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MIND AND CONSCIOUSNESS IN THE UNIVERSE:
SEARCHING FOR ONTOLOGICAL AND FUNCTIONAL ANSWERS

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"(...) The important thing is not to stop questioning. Curiosity has its own reason for existence. One cannot help but be in awe when he contemplates the mysteries of eternity, of life, of the marvellous structure of reality. It is enough if one tries merely to comprehend a little of this mystery each day. Never lose a holy curiosity. (...)"

- Albert Einstein (1955, p.64)

Acknowledgements

To my family.

Abstract

Consciousness is perhaps *the* scientific mystery of the twenty-first century. How we are conscious, who else is conscious, how does consciousness come to be and the nature of consciousness are all unsolved questions. I discuss these and other questions, exploring ideas from different fields, aiming at a debate of ideas and not a gathering of solutions or answers. Some of the history regarding the investigation of consciousness and some of its' major theories are approached with the aim of understanding how consciousness came to be, its' nature and its' role in our lives from collective and individual points of view. It is attempted to explore how man can serve as a conscious agent of evolution and how our species can use the cognitive tools at our disposal to create a cooperative, creative and empowered environment that promotes self-development and harmonious living within human beings and between species.

Resumo

A Consciência é possivelmente o mistério científico do século XXI. Como somos conscientes, quem é consciente, como é que a consciência origina e qual a sua natureza são algumas das questões sem resposta. Aqui são discutidas estas e outras questões, explorando ideias de diferentes áreas, com a intenção de promover um debate de ideias e não de fornecer um conjunto de soluções ou respostas. É explorada a história da investigação acerca da consciência e algumas das principais teorias com vista a entender como é que a consciência originou, a sua natureza e o seu papel nas nossas vidas, tanto coletivamente como individualmente. É procurado explorar como é que o homem pode servir como um agente consciente da evolução e como a nossa espécie pode utilizar os recursos cognitivos que tem para criar um ambiente de cooperação e criatividade que promove o desenvolvimento pessoal e um relacionamento harmonioso entre seres humanos e entre espécies.

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Introduction

"That I am conscious, here and now, is the one fact I am absolutely certain of – all rest is conjecture. Everything else – what I think I know about my body, about other people, dogs, trees, mountains and stars, is inferential. It is a reasonable inference, corroborated first by the beliefs of my fellow humans and then by the intersubjective methods of science. " - (Tononi & Koch, 2015, p. 1)

It could be said, perhaps, that the greatest mystery of human experience is consciousness. Science forfeited consciousness for several decades until during the 1990's it started once again tackling this elusive problem: the problem of consciousness. In contemporary psychology, the majority of concepts are 'contaminated' by cultural influences. Despite this, and because of this, it becomes so interesting to study a subject with such a diversification of meanings, hypothesis and ideas like consciousness. Consciousness is, undoubtedly, one of the greatest unsolved scientific (and spiritual) mysteries. For an integrative science of consciousness, psychology, philosophy, religion and literature, mathematics, biology, physics and other must come together because separately, they do not allow a full analysis of human mental life and, consequently, of consciousness. To do that it is of utmost importance to use a multidisciplinary approach that uses all the above-mentioned sciences (Symington, 2002). Although this dissertation is submitted as the final product of a developmental psychology Master's degree, I took the liberty to explore Neuroscience, Physics and Philosophy as well, in order to achieve a better understanding of the subject being addressed – consciousness. The reason for this is that, to look at consciousness from an integrative point of view one has to try and fuse/integrate these different levels of knowledge or perspectives. Only this way it is possible to address such a complex phenomenon as consciousness.

Albeit using systematic contributions from other areas, the focus will always be put on psychology. At last, although this thesis is created with the academic objective of pursuing a master degree it is not restrained by the conceptual boundaries of particular subjects and aims to make leaps, projections and even assumptions without being deemed less or not scientific. This body of work was created with an underlying idea of the

ontology of consciousness, one that challenges the conventional (neuro)scientific perspective of having the brain as the 'producer' of consciousness (will be explored later).

Research questions and objectives

There are many interesting questions regarding consciousness, such as: 'What is the mind?', 'What is consciousness?', 'How does consciousness come to be?', 'When did consciousness originate?', 'What has been the role of consciousness in human evolution and what role can consciousness have in the future of mankind?', to name a few for now. To this moment, all these questions lack a decisive, final answer. Throughout the course of this work I will try to approach several questions regarding consciousness. The objective is not to provide final answers but to discuss interesting and elegant ideas that might be able to help in the general debate regarding these questions. There are a vast number of theoretical approaches to consciousness consciousness and obviously, they won't all be addressed here. Conversely, there will be addressed some that, in the view of the author, have interesting and elegant ideas.

It will not be a focus to define *what is* consciousness. I will explore some definitions in order to contextualize the thematic but will not go much further. It is more important to try and understand the phenomenon of consciousness than to define it. The impose upon the author (and the reader) the reflection about the concept of *what is* consciousness is therefore one of the aims of this work. It is worth mentioning that all the reading and research done to create this dissertation resulted in a lot of personal questioning, often in changes in my thought and even in alterations of my views about life, nature and man. Susan Blackmore (2004) illustrates well this situation, because, after all, while studying consciousness, it is expected that our own consciousness is changed:

"Studying consciousness will change your life. These changes can be uncomfortable. For example, you may find that once solid boundaries between the real and unreal, or the self and other, begin to look less solid. You may find that your own certainties - about the world out there, or ways of knowing about it - seem less certain. You may find yourself beginning to doubt your own existence. Perhaps it helps to know that many people have had these doubts and confusions before you, and have survived. Indeed, many would say

that life is easier and happier once you get rid of some of the false assumptions we so easily tend to pick up along the way - but that is for you to decide for yourself." - Blackmore, S. (2004), p.20

Literature Review

The puzzle of consciousness

"Consciousness poses the most baffling problems in the science of the mind. There is nothing that we know more intimately than conscious experience, but there is nothing that is harder to explain." - David Chalmers (1996)

Consciousness is the most enigmatic issue in current theories of mind (Havlik, 2017). The problem of consciousness is related to some of the oldest questions in psychology and in life: 'What is the world made of?', 'Who am I?', 'What am I?', 'How did I end up here?', 'What is the meaning of life?', 'What is the meaning of all this?'. In the science of consciousness, some of the basic ones the *what, how, why* and the *who*: *"What are we conscious? How do we become conscious? Why are we conscious? Who is conscious?"* (Havlik, 2017). The answers to all these questions remain unknown. Nonetheless, our views of reality, of the universe, and of ourselves depend on it and, as such, consciousness defines our existence (Hameroff & Penrose, 2014). Today we know a lot about the brain and its' processes but the continual 'stream of consciousness' still remains elusive (James, 1890). To Blackmore (2004), part of the problem resides on the fact that the noun 'consciousness' is common in everyday life language and that, consequently it has different definitions, used in different ways. The noun is used by professional from different areas and ends up being used very differently across contexts. Another problem is that fact that consciousness studies are a 'new' subject and, essentially, multidisciplinary. It is essential to embrace the complexity of the problem of consciousness with a high degree of perplexity. The questions that arise from its intricate and complex problems can be as important as the proposed solutions. According to Blackmore (2004), to think about consciousness, *"perplexity is necessary"*. The same author follows this statement by explaining that due to several problems that exist in the science of consciousness, to delve into the subject of consciousness it is necessary to increase the level of perplexity and not the opposite.

