Consciousness

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Natural Evolution and Human Consciousness

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ABSTRACT

A visual conscious experience is my empirical basis. All that we know comes to us through conscious experiences. Thanks to natural evolution, we have nearly direct perception, and can largely trust the information we attain. There is full integration, with no gaps, of organisms in the continuous world. Human conscious experiences, on the other hand, are discrete. Consciousness has certain limits for its resolution. This is illustrated by the so-called light-cone, with consequences for foundations in physics. Traditional universals are replaced by feels and distributions. Conscious experiences can be ordered within a framework of conceptual spaces. Triple Aspect Monism (TAM) can represent the dynamics of conscious systems. However, to fully represent the creative power of human consciousness, an all-inclusive view is suggested: Multi Aspect Monism (MAM).

Key Words: *Consciousness; Continuous; Creativity; Discrete; Distributions; Feels*

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Introduction

My point of departure is a special kind of visual experience that I have had of waking up, with eyes closed, in a dark room: that of a slowly rotating pattern (Holmgren, 2002[5]). Similar experiences are reported by Rifat (2002[12]). Several times, I have seen an apparently stable pattern of small and rather evenly spaced sharp light dots, or light voxels (three-dimensional pixels), in a completely black sky. The pattern has been in a rather slow and very orderly rotation. Most often, the pattern has rotated in a clockwise direction, but I have succeeded by will to make it rotate counter clockwise. After a short while the rotation has stopped, and the very orderly pattern has rather quickly given way to a much more complex pattern, with various and variable light shapes emerging and disappearing, more or less transparent or opaque (with varying intensity), moving disorderly around in a darkish space. This later state is the situation I most often experience of waking up with eyes closed, and it is a bit similar to what I see when I close my eyes in a dark room in the normal awaken state. Then, the voxels are not so clearly discernible, but a general graininess in the visual field is most often obvious.

(This experiment is open to anyone, but may require some training. Make it a habit to observe the visual field with eyes closed. Sleep in a dark room and avoid disturbance at wake up. A difficulty is that we often open the eyes immediately at waking up; it is crucial to keep the eyes closed. I claim that the understanding of consciousness suggested here is essentially empirically grounded.)

I interpret the experience as revealing certain properties of the visual system in rest. I conclude that these dynamics are going on during sleep, for a short while attainable for cognition at wakeup. Soon, the full "rush of immediate transition" (Whitehead, 1978[15]) sets in so the simplicity is lost. I suggest a few conclusions:

1. The visual field is composed of numerous light voxels, each one corresponding to a distinct microprocess in the brain. Each light voxel, then, has a precise location in the brain, and it has a certain (short) duration in time.
2. All experiences of light are produced within the brain.
3. Each light voxel has a certain feel, its colour. The feel is what we experience.
4. In each moment, most microprocesses are in a potential state. Only when actualised, their feel appears in a conscious experience.

Graininess

The microprocesses I suggest are not yet understood. But how should we otherwise account for the extreme detailing and crispness of many conscious experiences? The argument applies not only to visual experiences. I suggest that similar extreme crispness is encountered also in auditory experiences, in music, in language, not least in our most abstract experiences, in logic, in mathematics.

Thus, I suggest a very simple and general basic analysis of conscious experiences: Human conscious experiences are built out of numerous feels, each feel corresponding to the actualisation of one small, localised and shortly actualised microprocess in the brain.

This is more general than Whitehead's (Whitehead, 1978[15]): "… all our physical relationships are made up of such simple physical feelings, as their atomic bricks." Note that my suggestion is free of detailed abstract theorising. The idea of graininess is based on my immediate experiences plus the vague idea of microprocesses, and then the hypothesis is widened to include all possible human conscious experiences.

I suggest that this simple approach to our conscious experiences has several advantages:

1. It makes clear that our experiences are built of feels, and nothing else. So our conscious experiences are recognised as the basic phenomenon. All human conscious experiences are included; from qualia to the most abstract cognitive structures, all is built of feels.
2. It gives a direct and precise link between experience and brain structure. Neurology has a different perspective: hopefully it will explore the nature of the suggested microprocesses, and mechanisms behind.
3. It gives a clear statement of the facts about the human predicament: All that we know comes to us through conscious experiences.
4. The introduction of microprocesses gives a robust relation to space and time. Space and time become recognised as abstract thought structures in which the microprocesses will naturally expose certain extensions in space-time. Thus they will unavoidably have certain non-local characters.
5. The continuity of nature is recognised, which solves the binding problem. Only our conscious experiences are discrete.
6. The relative crispness of certain conscious experiences is explained by the amount of microprocesses that are actualised. Vague feelings, moods, subliminal experiences, etc. are explained as the presence of relatively few or disparate actualised microprocesses.
7. All of this is integrated in nature, in minute detail caused and restricted by natural evolution. It follows that our conscious experiences make a difference in nature, and act creatively as we can observe in human culture.
8. We can now think of conscious experiences in very precise ways: they are distributions of feels in the brain.
9. The concept distribution can be understood as a distribution in simultaneity, i.e. a large number of simultaneously actualised microprocesses in one brain. Or it can be understood as a process during a time-span, a dynamic pattern of actualisations.
10. Feels come in rich spectra (cf. colours, tones, etc.) in different modalities. These spectra are largely similar in humans, evolved in evolutionary time. Thus, to a large extent they will appear as eternal (Whitehead, 1978[15]).

The full relevance of natural evolution

There is an often-cited proclamation by Theodosius Dobzhansky (1973[2]): "Nothing in biology makes sense except in the light of evolution." I suggest that this can be amended into: "Everything in life makes sense in the light of evolution."

We often think of human culture as separated from nature. This is a natural effect of any materialistic worldview, where things are thought of as separate entities with such and such properties. Such a view is certainly wrong, which is getting more and more obvious as brain functions become understood. It is now clear that our brains are fully integrated in our bodies, our bodies are fully integrated in our nearest environment, our nearest environment is fully integrated in a wider surrounding, etc. (Varela *et al*., 1991[13]). Full integration here means that there are no real gaps; the world is continuous beyond our conscious experiences. Our conscious experiences, on the other hand, are always discrete, causing the illusion of well-separated things, thoughts, etc. Even our most advanced and seemingly unnatural devices or thoughts are in fact all the time perfectly and continuously integrated in nature.

These observations are vividly expressed in Whiteheadian process philosophy (Whitehead, 1978[15]). Whitehead called his philosophy "the philosophy of organism". The organism is here thought of as fully integrated as described above, and ultimately all that we humans know is actualised in discrete conscious experiences.

This simple fact is normally, without much ado, accepted in life. Philosophically it was established by Almeder (Almeder, 1978[1]). We are constantly aware of limited insight, forgetfulness, lack of awareness in sleep, etc. A less obvious consequence, often forgotten, is that all our conscious experiences are actualised wholly within our brains. That means, for example, that the experience of light is produced only within our brains; there are no light-qualia around other than in the brains of living organisms. Similarly, there are no heat-qualia around, and the same applies to all the senses of living organisms.

This thought might give a somewhat creepy feeling. Is nothing out there; is it all dark? In what can we trust, and why? The comforting answer is supplied by Darwin's well-established theory of evolution, supplemented and supported by ever-growing insights in hereditary mechanisms (the ongoing modern synthesis). Life is certainly fantastic in all its grandeur and richness in details. But thanks to natural evolution, increasingly understood in evolutionary theory, ecology, genetics, epigenetics, etc., even in the most minute and complex details we can expect rational explanations. And we can trust that our conscious

experiences largely give us very exact and trustworthy information of what happens around us.

There remains no need for mystical and supernatural forces. The forces we observe now and in the future will all be natural. Self-organisation, obvious both in nature and in culture, is rationally explicable.

Limited resolution of consciousness

A certain insurmountable limit for the resolution of our conscious apparatus should be acknowledged. Ingenious devices of many sorts help to unfold novel facts in global and cosmic scales, and in microcosms. For information to become known for us, however, it is always internalised in the form of human conscious experiences. In quantum theory, for example, there has been much discussion about possible influences of consciousness.

The feels, in reality, cannot correctly be abstracted into conceptual constructions based on concepts like points with absolutely no extension in space, or waves with absolutely no extension in time. Such extreme abstraction, or reduction, is typical for scientific thought, taken to its most extreme in mathematical physics. Since every event in nature is fully integrated in continuity, we have difficulties to capture all the richness of its relationships in any kind of language, and not least so in abstract language. This is obvious in disciplines like ecology, zoology, history, etc., but perhaps less obvious for example in particle physics. Still, rather similar difficulties will appear and should be admitted.

