TOWARDS AN EXPERIMENTAL SCIENCE OF NATURAL CONSCIOUSNESS

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Abstract. In this paper, we want to argue for the possibility of validating the presence of consciousness in another person from a perspective that blends both, a third person approach of coming close to, observing and understanding the other; and a first person assessment into how the experiences of the other feel like. For this we will need to explain how the line between the third person and first person approaches is blurred in some methodological approaches. We rest our position largely on the back of some of David Chalmers' idea of panpsychism and other theories concerning consciousness like Integrated Information Theory (IIT). First we will talk about what has already been written on the subject by others and connect this to what we want to achieve in this paper, then we will develop some ideas concerning the methodology that we feel can be used to validate the presence of ones consciousness in others (conscious experiences)[3].

Introduction

Nowadays, there is a vivid philosophical debate about the origins, nature and existence (in an objective way) of what can be considered as the most 'real' subjective natural phenomenon, i.e., our conscious experience (Chalmers; 1997a). Thought experiments, like the existence of (philosophical) zombies and conceivability arguments, are used in this area of research as one of the most prominent conceptual methods (Brown and Fehige; 2011).

We can identify two large areas of interest on which the study of consciousness is focused. One of them relates to the physical processes originating and structuring our conscious experiences. Here the main focus is on the neural functional state of conscious experience which has been widely researched and has many competing and complementary theories (Kim and Blake; 2005), (Dehaene et al.; 2006), (Lamme; 2006), (Block; 2011) and (Cohen and Dennett; 2011). The data used in these theories comes from neural processes that can be identified by measuring neural activity during different conscious states or during tasks that involve cognitive capacities associated with conscious experience. The second area of interest involves the study of consciousness from the perspective of subjective phenomenal experience and usually involves a more wide conception of consciousness that goes beyond the neural functions (Chalmers; 1995) and (Chalmers; 1997b). Unlike the first theories, subjective experience is not so 'easily' measurable and the theories can seem very vague from a scientific point of view given the lack of reproducible empirical evidence. Within the scientific community (studying consciousness) the theories concerning the first topic are usually said to deal with the 'easy problems' of consciousness while the latter deal with the 'hard problems', precisely because of the difficulty in obtaining measurable data and their conceptual difference to the former one. Some researchers believe that solving the easy problems will solve also the hard problems since they are one and the same (Cohen and Dennett; 2011), while others maintain that the hard problems involve something going beyond the measurable neural states and functions (Chalmers; 1995). Even if one agrees that solving the hard problem can be reduced to solving the easy problems, we maintain that a good theory of consciousness should be able to connect neural states and functions to particular phenomenal states in a structurally sound manner, so both positions will benefit from a more systematic and reliable way of measuring phenomenal experience.

Most of the discussions regarding conscious experience encompass a considerable number of conceptual positions like (naturalistic) dualism (Chalmers; 1997b), materialism (Dennett; 1993), (proto-) panpsychism (Chalmers; 2011), epiphenomenalism (Robinson; 2015) and (russellian) monism (Alter et al.; 2012), among others. However, how should an answer to the question concerning the nature and objective existence of our most vivid self-experience look like? Should it look like a relative opinion? Is it not for any of us our own existence and experience a more tangible and objective truth than any physical (external) fact in nature can be? Should not the existence of a black hole be for me a more tangential truth than my own "internal' existence?

Let us assume that tomorrow there will be no technology and no implicit visual evidence of it in the world at all. In particular, there would be no photographs. Thus, there will be no indirectly accessible evidence of the existence of a black hole. So, which of these two ontological claims would be more 'objective' for each of us? Which is more 'believable', the conscious experience of myself or the existence of a black hole?

This raises a very natural question: In the experimental sciences we have been able to design experiments to prove the existence of lots of natural phenomena (e.g. physical objects and the so called 'laws of physics'), like elementary particles and black holes. Then, would it be possible to design an experiment to prove the existence of others 'conscious experiences' from our first person perspective (e.g. our own experience)? Equivalently, how could I prove that someone else is conscious?