Consciousness, awareness and the self

Consciousness implies awareness: subjective, phenomenal experience of internal and external worlds, a sense of self, feelings, choice, control of voluntary behaviour, memory, thought, language, and internally-generated images and geometric patterns (Harmeroff & Penrose, 2014). Awareness can be defined as the ability of oneself to be aware of the environment and the self, although this does not imply self-awareness and reflection upon one's internal states are necessary prerequisites for the emergence of conscious experience. The question of the nature of consciousness in intrinsically connected to the question of the nature of the *self*. The self, the sense of ownership of the experience is, after all, one of the defining characteristics of conscious experience.

History of the issue: The mind-body problem and consciousness

In his 1989 book entitled *"Evolution of the Brain: Creation of the Self*", John Eccles explains how thought regarding the mind-body relationship and regarding consciousness has evolved. The author talks about how, since its' inception, the philosophy of Greek thought paid great attention to the phenomenon of consciousness. During this time, more than two thousand years ago, the soul was first thought as being material as air or fire. With Plato and Aristotle, the soul became a *"non-material entity"* that interacted with the body). During this time, Hippocrates, a dualist, believed that *"in movement the brain is the interpreter of consciousness and (...) is the messenger to consciousness"* (Eccles, 1989, p. 179). In sum, Greek philosophy had a dualist and interactionist belief about consciousness. Fast forward a few hundred years, in 1637, Descartes wrote one of the most famous deductions of western thought: *"Cogito, ergo sum" – "I think, therefore I am"* (*in* Blackmore, 2004). Descartes believe that the pineal gland was the organ responsible for the mind-body connection and that it was the embodiment of the human soul. His dualist contemporaries discarded and rejected his theory. Others, like Spinoza and Leibnitz, rejected his interactionism and used different operations of *"God-controlled parallelism or harmony"* to try to account for the mind-body problem (Eccles, 1989, p. 179) attempting to embrace the mind and the body as one. During the following years, there was a lack of meaningful contributions to the mind-body problem because brain science was very primitive. Descartes believe that the pineal

gland was the organ responsible for the mind-body connection and that it was the embodiment of the human soul. It is also worth mentioning that he believed that animals had no souls and thus, behaved automatically. In the last 200 years of clinical studies, the *"intimate relationship between the conscious mind and brain"* has been revealed, although we still don't know the exact nature of this relationship (Tononi & Koch, 2015, p. 1). Regarding the investigation of consciousness itself, the great majority of the research still leaves many unanswered questions. In 1890, William James published *"The Principles of Psychology"* where he explored the subjective world and our inner experience. James coined the term *"stream of consciousness"* to explain and describe the never-ending succession of thoughts, ideas, images and feelings that we create (James, 1890; Blackmore, 2004). Apart from his work, throughout the 20th century the scientific community paid little to no interest in researching consciousness related questions. In scientific terms, it was only during the last decade of the century, when Francis Crick – who co-discovered the 3-dimensional double-helix structure of DNA in 1953 - and Christof Koch brought back the interest to consciousness questions, that consciousness science really started to flourish. From here on, during the last decades, thanks to theoretical and experimental progress, to advances in neuroscience and technology (mostly brain imaging methods), we have witness a progressive growth of scientific interest in consciousness, and we are now in a better position to understand what type of systems can be conscious, and in what type of conditions (Tononi & Koch, 2015).

Consciousness in the universe: nature, origin and distribution of consciousness

According to Hameroff and Penrose (2014), there are three general possibilities/positions regarding the origin and place of consciousness in the universe: 1) approaches that see consciousness as a natural evolutionary consequence of the biological adaptation of brain and nervous systems that emerged as a property of biological features during evolution. It is the prevalent scientific view, although there are different opinions regarding when, where and how consciousness appeared (only recently on humans vs. earlier in lower organisms). In this view, consciousness is not an intrinsic feature of the universe and is not a separate quality. Related to physicalist/materialist/reductionist view; 2) approaches that embrace consciousness as a separate quality, not physical and not controlled by physical laws, that has been in the universe since the beginning. Related to

Descartes' dualism, panpsychism (that attributes consciousness to all matter), idealism (that contends that consciousness is all that exists, the material being an illusion) (Berkeley, 1975 *cit in* Hameroff & Penrose, 2014); and, 3) approaches that acknowledge that consciousness results from discrete physical events, that have always existed in the universe as *"non-cognitive, proto-conscious events acting as part of precise physical laws not yet fully understood".* Here, biology evolved a mechanism to couple such events to neural activity which, in turn, results in "*meaningful, cognitive, conscious moments*" and although these events might not be explainable through current theories of the laws of the universe they should ultimately be scientifically describable (Hameroff & Penrose, 2014, p.1-2). Regarding the nature and distribution of consciousness (who is conscious), philosophers and scientists have proposed and expressed many different views. Opinions about the distribution of conscious range from the ultra-conservative - only humans are conscious - to liberal - all matter has consciousness. There are those who believe that it began with humans (discontinuity) and those who believed that consciousness, as a fundamental feature of the universe has always there (continuity (Velmans, 2000). Some authors view consciousness as possible only through human language (Popper & Eccles, 1976; Jaynes, 1990 *in* Velmans, 2000) or that consciousness only emerged when a "theory of mind" was developed in humans (Humphrey, 1983 *in* Velmans, 2000). Humphrey (1983) states that we find it useful for ethical purposes to treat other animals as conscious, but that without the self-consciousness the comes from a human 'theory of mind' there is no consciousness at all. The earlier versions of the position that only humans are conscious seems to be largely informed by theological doctrine, while the later versions are based on the idea that higher mental processes that are unique to humans are necessary for consciousness of any kind (Velmans, 2000).

Unexplained features of consciousness

As Nagel (1974) put it, phenomenal consciousness is *what it is like* to have an experience. The author showed how mysterious an unreducible subjectivity is using the metaphor of a bat's mind. Posteriorly, Levine (1983) approached the gap that exists between any physical explanation of consciousness and the subjective experience itself (coining it 'the explanatory gap'), and Chalmers (1996) came to the realization that

subjective experience could not be explainable by empirical science and this lead to the formulation of the 'hard problem of consciousness'.

The explanatory gap and the hard problem

The *hard-problem of consciousness* (Chalmers, 1996) is the problem of explaining how matter can give rise to consciousness. It is in general the question: 'What is the nature of phenomenal experience?'. Since perception and behaviour can both be accompanied and not be accompanied by phenomenal conscious awareness, experience and subjective feelings., how is it possible the we have "*phenomenal consciousness, an 'inner life' of subjective experience?*' (Hameroff & Penrose, 2014). And why do we have that subjective experience? The "*explanatory gap"* (Nagel, 1974; Levine, 1983) or the *"hard problem of consciousness*" (Chalmers, 1996) concerns the fact we don't have the slightest idea of why the neural basis of an experience are the neural basis of that experience instead of another or none at all (Block, 2009). Any discussion of consciousness that approaches the physical basis of consciousness needs to acknowledge the explanatory gap that can be conceptualized as follows: we have no knowledge that gives us an understanding of *why* the neural experience of green is the neural of that experience (Block, 2009). The experience of green is a subjective state, but brain states are objective and this creates a fundamental problem since we do not understand how a subjective state could be an objective state or even how the first could be based in the latter (Block, 2009).

The binding problem

The binding problem concerns how is it that we are able to have an integrated conscious experience. Different neurons capture different features of our surroundings and still we are presented with an integrated visual scene. In other terms, the different sensory inputs are processed in different brain regions (with at least small time differences) and yet are bound together into a unified conscious content. Hence, the binding problem is the question of "How is the conscious content bound together?" (Hameroff & Penrose, 2014)

'Non-computability'

Using Godel's theorem, Penrose (1899, 1994) describes how the mental quality of 'understanding' is not a computable and therefore must derive from a different mechanism or effect (*in* Hameroff & Penrose, 2014)

Forms of consciousness: Who is conscious?

