The “hard problem” of consciousness is a dead end

Abstract: Consciousness and the feeling of existence have yet not been fully explained. There are interesting arguments from panpsychist as well as from eliminative materialistic (neuroscientific) positions. A panpsychist perspective is normally one where the innermost part of the physical world consists of some kind of mental entities or experiences, while the materialistic perspective claim such entities are only material (non-mental). In between these two positions there are numerous ideas how consciousness is to be explained. As long as no final explanation has been found, we can keep on presenting theories of mind. Philosophical argumentation will however not be sufficient to validate a specific standpoint. I argue in this paper that the problem of consciousness should not be isolated as a separate problem as argued by Chalmers (1995). He defines the hard problem, and also presents an outline of a theory of consciousness, claiming this covers possible solutions. Rupert Read (2008) argues the separation of the hard problem is based in the view presented by Descartes as the separation of body and mind. He says this separation only will prevent us from really finding an explanation. I claim it is not possible to infer the nature of consciousness from philosophical reasoning only, why isolating part of the problem out from such reasoning is a dead end. To understand conscious brain processes, we should strive to unify as many knowledge spheres as possible, not separate some parts as if it would be possible to tell within which sphere a solution is to be found. I am not arguing for a certain view but claim we need to be open to all possible explanations, and an Chalmers’ outline to a theory of consciousness does not at all fulfil the demands for a fundamental theory of consciousness.

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1. Introduction

Experiments with people going through brain surgery, has shown that minor current stimulation of the visual centre gives rise to hallucinations (i.e. visual experiences without corresponding sense impression), and stimulation of another centre gives rise to a certain wish to do something (reach out for a glass etc). What is most interesting in such experiments is that the patient afterwards claims the activity (for example reaching out for the glass) was an act of completely free will, and even an explanation is presented why this certain wish came up as a logical chain of conscious decision making. But what the patient does is something strictly compulsory. There was nothing such thing as free will in this, even though the patient experienced it as an act of free will, just as there was no sense impression giving rise to the visual picture of the brain as experienced by the patient – but the patient was absolutely convinced the visual experience had a correlation to objects of the world.¹

Many experiments (like the one described above and others) indicate the existence of powerful subconscious processes controlling not only bodily functions (breathing, heart beat etc.), but also what we normally regard as conscious processes as our free will. A human being can give perfectly relevant and logical explanations to actions, and still such logical explanations might be nothing but rationalizations made by centres of the brain controlling thoughts. On the other hand the experiments do not show what consciousness actually is in terms of experiencing reality. We could as well say our consciousness obviously controls activities and thoughts by the use of electrical signalling of certain brain centres. I think most people would agree theories of consciousness should remain open to all kinds of solutions as long as we cannot explain brain processing better than we have the possibility to do today. Probably most people would also agree that findings in experiments, like the one above, give valuable contribution to the building of knowledge about the human mind.

Now presume somebody gets interested in solar panels and starts to investigate one of those panels, without having any particular knowledge in the field. He asks himself “How can light become electricity?” and in his mind he tries to find explanations to such a marvellous physical event. Lacking electrical knowledge he presents a metaphysical explanation, as “a ghost in the machine”. The most fascinating and interesting papers can be written, trying to clarify the phenomenon. After a number of years we would have different main directions, each one representing a certain hypothesis and “Philosophy of light” would thus be borne. It is a fact a certain interest has no absolute correlation to contemporary knowledge. My own mind only works with the information collected and I will always have limited access to the total sphere of knowledge.² The reason why science has been successful is it has left individuality behind, putting trust in collective knowledge with increased explanation complexity.

There are different approaches how to look upon consciousness in terms of being a ‘problem’ or not. Chalmers and Kim (2011) (as well as others) argue there is a “hard” part of the problem of consciousness belonging more or less to the philosophical sphere. Others accept the separation of a hard problem, but claim it is a scientific problem, which in turn not necessarily can be solved

¹ (Thimm & Traufetter, 2004)

² I presume in this paper transferring of knowledge by help of magic means (corresponding to Harry Potter’s world of magic or similar) is not possible.
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(McGinn, 2002). Within neuroscience some take a positivistic approach claiming the problem of consciousness will be solved by applying scientific methods (some day).³

We have to ask ourselves what we are aiming at when we present explanations of consciousness, and we should strive to present, as far as possible in detail, the prerequisites used to support verification from other disciplines. In this paper I discuss Chalmers’ perspective of the problem of consciousness as consisting of two different parts; one easy problem and one hard problem and his outline of a theory of consciousness as presented in his article (Facing up the Problem of Consciousness, 1995) as an example of a doubtful methodology how to close up a solution to the problem of consciousness. The methodology applied by Chalmers limits the possibilities to find a solution due to the idea of the isolation of part of the problem of human brain processing. To support my argumentation I will also refer to Rupert Read’s paper (The ‘Hard’ Problem of Consciousness Is Continually Reproduced and Made Harder by All Attempts to Solve It, 2008). Furthermore I show the limitations with Chalmers methodology by arguing his nonreductive explanation of consciousness is mainly built upon insufficient technology analogies about brain functionality.

To begin with I will present Chalmers’ definition of the ‘hard problem’ as well as his outline to a theory of consciousness, following his paper (Facing up the Problem of Consciousness, 1995). Thereafter I give a short presentation of Rupert Read’s argumentation why the hard problem should be removed from the philosophical agenda and out from this I argue why the separation of the problem of consciousness limit the possible solution spheres, thus being a most doubtful method to close up an explanation. One important part of my critique is aimed at Chalmers’ theory of consciousness, which shows the obvious insufficient claims raised by Chalmers serving an example why isolation of the hard problem is a dead end in terms of building knowledge about the human mind.

