837/Consciousness_A_Direct_Link_with_Lifes_Origin.
- Nagel, Thomas. "What is it like to be a bat?" *Philosophical Review*, vol. 83, no. 4 (1974), pp. 435–450.
- Oxford Dictionary*, <https://www.lexico.com/en/definition/consciousness>.
- Oxford Dictionary*, <https://www.oxfordlearnersdictionaries.com/us/definition/english/knowledge>
- Piaget, Jean. *The Origins of Intelligence in Children*. Madison: International Universities Press, Inc., 1998.
- Place, U. T. "Is consciousness a brain process?" *British Journal of Psychology*, vol. 47 (1956), pp. 44–50.

-
- Powell, Corey S. “Is the Universe Conscious?” NBC News <https://www.nbcnews.com/mach/science/universe-conscious-ncna772956> (accessed August 21, 2021).
- Proctor, Helen S., Gemma Carder, and Amelia R. Cornish. “Searching for Animal Sentience: A Systematic Review of the Scientific Literature.” *Animals : An Open Access Journal from MDPI*, vol. 3, no. 3 (September 4, 2013), pp. 882–906, <https://doi.org/10.3390/ani3030882>.
- Psychology Today*, “Is the Universe Conscious?”
- Reber, Arthur S. *The First Minds: Caterpillars, ‘Karyotes, and Consciousness*. Oxford: Oxford University Press, 2018.
- Reber, Arthur S., and František Baluška. “Cognition in Some Surprising Places.” *Biochemical & Biophysical Research Communications*, vol. 564 (July 30, 2021), pp. 150–57, <https://doi.org/10.1016/j.bbrc.2020.08.115>.
- Rockefeller University. “A Surprising New Source of Attention in the Brain.” *News* (blog), December 19, 2019, <https://www.rockefeller.edu/news/26994-new-attention-area-in-brain-discovered/>.
- Rosenthal, D. “Two concepts of consciousness.” *Philosophical Studies*, vol. 49 (1986), pp. 329–59.
- Sanchez, Pauline. “The Origins of Morality.” *Dialogue & Nexus*, vol. 4, article 6 (2017).
- Sarkar, Sahotra, and Jessica Pfeifer. *The Philosophy of Science: An Encyclopedia*. New York: Routledge, 2006.
- Sattin, Davide, Francesca Giulia Magnani, Laura Bartesaghi, Milena Caputo, Andrea Veronica Fittipaldo, Martina Cacciatore, Mario Picozzi, and Matilde Leonardi. “Theoretical Models of Consciousness: A Scoping Review.” *Brain Sciences*, vol. 11, no. 535 (April 24, 2021), pp. 1-58.
- Seth, Anil. “Illuminating Consciousness.” *New Scientist*, vol. 251, no. 3350 (September 4, 2021), pp. 44–48, [https://doi.org/10.1016/s0262-4079\(21\)01565-7](https://doi.org/10.1016/s0262-4079(21)01565-7).
- Shkliarevsky, Gennady. “Conservation, Creation, and Evolution: Revising the Darwinian Project.” *Journal of Evolutionary Science*, vol. 1, no. 2 (September 25, 2019), pp. 1–30. <https://doi.org/10.14302/issn.2689-4602.jes-19-2990>.
- Shkliarevsky, Gennady. “Science and Its Discontents: Is There an End to Knowing?” *Systems Research and Behavioral Science*, vol. 30, no. 1 (2013), pp. 43–55, <https://doi.org/10.1002/sres.2127>.