"Are we the only conscious beings? Or are other animals and other living system also, if so, might extend to non-living systems as computers?"

(Velmans, 2000)

The relevance of scientifically studying animal consciousness was questioned throughout all of the 20th century (Harley, 2013). Tononi and Koch (2015) state that most people believe that, due to similarities in behavior and brain, animals like monkeys and primates – connected in evolutionary terms with human beings – are conscious, but their subjective experience is necessarily different and less complex. This poses an interesting dilemma: should we attribute the existence of consciousness to all mammals? To all vertebrate and invertebrate? Or even to all multicellular animals? And what about single cell organisms? Taking in consideration that human beings are animals, a species amongst millions of others species of living beings, it becomes reasonable to question ourselves about the presence of consciousness in other animals. After behaviorism – that believed inacceptable to regard other animals as conscious – Thorpe (1974) and Griffin (1976, 1984) removed this limitation (*in* Eccles, 1989). According to Eccles (1989), we can regard an animal as conscious when he is apparently moved by feelings and states of spirit and when he is able to assess his present situation in light of past experience. The kind of meta-cognitive and subjective reports that can be obtained from humans to assess the presence of consciousness, can also be obtained from trained monkeys and other animals (Tononi & Koch, 2015). On an endeavour regarding another mammal, the scientific literature has confirmed that dolphins possess large brains, that are extremely sociable mammals with a large developmental period, with flexible cognitive skills and with powerful acoustic capacities, including a sophisticated eco-location system (Harley, 2013). All these findings open about the door to the existence of consciousness, of conscious experience in dolphins. Albeit these findings, Harley (2013) mentions the inconclusive results and says that to produce reliable (and conclusive) scientific literature about consciousness in dolphins (and other mammals), we need clearer classifications of consciousness, better methods to study it, and appropriate paradigms to interpret the results.

States of consciousness

On the human species (and predictably in others also), exist different levels, states or types of consciousness. The most basic difference in conscious states (in healthy individuals) would be between the normal awake state and the dreamless sleep state (also known as non-REM sleep state).

Wakefulness vs. Dreamless sleep state

In general terms, the conscious state is opposed to the unconscious of when we are sleeping in non-REM sleep – in REM-sleep, the sleep state where dreams happen, has some of the properties of conscious experience but not all. Nonetheless, when we are awake (normal awake state), we have conscious mind that is supported by unconscious cognitive mechanisms. Wakefulness is the most important state of consciousness and can be described as an upward stream of neural activity that starts in more primitive brain structures and consequently activates higher brain areas (Zeman, 2001). In the normal awake state, on one hand, we understand the world through our five senses and also through our interoceptive and endogenous senses. On the other hand, through our metacognitive and introspective skills we perceive our own view over our own life, which has a big impact in the whole of subjective experience of being. The sensorial organs are connected to the brain through the nervous system and serve as inputs of information for our brain that, receives that input and generates an output. This output is personal, subjective and non-transferable.

Disorders of consciousness

In conditions like coma, vegetative state or minimally-conscious state, consciousness is impaired.

Consciousness, Metacognition and Introspection (Smithies & Stoljar, 2012)

Essential and intrinsic to the existence of a conscious mind, there's the feature of the minds' ability to be aware of itself (self-knowledge) and of reflecting about the contents the are generated and that flow on the "*stream of consciousness".* That is the metacognitive ability to think about what we think, the ability to be introspective. Understanding that introspection is different from other ways to see the world - from other ways to process information even – it is interesting to note the differences (albeit the similarities) that exist when comparing with sensorial perception, in psychological and

epistemological ways. Introspection takes us, on one hand, to scientific and metaphysical questions about the nature of our ability to be self-aware, of our ability of self-knowledge. Following the line of thought of Smithies and Stoljar (2012), introspection seems to be intimately related to consciousness (some authors even describe consciousness in terms of introspection - higher 'level' of introspection correlates with higher 'level' or higher consciousness 'potential'. It also seems to be related to self-knowledge. In sum, we have conscious minds and we are *aware* that we do. Consequently, the big challenge is to explain how we know we are conscious, because it doesn't mean anything that we know we have a (conscious) mind by introspection, because even the nature of introspection is unknown and questioned about. This opens a very interesting question: How is it introspection – a different way of learning about ourselves, our mental states and the world that surrounds us – is different from these other ways of seeing and interpreting the contextual stimuli (i.e., the five main senses)?

Consciousness vs. Narcissism (Symington, 2002)

According to the logic of Neville Symington (2002), narcissism and consciousness are two antagonist units. That is, opposite poles of a spectrum. In this case, by narcissism it is meant a pathological form of it, albeit how vulgar and universal it is in today's society. The fact that it is universal doesn't mean it is a sane conduct, although we witness narcissistic and pathological conditions and structures at the basis of cultural life. Therefore, to make this narcissistic structure conscious requires a considerable emotional effort due to the fact that resistance in abandoning narcissistic ways of being is very big. The desire for freedom that this sort of path entails needs to be something that the person in question acknowledges to be important. Symington (2002) believes that narcissism is *"the main pathology of the modern world"* describing it as a "solipsist pathology that affects individuals but that also has great social repercussions". He adds that many completely different behaviours share the same underlying pathology: greed and corruption – overly disseminated in contemporary society; the homicidal tendencies of a 'serial killer', the coldness of a mother that abandons her child, the hypocrisy of the moralist that states one thing and acts differently, all have their origin on the same narcissistic source.

General overview on theories of consciousness

There is an extensive list of conscious theories and models. There are Higher-Order theories, Reflexive theories, Representationalist Theories, Narrative Interpretative theories, Cognitive Theories, Information Integration Theory, Neural Theories, Quantum theories, Field theories. Obviously, we will not explore all of them and will only briefly attempt to approach some of them for reasons that will be expressed later. Explicative models of consciousness – theoretical or empirical – are always a useful aid in its' comprehension. The science of consciousness has attained great by results by focusing on the behavioural and neuronal correlates of (conscious) experience (Tononi & Koch, 2015). Here I will focus on five. These five, I believe offer elegant answers to (most of) the problems that have been raised in the science of consciousness throughout its development. Nonetheless, I will draw ideas and information from them in order to create a better understanding of the problematic itself: consciousness. Some of the known theories are Baars' theory of a Global Workspace (1988, 1997), Tononi's Integrated Information Theory (2004) and Hameroff and Penrose's Orch Or (Hameroff & Penrose 1996a; Hameroff & Penrose, 2014) view are some of the most cited works.

Integrated Information Theory, IIT **(**Tononi, 2004**)**

According to IIT, first postulated by Tononi (2004), consciousness corresponds to *"the capacity of a system to integrate information"*. This idea is based on two essential phenomenological properties of consciousness: *differentiation* – the availability of a great number of conscious experiences; and *integration* – the *unity* of each experience. This theory also includes a mathematical model, that postulates the quantity of available consciousness in a system. This theory his in accordance – and respects – neurobiological observations pertaining consciousness. These include the association of consciousness with certain neuronal systems, the fact that neuronal processes underlying consciousness can influence or be influenced by neuronal processes that remain unconscious, the reduction of consciousness when in not-REM sleep and the time requirements from the neuronal interactions that support consciousness (Tononi & Koch, 2015). IIT defends that the level of consciousness of any system at a time is a matter of how many possible states it has at that same time and how these states are consciousness.