³ Many philosophers today in the West are influenced by two major sources: psychology (Freud) and computer analogies (logic structure, software, signals etc). There are for example old Indian philosophical traditions, for example the (The Upanishads, 1962/1884), but modern Western philosophers tend to be suspicious to other views than those used in Western (university) cultures. Maybe we should at least reflect upon there are other positions than those we are accustomed to meet. In (most) Indian philosophy fundamental reality is non-dual (which is not the same as ‘monism’ as discussed for example by Spinoza (1989)).
2. The “hard problem” of consciousness as defined by Chalmers

Chalmers isolates, what he defines as the “truly hard part of the problem” of consciousness, which in turn is defined as the “most baffling problem in the science of mind” (1995, s. 200). He argues against reductive methods as a way to approach the hard problem and presents his own non-reductive theory, a position he names “naturalistic dualism”\(^4\) (s. 211). The easy parts of the problem of consciousness are those where the standard methods of cognitive science are applicable, since explanations can be found in terms of computational and neural mechanisms performing a function. Chalmers says performance of functions is “well-suited to reductive explanation” (s. 203) and cognitive science and neuroscience will be successful in finding explanations to the performance of functions.

The hard problem on the other hand, is the problem of experience (thinking, perceiving etc) and Chalmers refers to Nagel and “something it is like to be”\(^5\). As against the easy problem, the hard problem is not a problem about performing functions, since one question will still remain after all the functions involved have been explained: *Why is the performance of these functions accompanied by experience?* [or] *Why is there consciousness at all?* Chalmers means there is an explanatory gap between the function in this case and the conscious experience. To bridge the gap, the usual methods of cognitive science and neuroscience fail and are therefore not applicable, since they cannot yield an explanation.

To cope with the hard problem Chalmers claims “an extra ingredient” is needed (s. 207), and he gives some examples of such used by others; chaos, nonlinear dynamics, nonalgorithmic processing, future discoveries in neurophysiology, quantum mechanics etc. All these attempts are, he means, connected to performance of functions, and when it comes to future discoveries within neurophysiology, the question *why* the processes are accompanied by experience will not be answered. Says Chalmers “It is not as if we will suddenly discover a phenomenal glow inside a neuron!” and he claims physical explanations (origin from reductive methods) will only explain physical structures and functions:

> But the structure and dynamics of physical processes yield only more structure and dynamics, so structures and functions are all we can expect these processes to explain. The facts about experience cannot be an automatic consequence of any physical account, as it is conceptually coherent that any given process could exist without experience. Experience may arise from the physical, but it is not entailed by the physical. (1995, s. 208)

Chalmers’ conclusion is since reductive explanation fails we need non-reductive explanations. Referring to Maxwell explaining electromagnetism by using new, not explained, fundamentals, Chalmers suggests *experience* should be taken as fundamental regarding consciousness (just as *mass*,

\(^4\) It is not perfectly clear how to define this “naturalistic dualism”, but Read (2008) says “David Chalmers has a new kind of dualistic (or even panpsychistic?) approach to the problem.”

\(^5\) Which actually is a question introduced by Timothy Spigge, but made famous by Nagel.
charge and space-time are fundamental within physics he says). Out from such a position a non-reductive theory of experience can be constructed, specifying basic psychophysical principles supplementing physical theory. These principles are Chalmers’ “extra ingredient” needed to bridge the gap between function and conscious experience. It seems Chalmers in this view of experience is inspired by Whitehead’s idea about “basic elements” of experience to be described out from the ingredients consciousness, thought and (or) sense-perception.

Chalmers argumentation can be summarized as follows:

1. A critique of the usage of reductive methods arguing such methods and theories “inevitably fail” and once having recognized this “the door to further progress is opened” (i.e. philosophical analysis of the problem) (1995, s. 200)

2. Nagel (2002) and his question how it is like to be a bat, is the basis of Chalmers’ argumentation about experience being fundamental. This is inferred from philosophical reasoning. (1995, ss. 201-202)

3. Chalmers says it is “objectively unreasonable” physical processing should give rise to a “rich inner life” and this fact is part of the reason why we have a “problem” with consciousness. (1995, s. 202)

4. The hard problem is not a problem about the performance of functions, and therefore specifying neurological mechanisms does not take us forward towards a solution of the problem. We need to go “beyond the performance of functions”, furthermore we need to find out why there is such a thing as experience and here we have the “explanatory gap”. (1995, ss. 202-204) This discussion about consciousness not being a performance of functions is Chalmers’ main argument.

5. According Chalmers science systematically fails finding an explanation, and this thesis is supported by references to a number of investigations (1995, ss. 204-207). Chalmers concludes we need a “new approach” since traditional scientific methods are too limited (i.e. have not succeeded to find a solution). (1995, s. 204)

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6 It seems Chalmers mixes up fundamentals as a priori, with physical quantities when he refers to mass, charge and space-time as being “fundamental within physics”. For example the ongoing research about the Higg’s particle finds explanations to the phenomenon of mass, why there is nothing “fundamental” about mass in physics. Charge is also not treated as a (philosophical) fundamental within physics. When it comes to “space-time” this might be interpreted as ‘time’ or ‘relative time’ or something else, and maybe one can argue time is a fundamental quantity, but it is not a quantity as mass or charge (even though it is treated as a quantity from a mathematical point of view).

7 (Whitehead, 1978, s. 36). There are interesting parallels in the views presented by Whitehead and those presented by Chalmers, who seems to be inspired also by Timothy Sprigge’s panpsychism. Whitehead in turn was inspired by Spinoza and specifically the monads of Leibniz.

8 Crick and Koch (Discussing a neurobiological theory of consciousness), Baars global workspace theory (a cognitive), Edelman (a biological theory), and different philosophical ideas from Dennett, Jackendoff, Allport, Wilkes, Flohr, Humphrey, Clark and Hardin
6. The “extra ingredient” is introduced as a necessary component referring again to the scientific failure. (1995, ss. 207-209)

7. Final conclusion: A non-reductive explanation taking “experience as fundamental”\(^9\) is needed since reductionism has failed. (1995, s. 210) Chalmers offers a framework to such a fundamental explanation as concluded necessary but the theory is not fully sufficient, thus making it necessary to work it through into a more powerful form. He presents an outline to a theory of consciousness fulfilling today’s knowledge about the brain (1995, ss. 211-217).

