

What has the search for consciousness looked like, and what can we infer from this pattern about our own human nature?

Willa Kopp-DeVol

Senior Project Advisor: John Fisher

Consciousness is inherently intrinsic, something that every human experiences and knows intimately. Understanding the nature of experience is critical for understanding ourselves. In this paper, I discuss and explore several theories of consciousness, and connect implications of this search to human nature. Each theory and philosophy attempts to solve the ‘hard problem’, drawing upon different studies, thought experiments and previous philosophies. The sources consist mostly of philosophical entries and essays, articles and books. Philosophy is an undiscoverable subject. All ideas discussed are the product of hard-working human brains processing the reality that they observe. More research needs to be done in neuroscience and brain-mapping for us to fully understand consciousness and the brain in their entirety. However, there will always be unanswered questions, philosophical ponderings, and curiosities that are important to kindle and accept as our species strives to understand ourselves and the world.

12th Grade Humanities
Animas High School
06 April 2020

Part I: Introduction

If you look up through falling snow, watching the world softly but quickly moving all around your field of view, a feeling so intensely human may start to stack itself within you. The feeling, ineffable and indescribable, allows the brain to understand the world in a way that it usually does not, and shows what you are habitually blind to. A reality so basic and yet complex that only the disorientation of snowfall, swimming in a vast ocean, or staring up at the tremendous arms of our galaxy, reveals it. Often a question arises, one that relates to me, the observer of this incredible reality. Why does this experience *feel* like something, and why am I aware in the first place? Why is there an observer to this reality at all? Is my experience simply the sensory input that this lump of matter, my brain, constructs? Or is it something more, something only subjective and personal and phenomenal?

Consciousness, for the sake of this paper, will be defined in the words of Thomas Nagel: "... an organism has conscious mental states if and only if there is something it is like to be that organism—something it is like *for* the organism" (436). These mental states can only occur if the object, person, or organism has intrinsic, subjective experience.

In 1995, a man named David Chalmers coined the term 'the hard problem' of consciousness, which is essentially the question of why we have conscious states at all, and why there is something that it is like to be me (Weisberg). Although not until recently titled the 'hard problem' (before, it was often categorized as the mind-body problem), the 'hard problem' has been the center of many debates, discussions, and research for millennia. Each theory or method attempts to solve, explain, or even deny this hard problem. Yet somehow we still find ourselves asking the same questions as if no answer ever truly satisfies the curiosity. This is often called

the explanatory gap. “There seems to be an unbridgeable explanatory gap between the physical world and consciousness” (Weisburg). Many theories have been produced to try and draw this gap to a close and solve the ‘hard problem’, for humans have always tried to understand the nature of ourselves and the world that we see.

Part II: Timeline

In Western philosophy, Plato often pondered the soul and mind in his works, and his student Aristotle was one of the first to formally question perception (Gennaro), believing that, literal or no, the sense organs¹ become the thing they are perceiving (Shields). Although both their philosophies and their understanding of the world were different, ancient philosophers had the same experience of being, the same wonder of the mind, and the same questions of who/what they *really* were.

As the world evolved through the middle ages, the question was debated in the background. It was not until the early 1600s that consciousness was brought to a center stage by philosopher René Descartes. He defined his ideas on consciousness in the form of substance dualism, proposing that the mind and body were separate substances. His ideas were metaphysical, relating to the soul. Descartes also believed “the notion that there is some privileged place in the brain where everything comes together to produce conscious experience ...” (Gennaro). This is often now called the Cartesian theater.

Around the same time, the scientific revolution was underway; extremely influential humans such as Galileo Galilei and Issac Newton were turning modern thought away from the

¹ Eyes, skin, ears, etc.

contemplative and philosophical thinking that had dominated for nearly 2,000 years. They focused on describing the world around us with laws and mathematics, and through observation, not logic or intuition. For the qualitative properties of reality, such as the feeling of looking at oneself in the mirror or tasting an orange², the scientists attributed to the soul, and did not spend much time trying to categorize or understand these aspects of reality.

Philosophy, however, continued to explore what science did not, and in contrast to dualism, a theory called monism was being popularized by G.W. Leibniz and Baruch Spinoza. Monism, and its many branches, holds that the mind and body are one; there is no dualism. Spinoza specifically believed that “both mind and matter [are] simply aspects (or attributes) of the eternal, infinite and unique substance[:] God Himself” (Goff et al). Mental and physical were one and the same, and Leibniz and Spinoza’s theories focused on joining the two.