1 Ontological Background

To begin with we are obliged to make here an ontological compromise that will justify our experimental approach. One of our main inspirations for this approach is that of Chalmers' idea of panpsychism as applied to conscious experience (Chalmers; 2011). Panpsychism is a classical concept that has been developed by several philosophical and religious traditions and that can be simplified into the idea that every entity in the universe has at some level a single source and this source, as far as consciousness is concerned, includes a phenomenological dimension, i.e., it is somehow conscious. One formal limitation that arises with panpsychism is that it lacks a degree of explanation as to how this conscious experience comes to be or looks like since Chalmers simply maintains that it is a fundamental property of things in the universe, which is imbued in information as an extra aspect of it. Other researchers have a more developed theoretical explanation among similar lines to panpsychism, namely, the proponents of Integrated Information Theory (IIT) (Tononi and Koch; 2015). IIT has an advantage over panpsychism in that it defines a way in which conscious experience could be measured in quantity and quality, although it makes no claim to be able to show how consciousness arises. IIT, also unlike panpsychism, defines conscious processes as a product of the interaction of complex structures that are non-reducible but that can be structurally described. In this respect it differs from the typical panpsychist notion that consciousness is everywhere as some form of 'fundamental' property but it agrees with it in that consciousness is not only a property of brains and some neural functional states but of systems that organize information in a particular way. In this regard, IIT is closer to a concept like panprotopsychism where consciousness is the product of interacting elements but goes further than it in defining how precisely these elements must interact. Specifically, particles at a micro level have a kind of proto-phenomenal property and when they are configured in the 'right' way, they can fulfill necessary conditions for the presence of conscious experience. It implies, that phenomenological data could be (physically) shared among entities, since, for example, external influences can generate similar patterns of neurons' interaction in a couple of agents producing common phenomenological structures among them. In other words, the physical interaction between agents can cause considerable phenomenological commonalities (changes) in the quality of their conscious experiences.

Panpsychism can be interpreted by the principle stating that everything in the Universe is expressed as a collection of multiple manifestations of a single substance or process. These ideas will be central to understand that consciousness is not a process that happens solely within the individual, but that it has extensions and expressions outside the individual, something that IIT also supports. So, we can assume that a conscious experience is somehow transmittable to or shared with others in certain ways.

Another important aspect of the phenomenological theories of conscious experience is that they can be used to understand consciousness as a much more extended process than just the necessary neural states it is often reduced to. As we mentioned before, some philosophical approaches to consciousness, like pan(proto)psychism, maintain that consciousness is much more ubiquitous rather than only found in neural (functional) states and that it is related to more basic informational structures. That does not mean that there is no way to connect such theories (like panpsychism) to human conscious experience and even neural experiential states, but the usual neural theories are far from managing to connect both.

Even though theories like panpsychism can explain where consciousness come from and theories like IIT can explain how it manifests itself they cannot really explain why a particular phenomenal experience is experienced the way it is, or feels the way it feels. So, why does a particular experience have a particular quality? Damasio seems to have one of the theories that can offer an explanation for this (Damasio; 1999). Damasio's idea maintains that human conscious experience is related to emotional content since it is experienced in particular ways that are connected to how we feel about things and cannot be reduced to the purely functional state, but depends also on the material (e.g. biological), where the state is manifested. So, the functional states of a neuronal environment together with the particular chemical reactions generated in emotional processes is what provides us with the particular quality of experience that we are used to feel. That would explain why human consciousness has a qualitative difference from other conscious entities (that are part of the panpsychist approaches), for example, silicon-based systems that follow the informational integration principles of IIT, even though conscious, will still have a different quality of experience. In the end, the human conscious experience could also be seen as possessing a fundamental emotional content that is the product of a particular type of matter (biological) going beyond the (physical) solely structural properties of the corresponding conscious agent. This is expected since, even though any type of matter has a natural predisposition to experiential phenomena according to panpsychism or IIT, biological matter has gone through a different historical process in comparison to matter based on silicon, which provided them of their intrinsic properties or derived 'identity'. The common ground between the two materials is that they are also subject to differential informational changes within their own environments, following the core principles of panpsychism (naturalistic dualism), or IIT, but the quality of their experiences will be different. So, at some extend, the information saved throughout time on

the physical (e.g. biological) 'skeleton' of a conscious agent plays an important role on the quality of his/her/its subjective experiences. Now, how structural is its role is a seminal question which requires a deeper investigation.