Chalmers says his theory of consciousness could be seen as naturalistic dualism and it is a theory of physics rather than one of biology, since biological theories “involve no principles that are fundamental in this way (...) but theories in physics (...) aspire to simplicity and elegance.” (s. 211).\(^{10}\)

Referring to philosophical analysis, Chalmers outlines a non-reductive theory of consciousness based upon three major psychophysical principles connecting properties of physical processes to those of experience. The three principles are summarized below:

(1) The first non-basic principle is about structural coherence between the structure of consciousness and that of awareness. Awareness is to be regarded as purely functional but linked to conscious experience and Chalmers sees a direct correspondence (as isomorphism) between consciousness and awareness making it possible to correlate an explanation of the mechanisms of awareness with the basis of consciousness.

(2) The second non-basic principle is one about organizational invariance, stating that any two systems with identical functional organization will produce identical experiences. This principle together with that about structural coherence are expected to “be planks in any satisfactory theory of consciousness” (s. 218).

(3) Chalmers’ third principle, the one regarded as basic, the double-aspect theory of information, involves information as Shannon’s paper *A mathematical theory of communication* (1948) defines it; information states embedded in an information space, which in turn is an abstract object. He discusses around two basic aspects of information (physical and phenomenal) are connected through direct isomorphism between physically embodied information spaces and phenomenal information spaces, thus making it possible to “find the same abstract space embedded in physical processing and in conscious experience” (s. 217). Chalmers says the information processing structure in a mouse is less complex than in a human being, thus giving the mouse a simpler experience.

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\(^9\) Sprigge argue the physical world is composed of sentient experience (McHenry, 2010, s. 14), which in principle corresponds to Chalmers’ view experience is to be taken fundamental, i.e. something we can use as basic building blocks. This seems to be one of the panphysichisistical fundaments, and I think this idea origins from Whitehead (see also note 7 above).

\(^{10}\) This argumentation somewhat confusing, since Chalmers in a way claims a theory of consciousness is to be regarded as physics since theories of physics are more elegant (and represent simplicity) than those within biology, but his idea seems to be there are fundamental principles present in physics corresponding to the principles he sees as fundamental in his theory of consciousness (see below).
3. The doubtful separation of the “hard problem”

Rupert Read discusses in his article *The ‘Hard’ Problem of Consciousness Is Continually Reproduced and Made Harder by All Attempts to Solve It* (2008) the view of the hard problem as a remaining idea, origin from the mind-body dualism as philosophical attitude introduced by Descartes, combined with the modern idea of mind as a computer analogy where the body is a machine controlled by a system with a kind of software. Read focuses partly at the concept ‘information’ which also is an important part of Chalmers theory of consciousness. Read discusses we are often captured by the computer metaphor when philosophical analysis is being made. Out from these models philosophers ask themselves how consciousness can evolve and isolate some specific abstraction of mind as a problem ‘hard’ to solve, separating it from cognitive or neurophysiological problems characterized as ‘easy’ to attack by scientific methodology.

[they keep the mind-body problem alive – almost that they personally guarantee that it will never die – by putting it tantalizingly out of reach of our epistemic/cognitive powers. As Wittgenstein once remarked, people like to state what the limits of thought and understanding are – because they then think they are thereby somehow starting to see beyond them... (Read, 2008, s. 53)

Read rises doubts towards the strategy of what he calls “divisionists”, since separating off a part as “the hard problem” cannot be regarded as a “sensible scientific research strategy; on the contrary, it is self-defeating.” (s. 59). He also brings up we of course learn things about the brain and mind if larger problems are divided into sub-problems, but these learnings are pure scientific findings based in the usage of new technology and scientific observation. Philosophizing brings nothing of that kind. Furthermore Read means the ‘divisionist’ strategy is “philosophically disastrous” (s. 60) since it will not bring us closer to an explanation. The problem should be dissolved “wholistically” and “give up the philosophical illusion that bits of the mind-body problem have really been solved and thus give up the still more vain illusion that one day the ‘hard’ problem of consciousness itself will be solved” (s. 71). Read actually argues we are not dealing with an intellectual problem, and the problems around consciousness are not to be treated and solved by arguing. Actually the idea there is such a thing as a science about consciousness should be questioned he says (s. 67).

What Read does in his paper, which is interesting, is to point upon the problem of having philosophers defining how science is to be divided and how to find solutions. Without going any deeper into the mission of the philosopher, I would anyhow like to quote Blanshard (1965) and his meaning of philosophy as a kind of tool to judge the presuppositions of science, rather than presenting theories within a certain science:

Philosophy is related to science in two ways: it logically precedes science; it also completes it. The scientist in his daily work is compelled to use many concepts which he cannot well stop to examine – time, space, motion, cause, number, proof, truth. He uses these ideas as a rule without any question of their meaning or applicability, and from a practical point of view is wholly justified in doing so. But unless they are really applicable, his results will be without foundation. Philosophy undertakes to examine these concepts, to define their meanings, and to consider their validity. The scientist similarly accepts without question
many important general principles. He takes for granted the whole of logic; he assumes that under the same conditions nature will always behave in the same way and that observation brings us in contact with an independent material world. Here again he is practically justified. Nevertheless, these assumptions are by no means beyond question, and it is the business of the philosopher to pursue this questioning to the end. Philosophy judges the presuppositions of science. (Blanshard, 1965, s. 701)

Following Read’s ideas there are some philosophical issues about Chalmers’ (troublesome) scientific approach that needs to be discussed. Please observe I am not claiming the scientific approach will succeed – that is not the issue here. I am claiming certain possible outcomes do not fit the framework presented by Chalmers, thus showing the doubtful approach in specifying where we should look for a solution since he claims this theory will be a fundament for any solution. It seems Chalmers is uses an analogy of mind as a computer, thus creating the problem of consciousness, just as pointed out by Read in his paper.