In the 1800s, a subsection of monism called panpsychism was popularized, with figures such as Bertrand Russell philosophizing that substances were not necessarily physical or mental, but that a more neutral, underlying quality existed. This would come to be known as neutral monism (Weisberg). Modern theories of panpsychism take a different light, maintaining that along with the objective, reality also has an intrinsic, mind-like quality. Reality is a two-sided coin.

In 1859, a man named Charles Darwin published *On the Origin of Species*, which held enormous implications for humankind and how we came to be. Many theories of consciousness branched from these implications. For example, it brought up questions pertaining to consciousness as an evolutionary advantage (McBrayer 11). It also had a hand in arguing for

² These qualitative experiences are often defined as individual ‘qualia’ (Kind).

materialism³, with the argument that as the brain evolved, so did consciousness.

In the early to mid-1900s, a compelling scientific method and psychology morphed into a theory of mind. This was called behaviorism, and was particularly inviting because of the rigidity of it. It was, in essence, the science of connecting behavior to the brain. To give an example, psychologist John Watson ran an experiment on a nine-month-old child, where he essentially conditioned Little Albert into having a fear-based response to white, fluffy objects (Plucker).

Watson emphasized the importance of the scientific method in psychology, wanting to move away from the theories proven by speculation and introspection. He also hugely influenced the nature vs. nurture debate⁴, showing that environment (ie. nurture) was responsible for much behavior.

Influenced by Watson, another behavioral psychologist named B.F. Skinner also made a large impact on behaviorism. He studied animal learning and conditioning, using rats as his main test subjects (Skinner).

As the method progressed and experiments were conducted, it became increasingly apparent that certain brain phenomena were connected with behavior. Many humans of the time took this a step further and concluded that *all* behavior could be traced back to a muscle twitch, a brain firing, or some physical process (Jaynes 15).

However, the ‘hard problem’ still remained, for no matter how connected the brain and behavior seemed, there was still the *experience* of living that was being ignored. Conditioning behavior and understanding the effects of an organism's environment does not tell you what it is

³ Materialism is often paired with physicalism philosophies: consciousness is purely material or physical.

⁴ A long debated topic that questions whether a person’s behavior is influenced by genetics or the environment (Sherry).

like to be them, or to know what, or if, they are experiencing.

Just before the turn of the 21st century, David Chalmers coined the term ‘the hard problem’ of consciousness, which he describes as “how physical processes in the brain give rise to the subjective experience of the mind and of the world” (Chalmers 00:07 - 00:20). Although he believes that it is the brain that processes, thinks, etc., he is highlighting the explanatory gap between the physical and personal experience.

In the past several decades since the 1980s, the field of neurophysiology has grown in both popularity and ability, with new technology and techniques revealing things about our brains that have never before been seen or understood. Many are now taking a more interdisciplinary take on the traditional ‘science *or* philosophy’, which has resulted in many journals, consciousness science conferences, meetings, etc., whose purpose is to discuss and share information about the brain and consciousness. Philosophy is still an important part of these, but it is working in a more integrated way rather than individually taking these questions on.

Part III: Research and Analysis

Part 3.1 - Physicalism, Behaviorism, and Eliminativism

Many modern thinkers often constitute consciousness, experience, or phenomenality to the physical and to the brain. As a result, and along with the long list of theories of consciousness, there also exists a list of theories that dispute the very notion. Understanding the nature of consciousness is important, and cannot be dismissed easily.

An eliminative argument against consciousness is often that consciousness is an illusion

that we have fallen prey to. It only seems as though we are experiencing conscious states, but it is not what is *actually happening*. However, this argument does not hold up, for it does not matter if your brain only simulates consciousness or if it is really there; they are one and the same. For example: “Suppose you’re hypnotized to feel intense pain. Someone may say that you’re not really in pain, that the pain is illusory, because you haven’t really suffered any bodily damage. But to seem to feel pain is to be in pain” (Strawson). What reality seems like and what it is are identical.

Even if consciousness was a grand illusion, we would still question why the illusion was there at all, and how. The problem does not go away, it is simply redefined.