-
- Shkliarevsky, Gennady. "The Universal Evolution and the Origin of Life." SSRN Scholarly Paper, Rochester, NY: Social Science Research Network, April 11, 2021. <https://doi.org/10.2139/ssrn.3824365>.
- Shkliarevsky, Gennady. "Understanding the Process of Creation: A New Approach." *Management: Journal of Sustainable Business and Management Solutions in Emerging Economies*, vol. 22, no. 3 (October 31, 2017), pp. 1–13, <https://doi.org/10.7595/management.fon.2017.0021>
- Shkliarevsky, Gennady. *The Civilization at a Crossroads: Constructing the Paradigm Shift*. Raleigh, NC: Glasstree Publishing, 2017.
- Shkliarevsky, Gennady. "Revising the Cosmic Story." *ArXiv:2012.12749 [Physics]*, December 23, 2020. <http://arxiv.org/abs/2012.12749>.
- Shkliarevsky, Gennady. "The Origin of Morality and the Making of the Moral Predicament." SSRN Scholarly Paper, Rochester, NY: Social Science Research Network, October 31, 2021. <https://doi.org/10.2139/ssrn.3953715>.
- Shkliarevsky, Gennady. "Living a Non-Anthropocentric Future," SSRN Scholarly Paper. Rochester, NY: Social Science Research Network, September 29, 2021. <https://doi.org/10.2139/ssrn.3933108>.
- Smart, J. J. C. "Sensations and brain processes." *Philosophical Review*, vol. 68 (1959), pp. 141–156, doi: 10.2307/2182164.
- Smith, Emily Esfahani. "Is Human Morality a Product of Evolution?" *The Atlantic*, December 2, 2015. <https://www.theatlantic.com/health/archive/2015/12/evolution-of-morality-social-humans-and-apes/418371/>.
- Sophocles, *Antigone*, line 333 (Ode I), <https://quotepark.com/quotes/1925744-sophocles-numberless-are-the-worlds-wonders-but-none-more/>.
- Stanford Encyclopedia of Philosophy*, <https://plato.stanford.edu/entries/consciousness/>
- Stanford Encyclopedia of Philosophy*, <https://plato.stanford.edu/entries/knowledge-analysis/#KnowJustTrueBeli>.
- Stone, Peter. "From Bacteria to Bach and Back by Daniel Dennett." *Philosophy Now*, issue 129, https://philosophynow.org/issues/129/From_Bacteria_to_Bach_and_Back_by_Daniel_Dennett, (accessed July 7, 2019).
- Tomasello, Michael A. *History of Human Morality*. Cambridge: Harvard University Press, 2016. <https://doi.org/10.5860/choice.197473>.

-
- Tononi, Giulio, and Christof Koch. “Consciousness: Here, There and Everywhere?” *Philosophical Transactions: Biological Sciences*, vol. 370, no. 1668 (2015), pp 1–18.
- Tononi, Giulio. “Consciousness as Integrated Information: A Provisional Manifesto.” *Biology Bulletin*, vol. 215, no. 3 (2008), pp. 216–242.
- Tononi, Giulio. “The Integrated Information Theory of Consciousness: An Updated Account.” *Archives Italiennes de Biologie*, vol. 150, no. 2/3 (2012), pp. 56–90, <https://doi.org/10.4449/aib.v149i5.1388>.
- Torday, John S., and William B. Miller. “The Cosmologic Continuum from Physics to Consciousness.” *Progress in Biophysics & Molecular Biology*, vol. 140 (December 2018), pp. 41–48, <https://doi.org/10.1016/j.pbiomolbio.2018.04.005>.
- Turner, Charles K. “A Principle of Intentionality.” *Frontiers in Psychology*, vol. 8 (2017), <https://www.frontiersin.org/article/10.3389/fpsyg.2017.00137>.
- Vallortigara, Giorgio. “The Rose and the Fly: A Conjecture on the Origin of Consciousness.” *Biochemical and Biophysical Research Communications. Rethinking Cognition: From Animal to Minimal*, vol. 564 (July 30, 2021), pp. 170–74, <https://doi.org/10.1016/j.bbrc.2020.11.005>.
- Van Hateren, J. H. “A Theory of Consciousness: Computation, Algorithm, and Neurobiological Realization.” *Biological Cybernetics*, vol. 113, no. 4 (August 2019), pp 357–72, <https://doi.org/10.1007/s00422-019-00803-y>.
- Vithoulkas G., and D. F. Muresanu. “Conscience and Consciousness: A Definition.” *Journal of Medicine and Life*, vol. 7, no. 1 (March 15, 2014), pp. 104–8.
- Webb, T. W. and M. S. A. Graziano. “The attention schema theory: A mechanistic account of subjective awareness.” *Frontiers in Psychology*, vol. 6 (2015), doi:10.3389/fpsyg.2015.00500.
- Wikipedia*, <https://en.wikipedia.org/wiki/Consciousness>.
- Yantis, Steven. “The Neural Basis of Selective Attention.” *Current Directions in Psychological Science*, vol. 17, no. 2 (2008), pp. 86–90, <https://doi.org/10.1111/j.1467-8721.2008.00554.x>.
- Your Dictionary*, <https://www.yourdictionary.com/consciousness>