Read refers to Wittgenstein concluding that the thinking and imagining subject does not exist, and there is nothing in the information from the eye that makes it possible to conclude this information comes from an eye. (1992, ss. §5.631-633). It seems Chalmers in a way position himself where he can philosophically find such information about consciousness making it possible for him to state findings about it, but this must necessarily be a philosophical (or scientific) mistake. The problem of consciousness cannot be treated as a semantic problem which can be attacked with philosophical tools (whichever those might be). This position of mine is however not possible to show, or prove, which is also stated by Read:

But some readers will as yet be unconvinced by my claims. If so, how can I hope to convince them? Perhaps by engaging in dialogue with them, by working with what they still want to say (differently from me) about these matters. I am going to cheat slightly here; I am going to call upon Wittgenstein, in the Philosophical Investigations (PI), to speak for me – or rather, to present just such a dialogue. /---/ What Wittgenstein gives one is tools, which may enable one to overcome one’s previous insistence that (e.g.) there is something weird and in need of explanation, about consciousness. He offers no more – and no less – than this. (Read, 2008, s. 64f)\footnote{Read refers to Wittgenstein (Philosophical Investigations, 1981, s. §412f) and underlines Wittgenstein does not dissolve the problem of qualia in any way.}
4. Critique of Chalmers’ argumentation

I fully agree with Chalmers when he writes:

We must seek to systemize the information we have, to extend it as far as possible by careful analysis, and then make the inference to the simplest theory that explains the data while remaining a plausible candidate to be part of the fundamental furniture of the world. (Chalmers D., Facing up the Problem of Consciousness, 1995, s. 212)

Unfortunately he does not fulfil this ambition since he only systemizes his own information, disregarding other findings. I claim this is a philosophical as well as scientific mistake which I will show in my argumentation.

When claiming reductionism has failed, Chalmers does this out from the fact no explanations have been found to the problem of consciousness. But entering a scientific field declaring the methods applied have failed since no explanations have been presented yet, has to be put in a context that basic research often moves in all possible (and impossible) directions before explanations can be found. Chalmers does not present any argumentation how he can judge future outcomes of neuroscience, except science will only be able to present theories connected to explanations of functions. I doubt this can be concluded by applying philosophical argumentation, since it is still an open question whether consciousness is a result of functional processing or not. Chalmers method of approaching the problem is rather counterproductive since it actually by necessity will exclude rather than include certain spheres of solution (i.e. physicalist/neuroscientific spheres). It might appear attractive to attack the problem of consciousness by intellectual and logical means only, as if a priori knowledge is accessible about mind just because it is a part being extremely personal, but I cannot see any reasons why aspects around consciousness should be a priori. Not until a solution has been found, we will be able to tell which methods failed and which succeeded.

We have to be aware that biology as a (complex) science is rather young compared to physics.\textsuperscript{12} Chemistry grew out from physics mainly during the end of the 18\textsuperscript{th} century, and biology can be said to have grown out from chemistry during the 20\textsuperscript{th} century. Without understanding of basic particle physics, electrochemistry etc, there is no possibility to clarify the function of the (biological) mind. Chalmers’ claim about the failure of neuroscience has to be seen in the context of neuroscience as an extremely young science. The fact a science “fails” finding an explanation within a certain period of time, does not automatically disqualify the methodology applied within this specific science. Chalmers also states a theory of consciousness will belong to physics rather than biology, and again it seems he makes prophecies about future outcomes of research without knowing at all what kind of explanations might be found. Referring to Maxwell does not strengthen his argumentation since

\textsuperscript{12} Compare for example knowledge about life processes we have today with those just some 100 years ago. It is also interesting to read theories claimed by Aristotle, which were very long-living (taken up by for example Thomas Aquinas and Spinoza, by whom Arne Naess were highly influences in his ideas nature processes).
Maxwell based his theories mainly upon experiments. Chalmers tries to reason purely philosophically, thereby giving an impression his discussion is more or less (mathematically) a priori, which I claim it is (absolutely) not. It is easy to get led astray building knowledge only upon philosophical reasoning as argued by Read.

To be able to define the sphere in which a solution to a problem is to be found, we need to be able to judge the character of the problem out from a base of knowledge within the field. The definition will contain the solution as an inductive, deductive or abductive inference. Since our consciousness is very much part of ourselves and our own thinking, it might appear as if a priori knowledge and deduction can be used to find an explanation. This would for example be the case if we look for a panpsychist solution; knowledge about conscious processes would then be present in consciousness itself. The “clean” scientific method uses induction from observations and experiments, but for the time being there is not enough data (or no relevant data) present making it possible to infer an explanation. In this case we have an obvious “gap” between observations and phenomenon. Abduction, or “inference to the best explanation” (Harman, 1965) is what often can be said to be applied when we work with problems, trying to “fit” the explanation with observations made, applied logic, relevant information etc. Harman concludes the hypothesis following the inference to the best explanation should be the most probable among competitive hypotheses. Some claim our intuition typically work this way, weighing different explanations in a kind of reality testing, trying to find what best fits. Chalmers basic observation is of course correct; there are no satisfying hypotheses explaining all aspects of human consciousness presented. But this fact is not equivalent to scientific failure.

Scientific progress, just as philosophical progress, is actually a very slow process and entering in the beginning of a research process would always result in the conclusion the process has failed if evaluation is to be done towards a final explanation. If the philosopher enters a scientific field and suddenly declares a failure, the philosopher takes an enormous responsibility for having been able to judge – not only contemporary knowledge – but outcomes of future research processes.

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13 Einstein claimed Maxwell was the one having paved the road for his theories, and without all the experiments performed by Maxwell it would never have been possible for Einstein to present explanations. Maxwell definitely did not start by isolating part of the problem with electromagnetism and it is difficult to find arguments why such an approach would have been very successful.

14 Falsification of philosophical argumentation is extremely difficult to carry through as long as the logic behind the reasoning is correct. Erroneous philosophical ideas about reality need to be discussed based upon scientific findings rather than by using philosophical tools.

15 Bayesian statistical computation is a method for inference, where prior beliefs are taken into consideration when judging probabilities. Frequentist inference methods only regard the evidence as a whole. Bayesian computations are thus regarded being closer to human brain inference methods.