In the 20th century, particularly from 1920-1960, a huge influx in the popularity of behaviorism came into play. Behaviorism was often considered a theory, but in actuality, it was more of a method of science. This field was largely influenced by B.F. Skinner and other prominent behavioral psychologists of the time (Gennaro 4), such as John B. Watson. Experiments were being done to test and understand animal behavior and learning, to find out more about the animal kingdom and our place in it (or above it). The studies of behaviorism showed that the mind was reliant on or at least was related in part to the brain. As we saw more and more properties that we previously attributed to the soul, being able to be broken down into simple phenomena, consciousness philosophy seemed to be being pushed from the spotlight of common knowledge and sense. How promising the notion that there would be no more philosophizing on the nature of consciousness; we could be reduced to chemical releases and muscle twitches (Jaynes 15). The ‘hard problem’ of consciousness would be solved because

there was no 'hard problem' to begin with.

However, behaviorism was more of a way of study than a theory, and did not explain what the 'hard problem' sought to answer. A thought experiment proposed by Frank Jackson outlines the problem of consciousness being purely physical:

Mary is kept in a black and white room from birth during which time she becomes a brilliant neuroscientist and an expert on color perception. Mary never sees red for example, but she learns all of the physical facts and everything neurophysiologically about human color vision. Eventually she is released from the room and sees red for the first time. Jackson argues that it is clear that Mary comes to learn something new; namely, to use Nagel's famous phrase, what it is like to experience red. This is a new piece of knowledge and hence she must have come to know some non-physical fact
(Gennaro)

This thought experiment shows that there is something that physicalism is not accounting for, something that only a first-person point of view can reveal. She learns a fact: what the color red is like, which means that "there are facts about color in addition to all the physical facts about color (since Mary already knew all the physical facts about color)" (Kind). If physicalism were true, Mary would learn nothing more about the color red, for she would already know everything there is to know. Essentially, our understanding of the world is not only reliant on physical facts, but phenomenal ones as well.

Similarly, if we were to map the entire human brain, in perfect detail, we would still not

know what it is like to be the brain.

Even if we had a complete wiring diagram of the nervous system, we still would not be able to answer our basic question. Though we knew the connections of every tickling thread of every single axon and dendrite in every species that ever existed, together with all its neurotransmitters and how they varied in its billions of synapses of every brain that ever existed, we could still never — not ever — from a knowledge of the brain alone know if that brain contained a consciousness like our own. (Jaynes 18)

Understanding how something is from the outside is not adequate. Thomas Nagel brings up a compelling argument in his essay “What Is It Like to Be a Bat”. He explains that if we dissected, mapped, and *knew* the brain and body of a bat, we would still not know what it is like to be that bat, and although we could imagine, that is not sufficient in understanding a life beyond ourselves.

Our own experience provides the basic material for our imagination, whose range is therefore limited. It will not help to try to imagine that one has webbing on one's arms, which enables one to fly around at dusk and dawn catching insects in one's mouth; that one has very poor vision, and perceives the surrounding world by a system of reflected high-frequency sound signals; and that one spends the day hanging upside down by one's feet in an attic. Insofar as I can imagine this (which is not very far), it tells me only what it would be like for me to behave as a bat behaves. But that is not the question. I want to know what it is like for a bat to be a bat. (Nagel 439)

Once again, there is a missing factor, the intrinsic nature of *being*, that science, language, and

human understanding as we know, has no way to legitimately comprehend. Yet we are reminded that by understanding this state of being, we can understand ourselves, who we are, and what life is at its most basic.

Simply stating that there is no consciousness is not a satisfying answer, for it only sidesteps the 'hard problem' instead of answering or discrediting it. So if we are conscious, and this state of awareness is real, what could explain it?

Part 3.2 - Dualism

In the early to mid-1600s, when Galileo was first gazing through a refracting telescope at the stars, a dominant theory of consciousness was dualism. Dualism meaning literally two states or qualities, was the distinction between mind (or consciousness) and body. There are two main types of dualism: substance dualism, and a more modern branch of the original theory: property dualism. The original substance dualism was very much bound together with the theological views of the time, surrounding soul and hard written beliefs in God. These dualists believed that our consciousness is separate from the body and brain, consisting of an entirely new substance. This substance interacts closely with the body to inform and influence it, but it does not die when the body does; it can be detached and hence analogous to the soul. In fact, during this time, the terms soul and consciousness were relatively interchangeable.