2 Methodology

We will also need a methodological process that will work together with our ontological position. Given that the west has relied on a scientific tradition that has its roots in a dualist position, like the one from Descartes, and that this position comes in strong contrast to the root of the panpsychist philosophy, we should explain why it could be possible to think about an alternative methodological process that feels like, but looks a little different from, the traditional one. For this, we can reference a discussion that grew up from the contrast between western and eastern ethological traditions. Frans de Waal made this distinction clear in his book "The Ape and the Sushi Master", where he compares the tradition in western and japanese primatological studies (De Waal; 2001). For de Waal, the japanese researchers had an advantage in that they came closer to the object of study (i.e. primates) in contrast with the western style, where the primates were observed from a distance during the studies. The reasoning behind the western methodology was that keeping a distance to the object of study is imperative to make an objective analysis of what is going on. In other words, the minute you come close to the object, you will 'contaminate' it or affect it in a way that will negatively affect its natural behaviour. For the japanese primatologists coming closer to the primates was much less problematic, something that de Waal justifies due to their religious tradition, namely, humans and nature are seen as less separated than in the west. Cultural traditions like shintoism in Japan are then closer to a panpsychist notion of the universe since animals (or even objects) can share many of the qualities and properties humans have. For japanese primatologists creating an empathetic bond with the animals was essential for understanding them. This allowed the japanese to understand the primates in a different dimension and 'see' things that were not evident from the more distanced perspective of the western tradition. Needless to say, several western scientists adopted some of the japanese methodologies and vice versa, thus balance was achieved. In particular, the blended new methodology coming from the western and japanese schools turns out to be the most successful one.

Now, inspired by the former case, we want to substract and extent some of the core aspects of the former combined methodology. This in order to highlight the prominent role that the task of experiencing along with the (conscious) object of study has, in studying and 'proving' others conscious experience in 1st person perspective. This paradigm-shifting approach is also supported by standard methodological procedures in modern physics. Specifically, a lot of discussions around the measurement problem in quantum mechanics offer as a main conclusion the fact that a necessary condition for studying any type of (natural) entities X, is to measure them, i.e., if one wants to obtain a real understanding of some aspects of these entities, then one should 'get in touch with' them (Alter

et al.; 2012). Besides, the more structural the properties of study are, the deeper the contact should be.

Here we can make a comparison with Dennett's third person view of conscious experience which he refers as heterophenomenology (Dennett; 2003, 2007) which, even if we consider it useful and valuable, could suffer from some of the same shortcomings experienced by western primatologists in the study of our close cousins. The idea with getting closer to our object of study which, in our case, is the conscious experience of another person, by making their experiences part of my own, is that we could have a qualitatively different and deeper access for understanding (intellectually) and experiencing (phenomenologically) the (others) conscious phenomena than only through a third person (distant) perspective.

3 The Experiment

Having made our ontological and methodological perspectives clearer, we now will proceed to describe how such an experiment can look like.

In order to construct our experimental framework we will revisit the classical (Chalmers') principles governing consciousness to see how we can generate from some of them, among others, suitable hints for constructing an experimental theory of natural consciousness (Chalmers; 1995).

At first sight, the only information that I have about the conscious experience of another person is the external signals that such a person (let us call her Mary) can give to me. For example, I receive information in the form of speaking and written language, or in the form of physical movements. Now, based on that information, how could I prove in a verifiable way what is like to be Mary?

In order to achieve this let us start by experiencing what is like to move like Mary. From the phenomenological point of view this is a reasonable starting point, since, by the structural coherence principle (Chalmers; 1995), the way in which Mary moves her body (and how that movement is processed) is directly related to the way in which her corresponding 'kinematic experiential' states vary. This is because there exists a kind of structural 'isomorphism' between the kinematic patterns being transported through the nervous system to the brain, which directly affect the awareness (access to global control), and the corresponding 'phenomenological' kinematic patterns generated in the conscious experience.