Higher-order approaches

Theories that postulate consciousness has a higher-order state believe that an experience is phenomenologically conscious in virtue of another state that is about the experience. There are also different varieties of higher-order theories of consciousness, depending on, among others variables, whether the monitoring state is a thought or a perception (Block, 2009). The higher-order approaches function, for example, as follows: equating a higher-order state as a thought means that conscious experience of red is the representation of red in the visual system accompanied by a thought in the same subject to the effect that the subject is having the experience of red (Block, 2009). Some proposers of higher-order theories have suggested that phenomenal consciousness is one thing and higher-order consciousness another (Block, 2009). A higher-order account of consciousness focus on the distinction between a visual representation and a conscious visual representation – that is accompanied by a higher-order thought to the effect that the subject has it (Block, 2009).

Global workspace perspective

First suggested by Baars (1988), this theory – a functionalist one – proposes a neural. Dehaene and his colleagues (Dehaene, Changeux, Nacchache, Sackur & Sergent, 2006) developed this theory, taking a more neural direction. Theory postulates that perceptual systems supply representations – that are used by reporting, reasoning, deciding (and others) mechanisms. In turn these mechanisms produce representations that are further consumed by the same set of mechanisms. Once the perceptual information is broadcasted globally, it becomes available to all cognitive mechanisms without further processing (becomes conscious). Hence, phenomenal consciousness would be this 'global broadcasting'.

Biological Theories

Biological theories are those that posit that consciousness is some sort of biological state of the brain and are physicalist/materialist in nature. For example, Edelman (1989) considers consciousness to be a product of thalamo-cortical re-entrant loops. Alkire, Haier & Fallon (2000) suggested a *"thalamic switch"* that could be responsible for making representational content phenomenally conscious.

The ‘Orch OR’ theory (Hameroff & Penrose, 1996a, 2014)

Among the several quantum theories regarding consciousness, the ‘Orch OR’ (Orchestrated Reduction) theory from Hameroff and Penrose (2014) is an interesting one. It views consciousness as physical but also as a fundamental feature of the universe, being all pervasive, yet still indescribable by actual scientific models of the universe. Briefly, in the ORCH OR, *“the objective reduction process that evokes consciousness, would be actions that connect brain biology with the fine scale structure of space-time geometry, the most basic level of the universe”.* The authors propose that quantum coherence in microtubules might be the mechanism for evoking consciousness (1996a, 2014)

Measuring consciousness: neural and behavioural correlates

The science of consciousness has evolved a long way by focusing on *“the behavioural and neuronal correlates of experience”* (Tononi & Koch, 2015). Consciousness is traditionally assessed by observing behaviour. There are basic behavioural features that – normally – are enough to indicate that a given person is conscious. For example, if a person is awake and acts meaningfully; if a person speaks, and especially if this person can answer questions about what he is conscious of; in lab context, the ability to report one’s personal subjective experience is essential for judging the presence of consciousness (Tononi & Koch, 2015). Nonetheless, *“behaviour can be misleading”.* On one hand, although sleepwalking encompasses behaviour – walk and speak – it is dubious whether or not the person is experiencing anything. On the other hand, someone who is asleep – stationary and silent – could be dreaming, i.e., *“vividly conscious of an imaginary environment”.* We can use the ‘dream reports’ and other types of reportability to collect information about the presence of consciousness but insisting on reportability means elevating language to a *“king-maker role”,* which brings an added problematic when we try to infer consciousness in non-verbal infants, preterm babies, fetuses or animals (Tononi & Koch, 2015). Ergo, the science of consciousness gradually turned to the investigation of the brain mechanisms that underlie conscious experience – the neural correlates of consciousness (NCC).

Neural correlates of consciousness (NCC)

The neural correlates of consciousness are the minimal neural mechanisms that are jointly sufficient for any conscious percept, thought or memory, under constant background conditions (Koch, 2004; Koch & Crick, 1990; Crick & Koch, 2003). The background conditions are the *enabling factors* that must be present for conscious experience to occur, the key being that the heart must beat and supply the brain oxygenated blood (Tononi & Koch, 2015). The NCC are usually assessed *"by determining which aspects of neural function change depending on whether a subject is conscious or not, as established using behavioural reports."* (Tononi & Koch, 2015). Deep sleep and anaesthesia - as conditions in which awareness is lost - have been used to analyse the change in the level of consciousness (Tononi & Laureys, 2009; Baars, Ramsoy & Laureys, 2003).

Some of the proposed NCC include: a strong activation of high level frontal-parietal cortices, gamma activity, the thalamus activity and the occurrence of the P300 wave (Koch, 2004; Dehaene & Changeaux, 2011; Tononi & Laureys, 2009). There is no consensus on whether any of the NCC's are real 'signatures' of consciousness because consciousness can be present *without* frontal cortex involvement (Mataró et al., 2001; Goldberg et al., 2006; Frassle et al, 2014); gamma activity can be present without consciousness (Engel & Singer, 2001) as during anesthesia (Imas et al., 2005; Murphy et al, 2011); consciousness without a P300 wave, for example, during dreaming sleep (Cote et al., 2001; Takahara et al., 2002) [all *in in* Tononi & Crick, 2015]. The lack of consensus with NCC's is essentially derived from the view that many of the proposed signatures could be correlates of neural activity that leads to a conscious percept, or for fiving a report following a conscious percept (Goldberg et al., 2006; Frassle et al., 2014; Pitts et al., 2012). The major challenge with NCC's is keeping constant a number of cognitive functions (selective attention, memory, decision making, task monitoring) in order to isolate the 'naked' subtract of consciousness (Tononi & Koch, 2015; Chalmers, 2000; Miller, 2007). The limitation of NCC stands on the pool from which the data is recorded. Mainly collected from healthy adults, this data may or may not apply to brain-damaged patients or to other animals (Tononi & Koch, 2015).

Discussion

"I know I am conscious: I am seeing, hearing, feeling something here, inside my own head. But is consciousness – subjective experience - also there, not only in other people's heads, but also in the head of animals? And perhaps everywhere, pervading the cosmos, as in old panpsychist traditions?" (Tononi & Koch, 2015, p.1).

The nature of consciousness, how it is evoked or manifested by the brain and its origin, distribution and evolution are all not yet deciphered mysteries. Following the line of thought from Tononi and Koch (2015), the fact that one is conscious is the only absolute fact. All the rest is conjecture and inferential. Thus, consciousness – the central factor of existence – demands a rational attempt towards its explanation and understanding.

Regarding the theories and models of consciousness, Block (2009) mentions that according to biological approaches of consciousness, the Global Workspace hypothesis and Higher-Order theories end up summarising what consciousness does rather than what consciousness is. But isn't that exactly what biological, namely neuronal theories do? It seems preposterous to think that other theories are *a priori* excludable from the consciousness debate because they do not accept a completely physicalist/materialist/reductionist view of consciousness. Nonetheless, scientists and philosophers like Block (2009), and Tononi and Edelman (1998) seem to think that somehow this is productive in solving the mysteries of consciousness. We end up in a sort of 'war' between theories and whose right about what and this shows how many of these researchers are not yet conscious enough about the problem itself to be able to leave their egos aside. The fact that biological theories reject all other theories or ideas that are not the same is very interesting since somehow, they do it (paradoxically) in the name of 'science'. Hence, from here on, we will try to focus on ideas and questions and not on theories and ideologies behind those who create them. It is possible to agree on several points provided by many of these theories, albeit the fact that still aren't able to grasp conscious experience itself. Those are: conscious experience is integrated – we experience consciousness, subjective experience as an integrated whole; conscious experience is differentiated – there are a vast number of possible conscious states one can be in (closer to baseline consciousness) and many other altered states of consciousness;

and, at a neural level, synchronicity plays an important role. These would be in my view the most congruent general aspects that most seem to agree on.