Réne Descartes, a philosopher who brought substance dualism into the light, believed the pineal gland, located in the center of the human brain, was the tie to the soul, which then was able to communicate back and forth with the body. "[If we decide to] move the body in any manner, this volition causes the gland to impel the spirits towards the muscles which bring about

this effect” (qtd. in Calef). The brain was not the one directing the play, it was in fact the soul, a substance entirely different from the physical.

Needless to say, as advancements progressed and we learned more about biology, evolution, and the laws of nature, this theory became less popular. For one, it became apparent that injuries to the brain were correlated with injuries to conscious states (Genarro). Such as seen in the split-brain research done by Roger Sperry, Joseph Bogen, and Michael Gazzaniga, severing the corpus callosum (responsible for communication between the two sides of the brain) of a human brain reveals the individual roles that each hemisphere play in behavior, thinking, and consciousness (Gazzaniga 654). If surgery and alterations to the brain affect the personality and abilities of the person, consciousness seems to be rooted to the brain, not a non-physical substance that is entirely apart from it.

Another argument against substance dualism goes as follows: if consciousness is a non-physical substance but still able to interact with the brain and body, this violates the first law of thermodynamics. Also called the conservation of energy principle, this law states that energy can neither be created nor destroyed. If the brain is influenced by a non-physical consciousness, energy needs to be transferred from one to the other. And energy flows in the physical realm. In Rocco Gennaro’s “Consciousness” article, he asserts, “... when mental events cause physical events, energy would literally come into the physical world.” This is not possible in the reality that we have meticulously observed, and so substance dualism seems to fall behind.

A new theory emerged, one that fit better with new understandings and arguments, dubbed property dualism. Although still different from the brain, consciousness to a property dualist is non-physical, but only because it is a property. For example, just as the boiling point of

iron, say, is a property of the metal but not its own physical substance, consciousness would be a property of the brain/body. It occurs because of the brain, so it is not entirely separate from it, but, unlike materialist or physicalist theories, consciousness is not the brain. "... conscious properties, such as the color qualia involved in a conscious experience of a visual perception, cannot be explained in purely physical terms and, thus, are not themselves to be identified with any brain state or process" (Gennaro).

Property dualism holds that consciousness is a non-reducible property of the brain, meaning that it cannot be broken down into any simpler parts. For instance, "we move toward a more objective understanding of heat when we understand it as molecular energy rather than as warmth" (Calef), but we cannot follow a similar line of logic when we try to understand consciousness as something more fundamental. How consciousness appears is exactly what consciousness *is*: the appearance; how it is to the individual viewer.

So consciousness in this regard is still apart from the brain, but is a non-physical product of it. However, even property dualists still argue that consciousness is a non-physical thing casually interacting with the brain and body, the conservation of energy law still denies that this could be true, and so dualism is false.

Another argument that criticizes the heart of dualism: the theological beliefs, brings up the phenomenon of human development. "No one seriously supposes that newly fertilized ova are imbued with minds or that the original cell in the primordial sea was conscious. But from those entirely physical origins, nothing non-physical was later added" (Calef). We are still fully physical beings later in life. The question would be then, where does the non-physical substance come in, and how? Dualists may argue that consciousness or the soul was placed in a fetus at a

certain point in the development by something “other”, namely God. This argument has no basis in scientific observation, and so often has little value when considering the heart of consciousness in philosophy or otherwise.

Part 3.3 - Emergence as Consciousness

If dualism can be disputed, perhaps a similar, yet more scientific theory—the theory of consciousness as an emergent phenomenon—can take its place. This theory is similar to property dualism, but it is more modern and founded in observation. Emergence is a law of physics, and is the reverse of reductionism. Emergence can be observed when “some macro property or behavior arises spontaneously from many interacting micro parts” (Rennie). Starling birds are a perfect example of this. Watching from below, you will see a large flock of birds all moving in relative synchronicity, forming strange amorphous patterns as they move across the sky. Each bird plays a part in the flight, no single one is directing the group, and yet witnessed from a larger perspective, they are *something more*, something larger than themselves.