16 We can compare this with the (old) discussion about progress within philosophy, for example Schlick: “Von Zeit zu Zeit hat man Preisaufgaben über die Frage gestellt, welche Forschritte die Philosophie in einem bestimmten Zeitraume gemacht habe” (Schlick, 1930, s. 4). He concludes Philosophy is no science; it is not a system of knowledge, but aim at clarifying science. “Durch die Philosophie werden Sätze geklärt, durch die Wissenschaften verifiziert.” (s. 8)
One of the most important aspects I want to point out regarding brain functionality is the fact it is today not known of an alternative method understanding the functionality of the statistical behaviour of the neurological structure of the brain, than computer simulation. To understand the enormous complexity (without understanding the functionality) an enlightening example is there are successful simulations made of minor areas of the brain (22x22 mm; 22 million neurons with 11 billion synapses). The simulation of 1 second (real time) brain activity, using today’s computer capacity, took about almost 2 hours. There is in a way, no possibility here to “understand” the brain functionality as a simple mapping of the simulated activity. I have difficulties imagining how philosophical methods can close up to the problem how brain activity can give rise to phenomena as for example experience. This would imply the solution can be found without having any particular knowledge about brain processing. Chalmers argues and underlines problems about the brain function are easy problems while those about experience and consciousness are hard. I am not arguing neuroscience will find solutions to Chalmers’ hard problem, but I claim the positive aspects of understanding brain functionality ever to be able to produce something that reminds of an explanation of consciousness based upon scientific findings.

There is a difficult problem discussed within neuroscience; how to judge the necessity of gaining knowledge about lower levels of brain processing to understand the higher levels. This can be seen as a direct parallel for example to the question whether it is necessary to have knowledge about brain function when it comes to being able to understand experience and consciousness. It is not computationalism as discussed by Chalmers (2012) that is a controversial issue in neuroscience, but rather the discussion pointed out by Thomas Fuchs (2011); is it possible to clarify the functionality of mind as a whole system disregarding the lower levels of computationalism? Fuchs claims it is necessary to apply an “ecological view” (holistic) to understand mind functionality, and he says today’s neuroscience is based on the “principal divide between the ‘mental’ and the ‘physical’” (p. 198). Furthermore Fuchs says philosophy of mind is based on a division between the mental and the biological and the hard problem of consciousness (as defined by Chalmers) cannot be “solved” until conceptualization of mind and life are being integrated:

17 EU has initiated its largest research projects ever, The Human Brain Project, aiming at building a supercomputer as a model of the human brain within 10 years (the project has been compared with the Apollo project aiming at putting a man on the moon before 1970). HBT is not just a mathematical modelling of brain functions, but a model a human brain with a complete new hardware, actually built on the functionality of the neurons (“Bottom-up-principle”). Philosophers and scientists have grappled with learning and memory for more than two centuries. Today, we know they both depend on the brain’s plasticity – its ability to modify its structure in response to changes in the environment. However, we do not understand how microscopic changes in molecules and synapses allow us to store, consolidate and retrieve memories. The HBP will make it possible to trace the birth, life and destruction of memories during cognitive tasks...” (HBP, 2013, s. 54)

18 Can it be philosophy offers alternative methods? Can philosophy be said to work a similar way as alternative medicine methods in relation to scientific methods, pointing upon other and older traditions being empirically based from another perspective compared to clinical studies? If philosophy can offer such powerful methods, these methods should be clarified.

19 I would say this is also the case if we finally end up with a non-physical explanation.
Neuronal excitations or circumscribed structures are not the adequate scale to look for the basis of the mind. Consciousness, mind and life are not micro- but macro-phenomena that only show themselves to others in co-existence, from the second-person perspective. Below a certain distance they just disappear. (Fuchs, 2011, s. 201)

This kind of claimed holism might appear attractive, but as long as the real nature of consciousness has not been clarified, Fuch’s approach excluding the micro-level is most doubtful. He makes his claims from a theoretical philosophical perspective, just as Chalmers. Contemporary brain research (for example HBP) has concluded the lower levels of neurological activity cannot be excluded since this is where the human brain as a biological process ever can be explained. I therefore claim we have the same situation regarding explaining experience; we cannot say that without understanding of basic brain functionality we will be able to find relevant theories about experience and consciousness. Again there is a question that remains open; before having found a solution, can we really presume we are able to exclude spheres of knowledge?

Below I will falsify Chalmers’ three basic psychophysical principles constituting his foundation of a non-reductive theory of consciousness, concluding the principles suggested would limit the research and perspectives about consciousness.

4.1 Principle (1): Structural coherence
Chalmers presupposes coherence between the “structure of consciousness” and the “structure of awareness” (1995, s. 212). To understand what he means with this coherence, we need to understand how the concept ‘awareness’ is to be interpreted. In language-using systems, the contents of awareness are “the contents that are directly accessible and potentially reportable” (s. 213). Awareness is functional and linked to conscious experience. It is also to be understood the other way round; where there are contents of awareness, conscious experience is to be found. “Thus, there is a direct correspondence between consciousness and awareness”.21

Before continuing I would like to point upon a dilemma in the prerequisites by Chalmers:

The claimed coherence is based only upon a logical reasoning without further references. It is easy to foresee the fact such reasoning seldom are a priori based, but rather based upon information we have received during years of learning, reading, listening, discussing and so on so forth. The dilemma is the information used by Chalmers cannot be verified and, as in this case, are not clarified thus making the argumentation weak. If I for example refer to van Swinderen (The remote roots of consciousness in fruit-fly selective attention, 2005) and his study about the presence of selective attention, sleep and general anesthesiain among fruit-flies, this indicate we have a problem with the

20 This reminds me of Wittgenstein’s “Die Probleme des Lebens sind an der Oberfläche unlösbar, und nur in der Tiefe zu lösen. In den Dimensionen der Oberfläche sind sie unlösbar” (Wittgenstein, Culture and Value, 1980 (1977), s. 74).

21 This definition of awareness somehow indicates involvement of the process of retrieving a memory. It is actually a possibility consciousness is an observation of the storing process of mind; situations are (unconsciously) observed, then stored and the storing as such is our ‘experience’. This is a philosophical idea.
claimed coherence between awareness and consciousness. Presuming coherence between structures of awareness and consciousness is not serving any purpose, but is rather counterproductive. It is so to say a meaningless presumption only limiting the views and perspectives of information collected. It is not a very successful scientific method to make this kind of presumptions. I cannot see how we ever can conclude such coherence without having relevant facts supporting the view, and as long as no such verification can be made, we need to be open to other possibilities.