Differences in subjective experiences of same inputs

Subjective experiences of the same thing can be different. My subjective experience of red can be different than your experience of red. Even though we're both healthy adults observing the same stimulus. A better example would be my subjective experience of a painting and your subjective experience of a painting. Visually speaking, what we see (in a very simple and basic way) is an image or succession of images created by our brain in response to light that enters the retina and his absorbed by its' photoreceptors and posteriorly communicated to the brain, that somehow translates these signals and produces a coherent, integrated result. This explains how easily visual illusions can deceive our own brains, making it project more or less (or differently) than the supposed observable reality. Blackmore (2004) uses Helmholtz's notion that our perceptions are *"unconscious inferences"* (Helmholtz, 1950 *in* Blackmore, 2004). For example, right now, I am conscious that I am writing inside the library but, at the same time, my brain is registering thousands of informational inputs: the intensity of the light on my computer screen, the light that comes from the outside, the colours, the sounds, the smells, the people around me and so on. Looking at a book with a red cover, I don't think about what is the colour of that cover, because my consciousness has already acknowledged the perception that it is red. This aspect of the book, like the floor, the ceiling, the table and remaining constituents of the room, have been processed unconsciously but I can bring them to consciousness. I don't need to think what is the colour of the cover, I know it as soon as I look at it (although it is a projection of my brain, more on colour later). I know because, unconsciously, my brain analysed the cover of the book, inferred and concluded that it was red. Because when I was a child I taught my brain to recognize the wavelength of red as red, now, unconsciously, my brain recognizes the wave length of red as red and allows that my perception (or unconscious inference) is projected on my conscious experience if I ask myself what colour is the cover of this book. But what about colour-blind people? Someone who is colour-blind might not distinguish between a green and red cover. The brain of the colour-blind processes exactly the same informational input as mine, but his unable – due to a genetic

anomaly – to process luminous information accurately. This means that the information input is received by the sensorial organ (the eye, more specifically the retina) that, unable to process the light in the wave length respective to green and red and this thus alters in a significate manner that which is the conscious experience of a colour-blind person. If a colour-blind never understands and learns what is colour-blindness, her consciousness will not include the lack of the existence of green or red.

Neural correlates of conscious experience

Albeit the ever-growing research in this field and fact that the neural correlates of consciousness are considered to be the cornerstone of the modern-day resurgence of the science of consciousness (Chalmers, 2000), none of them has become generally accepted (Havlik, 2017). Some of the mainly mentioned correlates are the activity of thalamus, the thalamocortical switch, gamma synchronization, re-entrant loops, the default mode network (Havlik, 2017). These correlates are of obvious importance but they aren't enough to understand even basic things. The activity of the Default Mode Network is interesting since it is at its highest when executive and attentional features of the brain are not working and is responsible for integrating interoceptive and exteroceptive information from multiple modalities (Lu et al., 2012), i.e., it is anti-correlated with attention systems and executive networks that represent the reactive functions of the brain (Havlik, 2017). Hence, this integration of interoceptive and exteroceptive information might be on display when one is meditating which would explain some clear-mindedness that characterizes the post-meditation or the meditators.

Who is conscious?

Because natural selection proceeds in steps, one should not be naive to assume that consciousness emerged in human beings, without something more primitive precedents (the 'discontinuity' in Velmans, 2009). Hameroff & Penrose (2014) explain that over the course of evolution, the contents of conscious experience became increasingly more useful (from a cognitive standpoint) - such as representative of the external world, and pleasurable. Hence, the pursuit of positive conscious experience would foster survival and thus, serve as an evolutionary advantage. So, who is conscious? In principle, any organisms would have an associated form or type of consciousness. To Nagel's (1974)

point that phenomenal consciousness is *what it is like* to have an experience, follows that we cannot make this search for ontological, functional and physical answers one that consider only us humans as conscious. That is, we can't possibly apprehend *what it is like* to be a bat, or a dolphin, or a dog, or another animal. The experience of *what it is like* to be one of those animals is so fundamentally distinct that it teaches us to proceed with care when we want to attempt to discern what consciousness is or how it works because it should be necessarily different experience to be a human, or a dog or a dolphin. Being a human, and the subjective experience of being a human being is very different from being a dog or a dolphin and has specific perks and complexities associated with it. Hameroff & Penrose (2014) when debating the questions of what type of organisms they should attribute consciousness to, explain how protozoans (single cell organisms) can escape mazes and solve problems, swim, find food, mate, learn, remember and have sex, all without synaptic activity (Nakagaki et al., 2000; Adamtzky, 2012 *in* Hameroff & Penrose) and the conceptual problem this generates because protozoans don't have classic brains and neurons, but seem to have some sort of conscious behaviour.

Velmans (2000) explains that phenomenal consciousness in humans is constructed from different exteroceptive and interoceptive resources and is composed of different *"experiential materials"* (what we see, hear, touch, taste, smell, feel and so on). It is true that our higher cognitive functions also have manifestations in experience, for example, in the form of verbal thoughts. Consequently, without language and the ability to reason, such thoughts would no longer be a part of what we experience (in the form of 'inner speech'). Hence, it is possible to think of a scenario where dogs and dolphins are conscious – in their own species-specific – without the need to include the inner speech as a necessary part of subjective experience. As such, an inner speech is not a rule for being conscious or having a subjective experience. A dog might not be able to communicate through words but surely can communicate via different sounds and behaviours, dolphins have echolocation systems that we can't even imagine how they would feel if we have them, although they don't possess a higher cognitive capacity to generate an inner speech stream of subjective experience they seem to have conscious experiences.

One can lose sensory and mental capacities while other capacities remain intact (some sensory impairment cases, aphasia, agnosia, etc). Regarding some views that

language, the ability to reason or a theory of mind are necessary conditions for the presence of language, Velmans (2000) states that there is no scientific evidence to support that any of these views is necessary for *"visual, auditory and other sensory experiences"*. Velmans considers this view specifically applied to humans as *"highly counterintuitive"* and explains why: *"If true, we would have to believe that, prior to the development of language and other higher cognitive functions, babies experience neither pleasure nor pain, and that their cries and chuckles are just the nonconscious output of small biological machines. We would also have to accept that autistic children without a 'theory of mind' never have any conscious experience."*

Indeed, it seems unlikely that babies don't experience anything and are merely reacting to environmental inputs or that autistic children don't have a conscious experience. Here, I think the problem here resides on the broad definitions of consciousness or conscious experience, when we should be focusing in elaborating on the different forms that consciousness or conscious experience can be manifested – even within humans. Subjective experience is probably the most complex and individual feature of any human being and to consider that there is only one way it could happen or be manifested as seem unlikely. Rather, accepting that conscious experience can have different forms seems a better, more constructive approach.

Introspection

Following the line of thought of Smithies and Stoljar (2012), introspection seems to be intimately related to consciousness (some authors even describe consciousness in terms of introspection - higher 'level' of introspection correlates with higher 'level' or higher consciousness 'potential'. It also seems to be related to self-knowledge"– which makes sense if we embrace introspection has a distinctive form of getting to know own selves and, particularly, our mental states. Nonetheless, the levels of awareness of our conscious minds and of their capacities and potential are not so general. Some of us stroll through life possessing a conscious mind and being aware of it, but with no action, moral or other consequences (more on this later).