Humans started to mull over this idea in its earliest forms in the late 1800s, and it continued to evolve into what we often categorize it as now: a sum greater than its parts (Goldstein 53). As we began to understand this law, we saw it everywhere, from snowflakes to ocean waves to galaxies. Why not apply it to consciousness as well? In this way, billions of neurons, when properly arranged, would result in consciousness, a sort of “lighting up” of awareness, if you will. This solves the previously mentioned human development argument against dualism by presenting consciousness as the emergent property when a certain amount of cells divide to form a human being.

This theory is particularly compelling because it does not have to account for the “why”.

The “why” is simply how it is, such as in the case of H₂O molecules becoming liquid water once they reach a certain number. The average motion of micro-particles is temperature, and that is simply how the universe works. It is a pointless question to ask “how does molecular kinetic energy emerge to form heat?” because the answer is fundamental: it is how reality as we know it works, no further explanation required.

However, Annika Harris, after explaining emergent phenomena in her book *Conscious: A Brief Guide to the Fundamental Mystery of the Mind*, goes on to dispute this answer by pointing out a fundamental flaw in the argument. Physics, as we know it, does not account for the intrinsic nature of objects. So, emergence, an observation of the physical, only describes the objective nature of matter and how it appears to be from an outside perspective. “(Additionally, when scientists assume they have bypassed the ‘hard problem’ by describing consciousness as an emergent property ... they are changing the subject.) All emergent phenomena—like ant colonies, snowflakes, and waves—are still descriptions of matter and how it behaves as witnessed from the outside” (70). The emergent property of the billions of neurons is simply the lump of pink-grey matter that is floating about inside your skull-case right now, not internal experience.

An interesting counter to this breakdown of the theory of consciousness as an emergent phenomenon is that there is another type of emergence that is non-physical. That matter can be described intrinsically as well, and a new law of emergence, one that deals with the subjective, can be formed. The theory that there is an intrinsic nature of matter is modernly called panpsychism.

Part 3.4 - Panpsychism

As we now know, sometimes the rigorous and inherently objective nature of math and science fails in allowing us to comprehend the subjective. The beginning theories of panpsychism were branches of monism, and stated that there was not such a harsh distinction between in and out, reality and perceived reality. As time went on, though, a distinction was continuously drawn, through scientific discoveries, societal beliefs, etc., and the worlds seemed further and further apart. Modern panpsychism holds that matter—all matter—has intrinsic qualities. From plants all the way down to atoms and subatomic particles, each physical thing has subjective experience. This experience is entirely different from what we know ours to be; it is simpler, unimaginable, but there, existing as the flip side of what is understandable from the outside.

A main argument for this theory is the fact that modern physics does not tell us about the inside of ourselves, the ‘what it’s like’. Philip Goff explains this in his article “Panpsychism is crazy, but it’s also most probably true”: “... physical science doesn’t tell us what matter is, only what it does. The job of physics is to provide us with mathematical models that allow us to predict with great accuracy how matter will behave. ... But it is one thing to know the behaviour of an electron and quite another to know its intrinsic nature: how the electron is, in and of itself.” We know that some matter—us, brains—have an intrinsic nature of experience. The theoretical imperative to make then, is that all matter has some type of subjective nature.

It is not that each electron, for example, has a consciousness, but that because it exists, there is something that *it is like* to be that electron. Our understanding only goes as far as the

physical, “outside” view, so we could not be sure if the electron was experiencing *being* an electron, whatever that would be like.

There are a few objections to this theory, the most compelling being the problem of combination. If all matter has an “internal world”, how does each bit of matter come together to form the larger consciousness we know as our own? The binding/combination problem can be formally described as the “problem of integrating the information processed by different regions of the brain ...” (Frith).

This objection, however, does not hold up with our understanding of the brain now. The brain, made up of billions of neurons, axons, dendrites, glial cells, etc., works like a well-oiled machine, exchanging information in the language of chemicals and electricity. Each of these cells form something greater⁵. The binding problem may be dismissed with the definition of emergence. However, it is why consciousness emerges or is there at all that is the hard problem.