In his argumentation, Chalmers concludes (1995, s. 213) experience “has a complex structure”, taking the visual field as an example, pointing upon in principle relations between the strength of the signal and the actual experience created and he claims it is a “central fact” that a particular structural feature of such signals corresponds to a feature in the information processing structure of awareness. He gives an example with colour sensation and says a certain three-dimensional space experienced (hue, saturation, intensity) are being “analysed in three different axes” which is “relevant to later processing”. Chalmers now concludes the 3D-structure of phenomenal colour space “corresponds directly to the three-dimensional structure of visual awareness. This is precisely what we would expect.” Please note here, Chalmers does not give references to this kind of “central facts”, but just concludes it is a central fact, hiding his inferences in logical reasoning without clarifying his knowledge base. What is meant with an analysis “in three different axes” and how does this “later processing” use such analysis? How does Chalmers know this? It is most probable the result of a mixture of neuroscientific reading and own (hidden) theories. Actually Chalmers hardly says anything about mind processing in this case, still obviously uses knowledge from neurological research. But if he uses such knowledge, this shows his ideas are dependent of something else than pure reasoning of issues of mind, namely findings of reductive scientific research.

According the Swedish brain researcher Berndt Ehinger (1995) visual signal processing is highly complex and the enormous amounts of information to be treated in short times makes it necessary for the brain to use methods combining direct signal processing with a kind of simulation based on memory and experience. Mind “fills in” blocks of information, based on earlier signal treatment, making it possible to interpret visual information much faster than direct processing only would

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22 Says van Swinderen: “An alternative approach is to be agnostic about an insect’s potential subjective experience and instead tackle quantitative variables associated with changes in consciousness. Rather than asking whether a fly has consciousness, which can only be entertained philosophically and is not the point of this essay, we might use “the fly” Drosophila melanogaster to study key changes in behavioral responsiveness, which can be approached mechanistically. Just as Drosophila has proved useful toward understanding phenomena such as nervous system development or circadian rhythms, Drosophila may also prove useful toward understanding general anesthesia, sleep and selective attention—three consciousness-related variables accessible to fly research. Unlike some nebulous checklists for consciousness (language, play, abstraction and the like), these variables benefit from very well-defined criteria for their evaluation (quantitative behavioral responsiveness levels) and they consequently seem entirely knowable at a mechanistic level.” (van Swinderen, 2005, s. 321)

23 Read says “But we don’t understand the causality (etiology) of such things better because we know what ‘information’ really is, or because of anything remotely like that. We understand them better because of new technologies and careful observation — because of real science and medicine, not because of philosophizing.” (Read, 2008, s. 60)
allow. “Vision is in other words not a photographic mapping of the surrounding world” (s. 142) This is also the explanation why optical illusions are quite common and how we can interpret pictures in 2D as 3D when applying the method of perspective geometry. Ehinger says (my translation to Eng.):

> It seems probable a unified picture in a physical sense of the surrounding world never arises in the brain. (Ehinger, 1995, s. 140)

I have not found anything supporting Chalmers claim an analysis is made in three axes in the brain for “later processing”. What he writes might appear true, but only building argumentation upon logics of course makes the argumentation convincing, but we are led astray if we forget there are no observations or other theories supporting the logic thus making it an empty philosophical discussion. The basis for neuroscience and cognitive science today is distributed network signal treatment to get results corresponding to pictures and mappings of a working human brain. Even though this approach in a number of years might prove to be wrong, it seems more probable it will move the knowledge a bit further compared to the enormous simplified model Chalmers claims to be a fundament for understanding consciousness.

4.2 Principle (2): Organizational Invariance

Chalmers says neural organization duplicated in its exact organization (i.e. duplication in silicon or similar) would create duplications of experiences, and this argument is supported by a thought experiment where this claim is false and we have two systems, one original brain and one copy in silicon with different experiences from colour sensation; the systems experience red resp. blue in a certain situation. Imagining neurons in the original brain gradually being replaced by the corresponding copies of silicon – what would happen to the experience? A slight change of the experience would occur. Imagining the two systems and a switch making it possible to change over from one to the other, there would never be any chance to be aware there was ever a change since what is experienced is what is experienced.

I prefer to refer to findings most brain researchers seems to agree upon; brain activity is based upon continuous chemical activity causing a statistical phenomenon in large areas of neurons. Chalmers makes a mistake which seems to origin from computer analogies, as highlighted by Read (2008) as presented above. Today there is not much support for the idea the human brain corresponds to a computer (or a Turing machine) with certain static logic. Most certain brain processing is a statistical phenomenon and not strict digital logical signalling as in technological systems. Statistical signal treatment can come up with different results even if the system is constant and the input is a constant matrix of data. Even if contemporary neurological research has mistaken regarding the statistical processing, it still shows the principle stated by Chalmers is not necessary.

Karim Nader’s (Wiklund, 2014) neuropsychological research shows a human “memory” never is finally consolidated. Every time we recall a memory it changes and during the time we are aware of it, it is unstable and possible to affect different ways and when this memory then is restored, protein synthesis creates a “new” memory comparable to when it was being stored the first time. Pontus Wasling says this instability is important for our self-apprehension:
The plastic, soft memories, fulfils a most important function (…) The brain is an expert of finding patterns, real or fabricated. To create consistency and fill in logical gaps. The instability is a way to create a story of a rational continuous “I”. We reinterpret events to fit our story of life. In this way we create a logical path to the place where we are at present in life. (Wiklund, 2014, s. 44)

Proteins are not very stable molecules, but are renewed continuously in the “protein factories” of our bodies, controlled by the DNA and RNA. We have no kind of “access” to this process, except in those cases pointed out by Wasling when memories are being recalled, but also then it is doubted by the scientists we really have the possibility to control the renewing with our will. Again it seems consciousness is more of a passive process, a kind of “observer” that changes its position and also the “I” to fit the ongoing life.

Denying these findings like this, makes it easier to argue “organizational invariance” necessarily has to be present. Chalmers theories show us one thing: the brain’s brilliant faculty for filling in the logical gaps and create consistency out from the information being present as inferences to best explanation. The brain is an extremely complex biological part of the human body and we have to be humble enough to confess we only understand a fraction of its processes today.

4.3 Principle (3): The double-aspect theory of information
Chalmers says this principle is “less certain” than the first two principles and he refers to “it is more of an idea than a theory” (2002, s. 218). Since this is a basic principle, it has to be regarded as the most important of the three principles. He starts out from the notion of ‘information’ and I think it is necessary to analyse this concept of his to be able to grasp the overall idea behind this basic principle.