Altered States of Consciousness (ASC)

A further point of interest is that matter is a perspective of reality or in other words, one way of experiencing consciously the universe. The case made by, for example, the experiences of meditation, shamanism, psychedelic plants and drugs is a big one. They modify our conscious experience of reality, of the universe. It's possible that we have experiences that have no correlate in the matter/objective experience of reality (on baseline consciousness experience of reality). It aids to the idea that realty is singular (that there are several ways of experiencing reality) and also to the idea the brain manifest the conscious properties of universe. In other words, many of these altered states of consciousness, namely psychedelics, change the way that electro-chemical interactions occur between neurons. This ends up generating an experiencing of reality that is substantially different than that from baseline consciousness. We still don't yet know how these altered states are processed, although there are some fascinating ideas, such as Narby's (1999) idea that cosmic information is embedded is DNA and that hallucinations are the experience of the ultra-weak light waves – biophotons – emitted by DNA:

"The global network of DNA-based life emits ultra-weak radio waves, which are currently at the limit of measurement, but which we can nonetheless perceive...in hallucinations and dreams." - Jeremy Narby (1999, p. 95)

He further continues to explain his theory, using the example of dimethltryptamine (DMT) and (pure concentrated) nicotine, both of which are hallucinogenic compounds:

"I wish to develop my hypothesis further by proposing the following idea: What if DNA, stimulated by nicotine or dimethyltryptamine, activates not only its emission of photons (which inundate our consciousness in the form of hallucinations), but also its capacity to pick up the photons emitted by the global network of DNA-based life?" Narby (1999).

Whatever the mechanism, through chemically altering how neurons are communicating and functioning (and the DNA that they possess in Narby's view), we can experience reality in a different way, to have a different conscious experience of *what it is to be us*, of *what is*. The ultimate lesson from the existence and the experiences of ASC is that reality can be perceived in more than one way. Right now, as I write this thesis,

my conscious experience is working at the level of matter. In other words, I'm experiencing reality in this 3-dimensional physical world. But this is not *the* reality or the *only* reality, it's *one* biological way of experience reality, a sort of lense to our conscious experience. Imagine for one second you are blind and have no conscious experience. Imagine conscious experience as a set of googles that (i) allow you to see and (ii) allow you to consciously experience that world and reality that exists inside and outside of you. The googles would come from the factory with the default lenses *but* there are other lenses that could be acquired throughout your development and life which allow you to *see* the conscious experience in a different way. Moreover, through these different lenses and different ways to consciously experience reality, I am very inclined to suggest that, just as we navigated the seas hundreds of years ago in search of new land in this matter oriented perspective of reality, we also can navigate the seas of altered states of consciousness and other realms of reality which just, like before, will bring knowledge and evolution to our species. Therefore, I suggest that altered states of consciousness should be viewed as tools for the development of consciousness, in as they provide a different conscious experience of reality and can provided a different type of self-knowledge than any experience in baseline consciousness, like a chemically induced form of introspection.

Real vs. Reality

If we think of the brain as a receiver, finely tuned to receive a signal and manifest it in the form of conscious experience, one could extrapolate that the brain is tuned to generate/manifest a specific conscious experience at this level of reality (matter-reality/baseline consciousness). When one experiences an altered state of consciousness, most likely reality will be experienced in a different way. This does not mean that which is being experienced by the individual is not real, but that it is a different conscious experience of reality. Think of it this way: what is real is always real but can perceived consciously through different frames/levels of reality. Maybe, talking about psychedelics, the chemical changes that it produces in the neuromodulators in charge of synaptic functions, could possibly be the biological basis for this 'change in tuning', tuning the conscious experience of the individual from, for example, 50 to 100. This change in tuning of the conscious experience – an altered state of consciousness – allows for a different experience of reality. One could also argue that within an altered state of

consciousness, one is experiencing different *dimensions* of reality. In this logic, the Newtonian-three-dimensional way of perceiving objects and the surrounding reality might be just *one* of the possible and biologically viable ways to experience reality.

Consciousness in the universe: origin and distribution

In terms of approaches to the place of consciousness in the universe, we could summarise them in: a) Science/materialism, with consciousness having no distinctive role (Dennet, 1991, 1995); b) Dualism/Spirituality, with consciousness being outside science (Chopra, 2001; Kant, 1998 *in* Hameroff & Penrose, 2014); c) Science, with consciousness as an essential ingredient of physical laws not yet fully understood. This third option seems the most reliable and elegant and also, in my opinion, takes from both materialism and dualism/spirituality. I fully embrace the idea of consciousness as a fundamental feature of the universe, that has been present since the dawn of time and matter, that has co-evolved with matter and its' increasing complexity (Velmans, 2009). I also embrace consciousness as something that should be possible to describe scientifically, once we have the right models of the universe, that see consciousness as fundamental, for example as a fundamental/primordial energy from which all matter is created – in the line of Nikola Tesla's Aether (1915/1956).

As mentioned, western scientific accounts generally agree that consciousness is in some sense based in the brain, a product or the brain or generated in the brain. I make the case to directly propose a different nomenclature (that has previously been used throughout the text) that also states a conceptual difference: that consciousness is *manifested* or *evoked* in the brain instead of being *generated* or *produced*. This entails a fundamental difference regarding the distribution of consciousness and its evolution.

Some contend that consciousness emerges from computational complexity (Scott, 1995; Tononi, 2004). There isn't a sense of how complexity *per se* might give rise to discrete conscious moments and, as such, computation *per se* fails to address certain aspects of consciousness (Hameroff & Penrose, 1996). Following the idea behind the new nomenclature, consciousness is *not* generated or produced in the brain but evoked or manifested by some sort of neural and/or quantum mechanism that happens inside the brain. Many possibly quantum mechanisms have been put forth (for example, the idea that consciousness depends or biologically 'orchestrated' coherent quantum processes in

microtubules within brain neurons; Hameroff & Penrose, 1995). Whatever neural and/or quantum mechanism(s) are necessary in order to evoke remain unknown (Koch, 2004; Chalmers, 1996). Albeit the unknown mechanism through which it is evoked or manifested, consciousness is then seen as a fundamental feature of the universe, having co-evolved with matter in its' complexity. This resonates the ideas expressed by Velmans (1990, 2000, 2005, 2009) about the co-evolution of matter and consciousness and Hameroff and Penrose (2014) suggestion that consciousness plays an intrinsic role in the universe. The manifestation of consciousness also seems to be associated with our self, from basic levels to more complex ones. We think, feel and integrate all of which is *thought* and *feeling* with our *sense of self*, allowing for the subjective experience that exists when consciousness is manifested. Hameroff and Penrose (2014) state that a specific brain process (in their case objective reduction could be responsible *not* for consciousness and would *not* translate into consciousness itself, but be responsible for harnessing the fundamental feature that consciousness is from the universe, connecting brain biology structure of space-time geometry. This would mean that consciousness itself is *"deeply related to the operation of the laws of the universe"*. Their theory is elegant if not for the mechanism(of objective reduction), for generating a non-reductive perspective that seems to be the most congruent within science today and that is a theory that postulates the basic premises of: 1) consciousness as a fundamental feature of the universe that has always existed, everywhere; and, 2) that somehow, some brain process connects us to that 'energy' or 'field' or 'medium' that consciousness could be and, thus resulting in consciousness being evoked in our brains in the form of subjective, conscious experience (the *sense of self* could play a role here also). For example, Eccles (1989) believed that synapses in the brain can be influenced by a non-material self, that thinks and feels. Accordingly, in the conceptions of Eccles (1989) and Lipton (2005), the self and the mind control the brain which, on the other hand, controls the body, that is, through our consciousness we have the ability to alter biochemical structures, and consequently neural related activities and process, with meditation being a clear example of this.