A more modern counter to panpsychism is that the theoretical imperative suggested by Philip Goff is more a leap of faith, and does not hold up as a strong argument. The article “Why Panpsychism Fails to Solve the Mystery of Consciousness” emphasizes this:

Even if we accept that basic physical entities must have some categorical nature ... consciousness is an unlikely candidate for this fundamental property. For, so far as our evidence goes, it is a highly localised phenomenon that is specific not only to brains but to particular states of brains It appears to be a specific state of certain highly complex information-processing systems, not a basic feature of the Universe. (Frankish)

⁵ Also, split-brain research has shown that each hemisphere is conscious, and the brain does not have a problem integrating the information processed by either one when the brain is fully intact.

We may be taking our understanding and applying it too far beyond ourselves. Not only this, but panpsychism, by nature, cannot be tested. We would have to create or discover an entirely new branch of ‘subjective physics’ to truly see if consciousness and experience are only attributes of brains, or if matter itself has an inverse set of laws/existence. It is hard to know what the future holds, for it may also be the case that “mental-physical relations will eventually be expressed in a theory whose fundamental terms cannot be placed clearly in either category” (Nagel 450), and objective and subjective will be joined in a way we cannot understand yet. These possibilities are often too large a leap for many to take.

Part IV: Where the search is going

Although eliminative theories of consciousness such as behaviorism have been countered, a more modern view has emerged in the past couple of decades that rehash them in a new light. We now know so much more about the brain and how it functions than we ever have, and some propose a new ‘hard problem’, called the ‘real problem’ (Seth). How are we to know if Mary would be uncertain what red is like, if we have never actually mapped the brain in its entirety? It is all just speculation. As Patricia Churchland has argued (qtd. in Kind), “How can I assess what Mary will know and understand if she knows everything there is to know about the brain? Everything is a lot, and it means, in all likelihood, that Mary has a radically different and deeper understanding of the brain than anything barely conceivable in our wildest flights of fancy.”

Many of the arguments made in the past have become outdated or were founded in ideas

that are now seen as misunderstandings of reality. There is still much to discover; we should not solidify conclusions yet. In this new wave of neuroscientific discovery and understanding, we seem to be connecting some dots that may lead us to a new question entirely, leaving the old one behind. This has happened before when Issac Newton's theory replaced the common understanding of celestial spheres, and the old idea was simply discarded. "It wasn't that Ptolemaic theorists had an inadequate account of the celestial sphere; rather, what was discovered was that there *was no celestial sphere*" (Kind).

Today there are many organizations, conventions, journals, and research facilities that are taking this modern stance and diving into the questions that can be answered. For example, the Association for the Scientific Study of Consciousness (ASSC) meets annually to discuss and share ideas about brain science, new studies, and other topics and problems that consciousness brings in the modern age (Lau). Researchers are focused on the "real problem", or the "mapping problem" now, for mapping the brain and understanding it in greater detail is something achievable, rather than the unknown world of speculative philosophy. That is not to say, however, that philosophy, especially surrounding consciousness, is not extremely important to keep alive. Philosophy has often been the catalyst for more scientific queries or laws which would not have been possible if there were not people asking the hard questions to begin with. By meticulously questioning reality, by discussing what we notice and find, we are bound to gain a greater understanding of this incredibly complex and awesome reality that we have all found ourselves experiencing.

Part 4.1: The dreadful miracle of the human condition

Our species often seems to be built for wonder. To look up at the canyon walls or the city streets, to question, what made them so, where did they come from, and why? We question, philosophize, theorize, test and observe. It is arguably what makes us human. When it comes to ourselves, the answers we seek are often unsatisfactory or unavailable. And yet we still seek. We search even when the quest is irrational or the answer nonexistent; we fight like hell to understand the reality we experience.