This has nothing to do with any kind of mystical forces. It is all about the impossibilities for us, owing to limitations in our brain mechanisms, to fully and unequivocally represent the complexities of relationships in the continuous reality. Our discrete languages always necessitate substantial abstraction and approximation. When it appears to us that we are dealing with an external world, we are in fact all the time dealing only with the internalised representation of it. We are dealing only with feels, and the smallest attainable atom is an actualised microprocess.

Space-time

As babies, we don't have clear intuitions about space and time. It takes maturation, own experiences, and much learning to grasp these complex abstract concepts. The feels that build our conscious experiences have discrete distributions in our brains, but should not be expected to be captured fully and correctly with the clear concepts of space and time. Einstein's introduction of space-time, in the special theory of relativity, meant an improvement in physics. However, in discussing the method of science, he explicitly referred

to psychological matters that could not be treated inside mathematical physics. For example he said: "On the stage of our subconscious mind appear in colourful succession sense experiences, memory pictures of them, representations and feelings. In contrast to psychology, physics treats directly only of sense experiences and of the "understanding" of their connection." (Einstein, 1950[3]).

The well-known light-cone can be used for an illustration of a fundamental problem [Figure 1]. Based on the finiteness of the speed of any possible signal transmission (finiteness of the speed of light), the light-cone defines limits for possible preceding and following causal effects for a point with negligible extension in the space-time continuum. Thus, it also defines the limits for the possibilities of self-organisation in nature.

This conceptual structure well describes fundamental abstractions applied in physics. The negligible extension of the point efficiently prevents causal effects applied to other points in immediacy, preserving clearness in the concepts before and after for every point. As defined in physics, self-organisation in nature is in principle determinist, even though statistics has to be applied in practical work.

Owing to the necessary extensions in space-time (factual non-locality) of each actualised microprocess, a light-cone with general applicability must give room for the real effects of consciousness (dark in Figure 2). The extensions of the central area, representing an actual and immediate conscious experience,

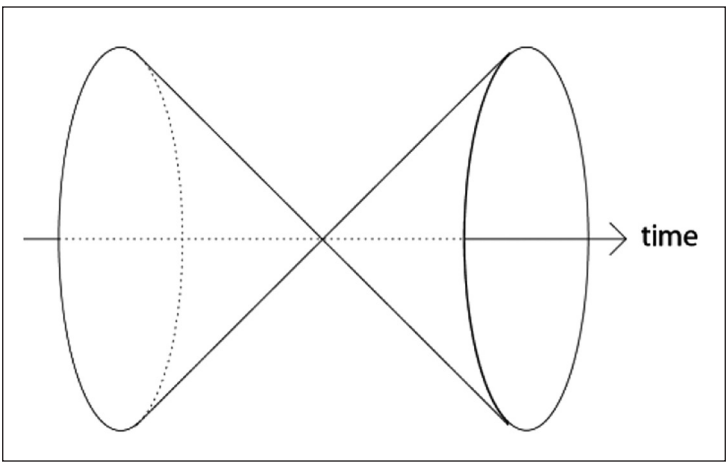

Figure 1: Light-cone defining limits for possible preceding and following causal effects to and from a point with negligible extension

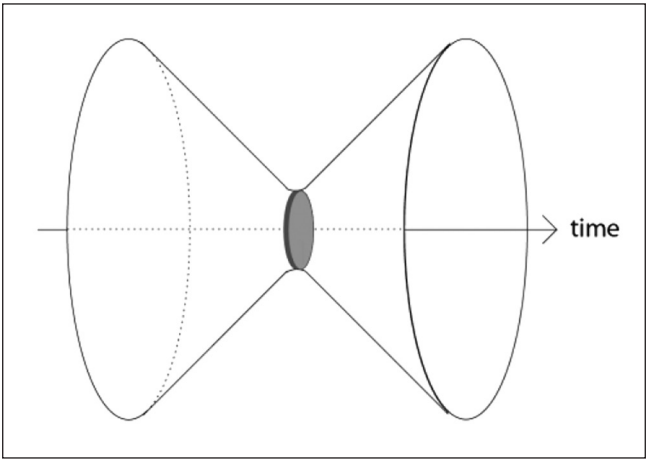

Figure 2: Light-cone where a conscious experience (dark) with extensions in space-time widens the limits for causal effects

are here not at all negligible. It has an extension-duration in space-time, and is potent for apparently non-deterministic change.

Observe again that this is not an introduction of anything mystical. The organism is still wholly integrated in the continuous world, and determinism is still unavoidable within the immediacy of consciousness. No backward causation is presupposed.