So, the closer I match my body movements to Mary's, the closer that I am to having the bodily-kinematic phenomenal properties that Mary has. In fact, exactly the same argument could be used when we replace the action of movement by any other concrete observable activity Mary does. For instance, reading Mary's books; speaking Mary's language; eating Mary's style of food; living in Mary's house and imitating the finer psychological aspects of the way in which Mary usually talks (from a linguistic as well as a logical perspective, i.e. an anthropological perspective).

The global idea behind this is that if I can modify my behavior and interaction with the external environment in such a way that my awareness starts to be as similar as possible to Mary's awareness then, because of the double-aspect principle of information (Chalmers; 1995), I will begin to experience the isomorphic phenomenological aspects in my experiential information space. That happens because some of Mary's phenomenal actions are 'isomorphic' (from the point of view of information theory) to some of Mary's physically embodied informational actions (i.e. the ones taken to be imitated by me), and those actions are structurally related with external physical conditions as the ones given in most of the examples before. Furthermore, these corresponding external physical conditions are very similar to the ones that I am imitating. Thus, if we apply again the double-principle of information to my experience by performing Mary's activities, then my phenomenal information space will be at some 'degree' isomorphic to Mary's phenomenal information space. In conclusion, I will experience on my own an isomorphic phenomenological version of what is like to be 'Mary performing such an activity'. Besides, we can talk in this context about a kind of *phenomenological and informational reflexion* between Mary and me, namely, Mary's phenomenological experience is reflected in her external movements and environment through an informational process, which at the same time reflect on my phenomenological experience, since I am imitating Mary's activities and I am surrounded by Mary's (physical) context.

It is worth to note here that in practical terms the most challenging tasks will be to generate the best conditions making me able to perform Mary's activity as near as possible to the way in which Mary actually does it.

This approach is supported by a very simple analogy coming from experimental sciences, i.e., if I want to prove that a specific physical object obeys some particular formal model, then I need to 'experience' on my own the corresponding experiment that proves the concrete phenomenon. In other words, I need to expose my consciousness, through,, for example, my vision, my touch or my hearing; either to that particular object directly, or to an indirect trace of the object by means of a suitable device. This would be the most direct way of 'validating' that a formal description of this physical phenomenon effectively coincides with the corresponding (conjectured) physical phenomenon. Of course, there are also other indirect ways of obtaining a vicarious certainty regarding a physical theory, like reading a technical article. However, in this case 'self-assurance' processes also include a component of 'trusting' the journal and the author(s) writing the article. In particular, one need to 'believe' that the experiment described in the article could be objectively reproduced anywhere else and that, under similar conditions, the results should be basically the same. So, this second kind of 'proof' is, strictly speaking, a kind of meta-summary of the actual proof that, for matters of effectiveness (time, space and resources), is often missed. Now, contrary to the common objects of study, which are usually external physical phenomena, regarding consciousness we should take into account the problem of 3rd person vs 1st person perspective. In this case, the measur-

ing tool is an agent with their own subjective perceptions, which will require an epistemological extension of the traditional objective measuring paradigms.

For instance, suppose that you want to prove in a direct manner that, in fact, lions exist. So, you would need to expose one of your basic senses (e.g. vision, touch) to a real lion in order to be completely sure that there are such animals. Otherwise, you would support your belief about their existence in a kind of 'indirect' data, for example, in photos, videos and oral testimonies. So, your 'proofs' would rely in this case on others 1st person perspectives proofs. Something similar occurs if we want to prove experimentally that some 'physical' phenomena exists. Effectively, what we do is to expose some of our senses to (some data coming from) the phenomena we are interested in. In these cases, such 'exposure to the evidence' is very 'simple' because it requires a smaller number of sensory experiences (either visual, auditory or other). For instance, all we need to see are some images, or touch something, or listen to some sound recording. However, in the case of experiencing X's conscious experience (e.g. Mary) we need the whole spectrum of our senses, because we need to be able to achieve simultaneously a kind of X's way of seeing, hearing, touching, smelling, speaking, moving and finally feeling. Thus, we would require our whole phenomenological capabilities. And, this is a necessary condition for the experimenter in order to be able to 'prove' that X has conscious experience.