Works Cited

- Calef, Scott. "Dualism and Mind." *Internet Encyclopedia of Philosophy*, ISSN 2161-0002, www.iep.utm.edu/dualism/. Accessed 03 March 2020.
- Chalmers, David. "Hard Problem of Consciousness – David Chalmers." *Serious Science*, 05 July 2016, www.youtube.com/watch?v=C5DfnIjZPGw
- Frankish, Keith. "Why Panpsychism Fails to Solve the Mystery of Consciousness." *Aeon*, Aeon Media Group, 25 Mar. 2020, www.aeon.co/ideas/why-panpsychism-fails-to-solve-the-mystery-of-consciousness.
- Frith, Chris. *The Unity of Consciousness: Binding, Integration, and Dissociation*. Edited by Axel Cleeremans, Oxford University Press, 2003.
DOI:10.1093/acprof:oso/9780198508571.001.0001
- Gazzaniga, Michael S. "Perspectives: Forty-Five Years of Split-Brain Research and Still Going Strong." *Perspectives*, vol. 6, Nature Publishing Group, 2015, pp. 653-59, doi.org/10.1038/nrn1723.
- Gennaro, Rocco. "Consciousness." *Internet Encyclopedia of Philosophy*, ISSN 2161-0002, www.iep.utm.edu/consciou/, Accessed 03 April 2020.
- Goff, Philip, Seager, William and Allen-Hermanson, Sean, "Panpsychism", *The Stanford Encyclopedia of Philosophy* (Winter 2017 Edition), Edward N. Zalta (ed.), <https://plato.stanford.edu/archives/win2017/entries/panpsychism/>.

Goff, Philip. "Panpsychism is crazy, but it's also most probably true." Aeon, Aeon Media Group, 01 Mar. 2017, www.aeon.co/ideas/panpsychism-is-crazy-but-its-also-most-probably-true.

Goldstein, Jeffery. "Emergence as a Construct: History and Issues." The New England Complex Systems Institute, Dec. 1998, http://nurmandi.staff.umy.ac.id/files/2012/02/complexitytheory_1-1.pdf#page=50

Harris, Annaka. *Conscious: A Brief Guide to the Fundamental Mystery of the Mind*. HarperCollins Canada, Limited, 2019.

Kind, Amy. "Qualia." *Internet Encyclopedia of Philosophy*, ISSN 2161-0002, www.iep.utm.edu/qualia/. Accessed 04 February 2020.

Lau, Hakwan. "20 Years of ASSC: Are We Ready for Its Coming of Age?" OUP Academic, Oxford University Press, 4 May 2017, www.academic.oup.com/nc/article/2017/1/nix008/3796583.

McBrayer, Justin, Adam Hamilton. "Do Plants Feel Pain?"

Nagel, Thomas. "What Is It Like to Be a Bat?" *The Philosophical Review*, 1974, pp. 435–450., warwick.ac.uk/fac/cross_fac/iatl/study/ugmodules/humananimalstudies/lectures/32/nagel_bat.pdf.

Plucker, Jonathan A. "John B. Watson (1878–1958) - Popularizing Behaviorism, The Little Albert Study, The 'Dozen Healthy Infants', Life after the University." *StateUniversity.com*,

www.education.stateuniversity.com/pages/2543/Watson-John-B-1878-1958.html.

Accessed 03 April 2020.

Rennie, John. "Emergence: How Complex Wholes Emerge From Simple Parts." *Quanta Magazine*, 20 Dec. 2018,

www.quantamagazine.org/emergence-how-complex-wholes-emerge-from-simple-parts-20181220/.

Seth, Anil. "Conscious Spoons, Really? Pushing Back against Panpsychism." *NeuroBanter*, 1 Feb. 2018,

www.neurobanter.com/2018/02/01/conscious-spoons-really-pushing-back-against-panpsychism/.

Sherry, John L. "Media effects theory and the nature/nurture debate: A historical overview and directions for future research." *Media Psychology* 6.1 (2004): 83-109.

Shields, Christopher, "Aristotle's Psychology", *The Stanford Encyclopedia of Philosophy* (Winter 2016 Edition), Edward N. Zalta (ed.),

<https://plato.stanford.edu/entries/aristotle-psychology/suppl3.html>.

Skinner, Burrhus F. *Operant Conditioning*. Vol. 18, American Psychological Association, 1963, pp. 503-515,

www.social.stoa.usp.br/articles/0016/2394/Skinner_B._F._Operant_Behavior.pdf.

Strawson, Galen. "The Consciousness Deniers." *The New York Review of Books*, NYREV, 13

Mar. 2018, www.nybooks.com/daily/2018/03/13/the-consciousness-deniers/.

Weisberg, Josh. "The Hard Problem of Consciousness." *Internet Encyclopedia of Philosophy*,

ISSN 2161-0002, <https://www.iep.utm.edu/hard-con/>. Accessed 29 March 2020.