Chalmers understands information “in more or less the sense of Shannon”, with reference to Shannon’s paper (A Mathematical Theory of Communication, 1948). What Shannon actually did was to apply a strict engineering approach to the problems involved in the transfer of information, disregarding semantic aspects (etc) of information, focusing on the technical aspects to find a solution. Telegraph lines transferring signals will show increased incidences of errors in the decoded message increases the more dots and dashes are being sent. Shannon applied statistical methods to make calculations possible how to find the highest possible rate at which information can be transferred still being error-free. One of the problems is the presence of noise, which also is a statistical variable. His theory is strictly mathematical and my aim here is not to dig any deeper into the mathematics. Shannon’s paper was taken up in many different contexts, and it became very

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24 Proteins are not to be compared to for example molecules in metals organized in fixed crystalline structures.

25 The historical context of Shannon’s paper is information technology growing out from military technology development during the 2nd WW. Shannon’s theories were a base for how to build telecommunication and computer communication systems to assure how information could be transferred from point A to point B without being corrupted by noise.

26 Rupert Read says “If the innovations of Shannon, Weaver, Dretske et al. had instead been called ‘uninterpreted symbol manipulation theory’, say, this would have been much less likely to mislead folks into thinking that the mind-body problem (or mind-machine) gap was being bridged at last. For it would then be
popular looking upon the human nervous system as an example of discrete communication including noise. This analogy is attractive but not necessarily correct. It shows however human beings tend to move one logic system as an analogy from one field to another. Shannon himself commented that applications of his ideas within other areas is doubtful, emphasizing his theory is to be used for technical signal processing and should not easily be applied within other areas.27

How does Chalmers interpret ‘information’? We need to understand this to understand his principle:

Where there is information, there are information states embedded in an information space. An information space has a basic structure of difference relations between its elements, characterizing the ways in which different elements in a space are similar or different, possibly in complex ways. An information space is an abstract object, but following Shannon we can see information as physically embodied when there is a space of distinct physical states, the differences between which can be transmitted down some causal pathway. The states that are transmitted can be seen as themselves constituting an information space. To borrow a phrase from Bateson (1972), physical information is a difference that makes a difference. (1995, s. 216)

Shannon discusses in terms of information source, transmitter, channel, receiver, destination and noise. ‘Information’ is used in some kind of wider meaning, so let us conclude we have some kind of ‘information’ to be transmitted. Chalmers says there are information states embedded in an information space present as well, which is not very clarifying. An information space consists of some kind of elements building its structure. What these elements are, he does not give any further information about, but the structure is made of difference relations between them, maybe rather than the elements themselves? If we now imagine this somewhat vague structure, whatever it might be, Chalmers says the structure characterize how the elements (probably in the space they belong to) can be similar or different “possibly in complex ways”. The structure consists of elements characterizing the way these elements are different or similar.

An information space is “an abstract object” and “following Shannon” (who discusses in pure mathematical terms not making it obvious how we are expected to follow Shannon) information can be seen as “physically embodied”, when there is a space “of distinct physical states”. It seems the concept “space” now has another meaning referring to the space of “distinct physical states”, and then the rather confusing “differences” are introduced, but not with extensions as used earlier as in “difference relations” or “different elements” but rather one of the ways in which the difference relations between the elements of the space, characterizes them as different. What is being transmitted are “the states”, and by this I understand it as a reference to the informations states discussed earlier, as states “embodied”.

clearer that all the ‘theory’ yielded was simply a very clever mathematicization, not (yet) a description or explanation of anything bodily or spatial instantiation. (2008, s. 58)

27 (Encyclopaedia Britannica, 2013, s. ‘Information theory’)
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Chalmers thereafter twists the definitions another turn, because he says the states that are transmitted “can be seen as themselves constituting an information space”, which I have to interpret that the information states being embodied, constituting an information space. I cannot say how we are supposed to interpret “embodied” but since we somewhere have Shannon we should discuss something that can be transmitted. The phrase borrowed from Bateson is not easy to interpret in this context. Using Shannon does not make sense at all, since he discussed technical issues rather than information as treated by the human brain, and again it is not clear which knowledge Chalmers uses about signal treatment in the human brain, why I have to presume he uses mixed neuroscientific findings.

However, this is how Chalmers explains the notion of information. The principle discussed, the double-aspect theory of information “stems from the observation that there is a direct isomorphism between certain physically embodied information spaces and certain phenomenal (or experiential) information spaces”. Since Shannon seems clearer and also being referred to, I presume what Chalmers is trying to explain here is that the information being used for transmission (i.e. a voice in a telephone) shows an isomorphism with (for example) the modulation and signal representation being transmitted, it might also be an isomorphism from transmitter via the channel used to the receiver. Exactly which “observation” Chalmers refers to is not clear.

Referring to the principle of structural coherence (principle number 1), we “find the same abstract information space embedded in physical processing and in conscious experience” 28 (s. 217) which leads him to the hypothesis that “information (at least some information) has two basic aspects, a physical aspect and a phenomenal aspect.” What then follows confuses:

This has the status of a basic principle that might underlie and explain the emergence of experience from the physical. Experience arises by virtue of its status as one aspect of information, when the other aspect is found embodied in physical processing.

(Chalmers D., 1995, s. 217)

It might be Chalmers looks upon information a metaphysical way, where the “phenomenal aspect” cannot be defined or observed and probably not even measured? This is a kind of panpsychism, which in a way is interesting but such metaphysics cannot be said to overrule science. 29 McHenry says in his analysis of panpsychism that “David Chalmers has flirted with the notion by suggesting that any physical process can be treated as an information-processing system which is realized both physically and phenomenally /---/ When physicalist philosophy of mind begins to make overtures to panpsychism we know we have entered a new period of discourse.” (2010, s. 16)

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28 I am not sure but it seems Chalmers has used “embedded” instead of “embodied” in this sentence, but it might be that he really means embedded. Unfortunately the interpretation of the sentence will differ quite a lot depending of what is the correct word. However I have to presume he has used the correct word and therefore interpret him as written here.