Moreover, let us consider each of our five basic senses as a (phenomenological) dimension allowing us to have contact with the external world in a very unique way; and we add as sixth dimension the phenomenological ability affording us to say 'I feel Y' or 'I understand Z'. Then, the problem of verifying someone else's conscious experience in 1st person perspective can be considered as a 6 dimensional experimental problem in natural sciences. So, it can be considered as one of the most challenging ones, since, for example, the verification of the existence of black holes, atoms, bosons, specific kinds of cells and animal are at most 4 dimensional problems. The reason is that they require, in general, just some visual and/or tactile and/or auditive and (phenomenological) understanding. For example, if we want to verify that a particular type of cell exists, then we need an special kind of microscope, the right substance and a minimal understanding of the main properties defining such a cell. In conclusion, the experimental challenge that we have before us requires the design of (sub-)tests covering each of these six dimensions.

Now, following the former approach we infer that for proving from a 1st-person perspective that Mary consciousness 'exists', we need to start by being exposed through our senses to Mary's sensitive experiences in order to be able to experience Mary's phenomenal states from a qualitative point of view.

So, one of our main goals would be to extend experimentally Descartes' paradigm "I think therefore I am", to a kind of *I think about you, therefore you are*. Therefore, going further we could extent the former claim to *I feel you, therefore you are in myself*, which will put both agents in a position where they are 'phenomenologically coordinated' and, in doing so, experiencing the other, or

being like the other happens from the 1st person perspective providing a much more direct experience of the other's world.

On the other hand, being conscious at a time 't' is always being conscious about something, e.g., a concrete physical object, a specific environment, a sensation, an abstract concept (in general an 'entity') and him/herself. In fact, the 'aboutness' of consciousness is fundamentally related with the entity being object of such an intention. For example, when I say that I am conscious of 'someone', then my subjective 'perception' of that person is fundamentally related to the real person. So strong is this relation that it is common to listen to phrases like 'I know my best friend'. Informally, it means that I have acquired in some psychological aspects a real knowledge of that person and that this knowledge is coherent with the actual behavior of that person.

Now, it is necessary to make a sort of parenthesis here in order to make clear how we can exactly relate to others given that we relate in different levels and different ways to different people, depending on the relationship we have with them. Concerning this matter, we find that the discussion surrounding some studies on empathy could be enlightening (Slaby; 2014). Effectively, there is a great deal of talking about popular speeches dealing with how relating to others and understanding them involves 'putting yourself in the others' shoes'. What this idea evokes is a sort of perspective shifting that we must engage to understand other people. As Slaby so eloquently puts (Slaby; 2014), there is a problem with this approach given that a person cannot renounce their agency (in Heideggerian terms) and, as such, any perspective's shift will be plagued by the perspective of the agent making the effort to see things from the other's point of view. This is not difficult to imagine, if we understand that the history (phylogenesis, ethnogenesis, ontogenesis and sociogenesis) of an agent ends up shaping their prospective decision making. In other words, there is an imperative of differentiating the self from the other when we try to understand others, see the world like them and possibly act like them.

Based on this criticism Slaby concludes that the empathetic approach of perspective shifting falls short of allowing a true identification with the other except in very simple and uninteresting cases. This is why Slaby proposes that Interaction Theory (Gallagher; 2001), in contrast to the empathy studies, could actually provide a framework with which to achieve a more truthful account of experiencing the world as the other. What this theory suggests, based on the inevitability of the agent's own agency, is that two people that interact in similar contexts could develop a closer understanding and mental connection, than by using purely psychological methods like simulation and imagination. This idea is not necessarily new, since it has been examined, for other purposes, on more anthropological studies where the engagement of common activities is the basis for the generation of a sort of joint cognitive system that allows better coordination and tacit understanding (Reynolds; 1993), (Hutchins; 1995) and (Stahl; 2006). What all these interactive approaches for understanding and working alongside others have in common is that they see our mental world not as something hidden that can come out only through introspection, but as something

much more visible and evident in the way an agent engages and interacts with its surrounding.