The role of consciousness in evolution

When Charles Darwin started to develop his theory of evolution, he quickly acknowledged that one of the greatest problems was how to explain the existence of *mind*

in a material world (Smith, 2010). Let's take as a starting point Darwin's recognition of his own incapacity to explain the mental phenomena:

"In what manner the mental powers were first developed in the lowest organisms is as hopeless an enquiry as how life itself first originated. These are problems for the distant future." – Charles Darwin *in "*The Descent of Man" (Chapter 3)

Although he wasn't able to explain mental phenomena, Darwin created a logic for the evolution of species: "the survival of the fittest" (Smith, 2010). In sum, this mean that nature selects the individuals from each species, that are better adapted to the environment. From here, we can interpret Darwin idea slightly differently – a bit like a glass half full or half empty. Instead of looking at the idea as nature selecting the strongest individuals, we can look at it as the idea that nature select and eliminates the weaker, less adapted. Nature 'doesn't care' about the strongest, the more adapted, as they are the consequence of their behavior (more or less adaptive), but to the organism and beings that are not adapted and thus determines their incapacity to survive (Lipton, 2005). We could say the same of consciousness. In general terms, minds that are more conscious/higher degree of awareness will have a tendency to survive for longer time period or would be better equipped for it. We can also go on a different path, in the sense that, minds with higher degrees of awareness will have a fuller and wider mental and experiential life, and that, this is the next evolutionary step. In other words, if there are no worries about basic needs for survival, if one develop a sense of self that explores morality and integrity this would convey upon this person an evolutionary advantage. In today's world, we bombarded with stimuli that clouds our abilities to explore higher states of awareness, and so, the evolutionary advantage would be that of being able to explore those higher states of awareness and collecting their benefits in mental and physical terms. Let me give an example: someone that has a balanced nutrition and exercises regularly, fruit of being conscious and aware of the importance of that nutrition and exercise will tend to live longer than a person that has a disruptive nutrition and does not exercise. This is debatable to the extent that nowadays we see people eating 'healthy' as part of trends or, in order to achieve some sort of social status or social integration. Nonetheless, we could say that what changes is the behavior, but the behavior has its' origin on the conscious mind of the individual that becomes aware of the causality between the food he eats/exercise he makes and his physical, biological and mental well-being, that promotes the duration of

his life. The same goes, in a much larger scale, for higher ecological awareness. Some human beings have developed a higher ecological awareness towards the planet and to the impact that our actions as a species have on it. These individuals end up taking actions to have an impact, actions that ultimately come from the way this newly embedded higher ecological awareness makes them think – and, in many cases, act.

It is worth noting that humans, albeit the power of nature, being able to control others around them to their benefit do not submit in the same way as other species do to natural selection. Nonetheless, we can say that cultures and civilizations would not be possible in the absence of consciousness, which makes consciousness an essential development in biological evolution.

Man as a conscious agent of evolution

Conscious evolution, social development and environmental justice

The degree of awareness that consciousness implies will determine the influence that consciousness can have on behaviour. For example, if one is at a minimal level of awareness in his conscious experience he will not be able to modify his behaviour to the same degree of someone who is in a high level of awareness. In other words, different levels of awareness involve different levels and capacities for introspection which, ultimately, will influence an individuals' ability to alter his behaviour (towards himself, others and the surrounding environment). Thus, with varying levels of awareness that can be present in the human form of consciousness, different behaviours are expected. For example, someone who develops a high level of awareness for the surrounding environment – nature in general – will, more likely, have a higher *ecological awareness* and behaviours that are congruent with this awareness than someone who does not (recycling, carefulness with waste, vegetarianism, veganism, etc). The same applies for a lot of other aspects of human life. If one develops a high level of awareness for the lack of social justice and for the inequality that prevails in the modern world, one will, more likely, have a higher *social consciousness* and behaviours congruent with this awareness than someone who does not (activism, social causes, etc).

The narcissistic structure

Here comes into play the idea of the *narcissistic structure* the clouds our capacity for higher levels of awareness (Symington, 2002). The author says that "(…) to make this narcissistic structure conscious requires a considerable emotional effort due to the fact that resistance in abandoning narcissistic ways of being is very big." A consequence of this narcissistic source is that the individual is not (usually) able to bring awareness to his own narcissism because it is so common in his life and in his surroundings. Thus, to become conscious of this narcissism, one needs considerable emotional and intellectual effort combined with a *"quasi-religious*" quest for personal integrity (Symington, 2002). Also, the lack of introspection abilities might be connected to this inability to bring the narcissistic components to awareness, as both as a cause and a consequence. Symington (2002) thus emphasizes the desire for the freedom that this sort of path entails needs to be something that the person in question acknowledges to be important because it will involve first-person and third-person scrutiny.

The next step in human evolution

Societal transformation and consciousness-based development are key for developing a better world and to develop our existence as human beings. Focusing on small-scale and large-scale communication and cooperation might just be the triggers to the rise of collective consciousness and the next step in human evolution, which will not be a morphological one, but a mental one. The central belief to this conscious-action perspective is that all human beings have an inner potential to be built upon. The realization or awareness regarding this inner, personal potential leads to a change in actions and behaviours which changes the results and outcomes at different levels of day-to-day realities, on the relationship an individual has with himself, with other members of their species, with other species and with the surrounding environment. A logic of self-empowerment that contrasts with the current and dominant logic of self-reductionism. Jung (1933) developed the idea that all individuals need to go through a process of individuation, and this resonates exactly with what is being discussed here. During this process, individuals become increasingly aware of their own being, of their own potential. With this process of individuation as part of the equation, a collective of individuals would be in a stronger position to create change through a cooperative (vs. the

competitive) paradigm as to what means to live as a community, as a civilization and ultimately to take the next step in human evolution and subjective experience.

Implications for Clinical & Therapeutic contexts

The great majority of the ideas exposed throughout the text can be used in a clinical and therapeutic context by psychologists and psychiatrics. A great example would transpersonal psychology. The idea of the individual and its' self as an open living system, that interacts with surrounding universe in a self-empowering logic and not in a reductionist one can be an extremely valuable therapeutic and clinical tool in therapy.

The problem with what is normal (or isn't)

Above we discussed colour as being a projection of the brain. It is also an example to show how different conscious experiences can be, even for individuals of the same species. We shouldn't assume that the usual or generally observed reality (baseline consciousness) is indeed *the reality*, the normal or even healthy/sane way to experience it. It is one biological way of *experiencing reality*, which in the case of colour-blind involves 'only' colours, but could have many other implications, including cultural, social and self ones (think of Autism) that all influence that which is a subjective experience of being. This comes to say that, yes, there might something like a baseline consciousness (that could be species specific), that allows to perceive reality in X way but that does not mean it is the only way, the correct way or the healthy or sane way to experience it, and more importantly, it surely doesn't mean it could be in any conceivable way possible to embrace that which is outside of experiencing reality through this baseline consciousness as a pathology of some kind. This is very pertinent because in today's society we commonly see physicians, psychiatrics and psychologists place anything that is outside as a pathology. In turn, this can have negative repercussions because people that for one reason or another are not in the baseline state of consciousness, or are regularly or easily disrupted from it, are branded as mentally-ill, when really, they might just experience reality in a different you that the most of us do, and that, by itself, does not make pathological.

Conclusion

"I regard consciousness as fundamental. I regard matter as derivative from consciousness. We cannot get behind consciousness. Everything that we talk about, everything that we regard as existing, postulating consciousness." **(**Max Planck, 1932).

I support the view that consciousness has exists since the dawn of time and that it is all permeating, i.e., that it permeates all matter. Physically, consciousness would then be this unified field/aether/fundamental property of the universe, that permeates all matter, residing in the physical world inside each atom, representing its' 'empty space'. If so, by which mechanism does this pure consciousness/aether get manifested? Through some sort of brain mechanisms that makes it possible to access that "fine scale space time structure" as Hameroff & Penrose (2014) put it. It could be that something in brain and nervous systems causes the matter of which they're composed of (and that already has a conscious property) to connect with this conscious property, emerging conscious experience as an outcome of this interaction. *The synchronicity of neuronal firing can be thought as one specific note that brain is playing in order to tune in this consciousness field.* This note vibrates at a specific frequency. The vibration resonates with the natural vibration of the unified field, connecting the two through some sort of quantum phenomena. Consciousness would 'boil down' to the way things vibrate in the universe, which makes sense since everywhere on the universe in basic on frequency, vibration and energy.