29 Panpsychism is a view discussed for example by Alfred Whitehead as explained that each ‘actual entity’ in universe can be regarded as bearer of some kind of abstract consciousness. His definition of ‘entity’ is though not easily understood (reading and understanding his book Process and Reality (1978) is a delicate mission for everybody interested. Russel said the view presented by his former colleague Whitehead was peculiar, but I claim Whitehead’s ideas still are interesting, having inspired different directions of “process philosophy”).
I think we have to be aware ‘information’ as used in a human brain, cannot necessarily be understood from a philosophical point of view as simplifications of some basic analogies from technical applications.\textsuperscript{30} There is so to say no \textit{a priori} knowledge to apply to understand how communication might take place in a biological system. We could take a basic example of communication in biological systems with molecules as information carriers in \textit{Vibrio fischeri}.\textsuperscript{31} I am not sure how biological system communication corresponds to Chalmers’ “information space” or “information states” or if molecules are the “elements” discussed. Presume they are; where do we find the isomorphism in such a case? Should we just exchange Shannon’s electrons with molecule as information carriers? On the other hand, this might be the “easy” part of the problem this might be a simple cognitive process. I would say there is no “hard problem” in this case, just as there is no “easy problem”, and the issue if there is some aspect of consciousness present is not relevant at all. If \textit{Vibrio fischeri} is somehow “conscious” has no direct influence to the problem around ‘information’. Chalmers’ “Double aspect theory of information” seems to have connections to his ideas about two dimensional semantics and he actually deals with the problem of consciousness as if it is a problem of semantics, which I claim it is definitely not as long as we do not regard “consciousness” as being an invented conception without references to the world around us.

\textsuperscript{30} For example by referring to Shannon as if he is some kind of authority within information processing of the human brain, which he definitely not is and never claimed he was, but rather tried to avoid such connections. Goldstein (2005, s. 174 ff) presents the hypothesis Gödel’s first theorem of incompleteness tells us man’s consciousness cannot be a computer, because “the mathematical knowledge we persist cannot be caught in a formal system” since such a system can never be described within the system itself, which would imply the human mind always to be something more than what can be modelled with computer algorithms. However attractive this position might be from a philosophical perspective, we have to be aware it is purely speculative.

\textsuperscript{31} One example of ‘information’ in a biological system is how the bacteria \textit{Vibrio fischeri} communicates. \textit{Vibrio fischeri} lives in the small Octopus \textit{Euprymna scolopes}, and actually protects the octopus from fishes of prey by sending out a light below the octopus, thus preventing a shadow at the bottom. The light sent out from large colonies of \textit{Vibrio fischeri}, needs to be in balance with the incoming light (from the sun or the moon), and this is done by a complex communication between the individual bacteria – they actually “count” each other by sending out a molecule (quorum-sensing signal), in principle saying “here I am”, and each bacteria can “count” other signals making it possible for the bacteria to form an exact population balancing the light. (Engström, 2014)
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5. Conclusion

I have tried to show knowledge about brain representation of information, emotions, thinking, creativity etc can be expected to be future outcomes of neuroscientific research, as well as new ideas addressing the problem of consciousness. I have done this to support my claim Chalmers’ method isolating the hard problem of mind as a part of the problem of consciousness not being able to close up by means of reductive theories, seems most doubtful. It also seems Chalmers uses findings and theories within reductive neuroscience as an indirect as a hidden base for inference. From today’s knowledge we can only partly explain brain processing. Consciousness might be a passive process comparable to the observation of a memory, just as it can be an dominator of mind.

It is obvious Chalmers is interested in the issues around philosophy of mind, but the way he works here is counterproductive. Even (long) before a satisfying hypothesis of consciousness has been discussed, he argues the sphere of investigation should be limited to a philosophical non-reductive one, as if the hypothesis to come would almost be ready to present. Chalmers’ argumentation is in a way convincing, partly built upon philosophical thought experiments, but such ‘experiments’ have no correspondence with scientific experiments and observations (as argued by Chalmers) since the facts they are based upon are not clarified. If Chalmers claims neuroscience has “failed”, he cannot at the same time use neuroscientific findings to build his ideas. If, on the other hand he would claim he does not use such findings, but build his ideas upon logic, it seems he needs to clarify how knowledge about consciousness can appear to be a priori as if explaining consciousness is a problem of semantics, which of course maybe should not be excluded from the sphere of possible “solutions”; “consciousness” might be just an invented concept without true referential object?

Chalmers raises no arguments or particular findings supporting his argument experience cannot be reductively explained. Chalmers’ claim consciousness cannot be a performance of functions is only supported philosophically by pointing upon an explanatory gap, but he has not been able to explain why this gap cannot be bridged by future findings in neuroscience or simulations. Reductionism does not imply human mind is a simplified mechanism performing functions. To me it seems Chalmers put far more limitations to the problem of consciousness than I have found in neuroscience. Arguing scientific reductionism has failed to come up with an explanation, thus necessarily making it necessary to turn to non-reductionism is not very productive. How can it ever be possible to point upon an area of research, claiming the research has “failed” at a specific time? Applying this methodology to science would definitely kill all further attempts to gain more knowledge. We would thereby replace science with pure philosophical speculations, exemplified with Chalmers’ theory of consciousness.

I have also tried to show that dividing a part of the problem of consciousness might well fit for example panpsychist views but there are several other views not being covered by such approach used by Chalmers. By falsifying Chalmers’ theory of consciousness the necessity of not limiting the sphere of solution when looking for an explanation of the problem of consciousness is emphasized. I have shown Chalmers’ theory is based partly upon simplified computer analogies where the brain works according a logic structure, and partly upon a metaphysical idea which is hard to grasp. A technological information system, typically a computer, does not build its capacities upon statistical behaviour. I point this out specifically since it is important to understand the difference here
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compared to the analogy of the human brain as a computer. Chalmers tries to apply methods from philosophy of language onto areas where the need for highly complex views are obvious, no longer graspable for one single human mind. The clear limitations of his methodology become obvious in his extraction of his outline to a theory of mind out from his definition and isolation of the hard problem of consciousness and my falsification of his theory should show these limitations in detail.

I have argued the division of a “hard problem of consciousness” is a philosophical and scientific dead end which does not serve the building of knowledge about human mind, including the question how to explain consciousness.
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References


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