This creates the possibility that by the continuous interaction with the other, we engage in conscious and subconscious information gathering and processing by means of our senses, and this allows us to create, first, a sort of model of the other that will make effective interaction possible and, second, a more precise joint phenomenological experience that will match sensations, feelings, intuitions and other phenomena that are not always possible to explicitly communicate, imagine or simulate. In this interaction both, the first person and third person perspectives of the conscious reality of the other come together in one common experience.

An experiment based on this kind of interactive process can be used to evaluate how we can really get into understanding the other and assigning a mental world to him/her/it, given the shared phenomenological experience and the connection generated through interaction. Like Slaby says the "accounts of joint agency and mutual recognition–lie important further tasks for a philosophy of mind that aspires to move for good beyond all forms of solipsism, subjectivism, and individualism" (Slaby; 2014, Pag. 257). We are not proposing that an experiment will completely solve the issues behind what it is to know that the other is also a conscious entity, but it will bring into the scene stronger factual arguments and experiences, instead of (fictional) hypothetical ideas like the existence of philosophical zombies, which can be employed in several direction in order to defend a quite diverse amount of opinions in related matters (Chalmers; 2011).

Closing the parenthesis and going back to the experiment, one possible way of achieving this in a practical way is to use actors to generate the kind of interacting experience required. The benefit of using actors is that they are more trained in pretending to be others and engaging with others in improvised and artificial settings and situations. But, even within the acting world, there are considerable theoretical challenges to take into account. For example, using actors that engage with method acting will pose problems similar to those identified by Slaby in empathy studies given that method actors try to use their own mental world as a way to identify, with fictional characters making, a marked distinction between themselves and the others and sometimes getting too involved in their inner world preventing them to be vulnerable to external influences, which is what we would want to achieve. On the other hand, actors who follow the Constantin Stanislavski's system (Hodge; 2000) will be closer to the conception of interaction theory, since this kind of actors get an (kind of) 'identification' with the corresponding characters by engaging in the interactions the latter ones would also experience.

An additional challenge is the matter of evaluation. We need not only to find people that are close and capable of trying 'to be the other person', but also we need to be able to specify formally how they are closer to the one(s) they imitate in comparison with what they were before. What seems to us the ideal approach

would be the one accommodating all methods available, but this poses several problems.

Any experiment like the one we proposed requires lots of time and space, which neural imaging techniques do not allow for. It could probably still be included in some way, but not in the most practical one.

This means that psychological methods of evaluation need to be in our focus. For this, a mixture of personality and well-being (e.g. 'feeling') questionnaires should be the most appropriate, like the Five Factor Model (FFM) (Costa Jr and Widiger; 1994) for testing the general personality structure and some form of satisfaction/happiness scale in regard to a certain activity to test a person's subjective impression of their well-being or emotional state in a specific situation. Employing such methods should provide some measure of how a person generally experiences his/her own (and others) life and how he/she do so in specific situations, and how these qualitative features change over the course of the experiment for the one who is imitating someone else, or even for both.

Finally, the precise design and execution of the corresponding experiment will be the central matter of a further study. In this paper, we focus mainly on describing the core ontological setting for developing an experimental science of natural consciousness.

4 Conclusions

Assuming a strongly naturalistic approach to the study of consciousness, i.e., taking for grant the self-evident fact that consciousness is part of the natural realm, as much as a planet, an atom and a black hole is; we showed that, at least from the theoretical and ontological point of view, it is possible to experience in a 1st person's perspective the conscious experience of someone else at some level. In fact, this kind of other conscious' first person experience posses the most challenging task for the experimental natural sciences, not only for the formal, but also for the practical perspective, since it is the only 'six dimensional' empirical challenge for the corresponding 'phenomenological observer'.

In addition, due to the former facts this kind of experiment involves a complete behavioral transformation of the observer, which involves any of his/her senses along with his/her own subjective feelings. Specifically, a considerably big amount of his/her habits should be temporary altered into the habits of the corresponding subject of study, in order to be able to resemble the conscious states of the latter one in a provable way.

Although we make no claims on how consciousness actually comes to exist, we aim to offer a natural and objective setting where foundational answers to the nature of consciousness can be studied and subsequently answered in a way closer to the one used in the experimental natural sciences, in comparison with the (meta-)physical state of the art that most of the results obtained in this special academic discipline posses.

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