We can make the following useful distinction: 1) consciousness as a fundamental part of the universe and of all matter; 2) consciousness as the conscious experience of the observer. Hence, on one hand, we have consciousness as a physical property that exists in the universe, the is primordial, that permeates all matter. On the other hand, we have consciousness as the subjective experience, would results from some brain mechanisms the allows the brain, and consequently the body to access consciousness and manifest it in the form of a subjective experience. There are some propositions that share and expand some of the above-mentioned ideas such as the Laszlo's Akashic Field (2004); Tesla's Aether (Tesla, 1915/1956); Bohm's implicate vs. explicate order (1980/2002), to name a few. Actually, this idea of interconnectedness and wholeness is an idea shared by many

ancient traditions and civilizations, both eastern and western. Ultimately, consciousness and universe itself should probably 'boil down' to frequency, vibration and energy.

A science of consciousness: future aims

1) Multidisciplinary science of consciousness: It seems rather obvious that a full, integrative theory of consciousness in necessarily interdisciplinary. One can adopt individual frames of reference but they will always be incomplete to explain the full range of the phenomenon of consciousness (as those who say it is enough, more often than not are dismissing important problems). In that line, the views expressed in this work emphasize the need to have a multidisciplinary science of consciousness. As a research method, interpreting subjective experience of psyche and soma may prove to be a useful resource. To do this, it may be useful to reexamine pre-Cartesian views and ancient Buddhist views of an inseparable mind/body, in which emotional state (among other things) centrally conditions our every perception (Grossman, 2003).

2) Value of 1st-person research methods:

" (…) *if the scope of physical science extends no further than the mere description of sensory experiences, then strictly only one's own experiences can be taken as the object of such description; because only one's own experiences are primary data. Now it is clear that on the basis of a mere individual complex of experience not even the most gifted of men could construct anything like a comprehensive scientific system. So, we are faced with the alternative of either renouncing the idea of a comprehensive science...or to admit a compromise and allow the experience of others [who are thus posited to exist and have experiences apart from ours] to enter into the groundwork of scientific knowledge. But we should thereby, strictly speaking, give up our original standpoint, namely, that only primary data constituted a reliable basis of scientific truth.*" (Max Planck, 1932).

Above, Planck states the importance of something I think must be obvious in research consciousness. That we cannot rely only on 3rd person 'scientific' data, but as well in 1st person reports and accounts of our own conscious experience because after all, consciousness/conscious experience is unique and private and thus different for each and every one of us (although we can generalize points of experience). The beginning of each

and every act of knowing, and therefore the starting-point of every science, must be in our own personal experience, our 1st person accounts of consciousness have therefore value in a science of consciousness and each individual can and should investigate their consciousness.

2) Materialism and Post-Materialism: the general idea within the science of consciousness regard the brain is, at least, central, for conscious experience. There could two options: (i) taking the brain as that which *generates* consciousness; or (ii) the brain as that which *evokes* or *manifests* consciousness - which by this logic exists *a priori* as a fundamental property of the universe. For now, I adopt a view that has consciousness has a fundamental feature of the universe. I suggested also that consciousness itself or 'pure consciousness' could be seen as a unified field that permeates all matter, similar to Laszlo's idea of an Akashic Field (Laszlo, 2004) and to others. We would then *connect* to this field through some biological/physical mechanisms that makes it possible for our brain to *evoke* or *manifest* consciousness.

The materialist world view, which is also the dominant in the scientific world, seems to think that the only true reality is that which we experience through baseline consciousness, often categorizing everything else as pathological. This materialist view and model of the universe has powered the industrial and technological revolutions that completely changed life over the last 300 years. But what is considered *material* has also changed over the last 300 years. In 1850, Faraday created the idea of electric and magnetic field, something you cannot see or touch (back then), which at this time was considered *immaterial* / *non-material causes.* In the present day, even the purest materialist, accepts this invisible, 'non-material', electric field as an essential part of the materialist description. Hence, scientific community changed the definition of *material*. Maybe 50 years from now, we will witness new changes to this definition as we come up with new knowledge. The analogy is brought up to elucidate the point of view of some orthodox (neuro)scientists. They state that we should try to explain consciousness based on neurobiology knowledge we have *right now*. And this could even be a good approach but it would have had to be used without a dogmatic approach for other ideas that can be at the moment be *unscientific*, but that just be not be in 10, 20 or 30 years. What happens is the opposite. Some neuroscientists introduce their ideas and often state that it is the only scientifically conceived proposition. Imagine telling Faraday in 1850 that he had to

explain everything using the physics of billiard balls. A true scientific inquisition must be based on the idea that science does not have the tools (yet) to sufficiently explain, test and verify what consciousness is and how it works (otherwise it would have been done already). Ergo, it is important to gather, propose and debate new and old ideas, to make leaps and assumptions. And what currently happens in the scientific community is the despise and discredit of most of these ideas. This happen because, unfortunately, science has become dogmatic in most of its width, instead of serving as an open, naturalistic method of inquiry. It is also inconvenient for people with new ideas and theories to try to deem them 'scientific'. Time will surely verify the validity of theories and ideas and what someone deems unscientific today might just be scientific tomorrow, and this teaches us to be open-minded and to think in a work-in-progress kind of way. To be clear, we cannot be – with the present knowledge – *certain* that consciousness is generated inside the brain or is present inside and outside the brain, or the brain *manifests* the conscious property of all matter. We are *unclear* about the where, how and why of consciousness, of its' relationship with mind and with matter. Science will most likely evolve to create news ways to research consciousness applying its' objective and reductionist paradigm. That is, of course, capable of generating good things, as it has always been. Nonetheless, this should be approached with some care. Today, the dogmatization of science and the ego based mentality of some academics and people inside the scientific world, tend to maintain an absolute reductionist approach to consciousness within the scientific spectrum, reaching the ego-centred response of discrediting their colleagues in often humiliating manners.

It's worth emphasizing the need for science and scientists to *not be dogmatic*, i.e., to have an open-mind, to analyze and entertain the plausibility of even the strangest of hypothesis, and to use a combination of intuition and science. After all, none of us knows any ultimate truths. If you exclude those who tend to use new ideas or propositions for personal or financial gain, you are left with those that just wish to follow their *own naturalistic inquiry of the world*. Also, skepticism is healthy in moderate doses, it comes as a result of inquiry, of questioning – which should be done. To be *a skeptic*, or to live as one is, on my opinion, unhealthy or unproductive. History proves that time after time the once accepted paradigms get shattered and replaced by new ones. The skeptic might not live to see this change and thus, in order to advance and promote the science of

consciousness, moderated skepticism and open-mindedness are *the* key. Inside this 'science of consciousness', the scientific mind-set needs to be pragmatic. A pragmatic scientist must refuse to be dogmatic about the ontology of mind or matter and must be willing to consider possibly strange phenomena in order to come to a deeper understanding about consciousness itself. The shift from materialistic science to post-materialistic science may be of vital importance to the evolution of human civilization. Pruett (2012) argues that human self-perception has evolved through the shocks of three major scientific upheavals. The first, due to Copernicus, reset our *physical* place in the universe. The second, due to Darwin, revised our *biological* place. And the third, now in progress, will ultimately redefine our *psychic/spiritual* place in the cosmos.

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