Only, in extremely complex and swift processes within our brains, known to us as our conscious experiences, meanings, intentions, urges, etc., intrude in causality.

It may appear that I tend to bring in many concepts, juxtaposed against each other e.g., in last sentence, from brain to physics to causality. That may appear to make the position hard to sustain. Let me explain. What I suggest is an ultimate metatheory, where for example brain, physics, and causality are all on equal footing, i.e., they are all distributions of feels in human brains. On that meta-level, I see no alternative to mention large sections of reality in a somewhat loose way. I admit that more detailed discussions explaining the intended relations might be preferable, but it would cost increased complexity of exposition.

Natural evolution providing a basis for conceptual spaces

For a unified theory, we need a conception of the matter of the theory that does not exclude anything. The matter simply has to be our conscious experiences, so

nothing will be left outside. The outer world is included thanks to the enormously fine-grained (ultimately continuous) afferent and efferent workings that have emerged in natural evolution. It has provided us, for example, with nearly direct perception (Michaels and Carello, 1981[7]; Warren, 2005[14]).

Gärdenfors (2004[4]) suggested a new conceptual framework for cognitive science: conceptual spaces. Pereira Jr and Almada (2011[10]) argue that this approach "affords the construction of a universal state space of human consciousness, where all possible kinds of human conscious states could be mapped". They suggest a new model of consciousness based on neuro-astroglial interactions. Interestingly, uniquely human features have been found in adult human astrocytes (Oberheim *et al*., 2009[8]).

Conceptual spaces can help to begin sorting conscious experiences according to taxonomy. Again, the most general conception is to see conscious experiences as consisting of large numbers of feels having distinct and discrete distributions in space-time. The feels change only in evolutionary time; in Whitehead's terminology (Whitehead, 1978[15]) they are eternal.

Distributions, on the other hand, are extremely dynamic, very swiftly taking enormously variable forms. But they too have evolutionary histories, sometimes tending towards stable forms, and combinations of forms, e.g. in mathematics and geometry. These analyses in feels and distributions replace the traditional universals.

The dynamics of conscious systems

Pereira Jr (2013[11]) has proposed an analysis of human consciousness in three aspects: Triple Aspect Monism (TAM). Briefly, the three aspects are the physical-chemical-biological, the informational as described in information theory, and the mental conscious aspect with affective feelings and sensitive feelings. The three aspects also represent three levels that interact dynamically over time, the informational level mediating between the causal and the inferential (conscious) levels.

This scheme is a viable approximation for a complete dynamics of conscious systems. Combined with suggestions for concrete mechanisms for the production of feels in the brain (Pereira Jr and Furlan, 2010[9]), this way of thought has a large potential to provide a basis for an integrative science of consciousness. It necessarily has a rather narrow focus in a scientific attitude, well situated in the realms of the natural sciences.

An all-inclusive view

In life, all of us encounter enormously richly structured conscious experiences, beyond the reach of any present science. In theory, however,

we can imagine taxonomies, roughly defining multi-dimensional characterisations like family resemblances (Wittgenstein, 1953[16]), sorted into conceptual spaces.

The scientific attitude, even in the humanities, tends towards abstraction and reduction. Life contains more. For example, in all times, humans have found comfort in group memberships. Common habits, symbols, rituals, etc., with no scientific stature whatsoever, naturally have strengthened groups, and accordingly have become favoured in natural evolution. Consequently, many between-group tensions and conflicts have plagued societies, and still do.

I suggest that no possible aspect of life should be disregarded. Even if many human aspects appear as conflicting, the continuity of nature always secures monism. Loosely, I suggest Multi Aspect Monism (MAM) as an all-inclusive alternative to TAM. It would suggest that reality can be looked at, understood, and manipulated within many various and often intermixed aspects. Science, then, is one of many possible aspects; other aspects can be religion, sports, politics, arts, etc. From a scientific viewpoint, the theory of natural evolution is a crucial aspect, which does not reduce into physics (Mayr, 1988[6]). The theory of natural evolution is a life science, which physics is not.

Self-organisation is obvious in many animals, not least in the social insects: ants, bees, etc. Many animals have sensory capacities far beyond human limits, and their performances are often astounding. The cognitive capabilities of humans, however, are novelties which have evolved far ahead of all animals. The immense creative power of consciousness is clearly demonstrated in human culture. The evolution within the human branch has been gradual, e.g. with crucial enlargement of brains in Homo erectus some 200 000 years ago. Extinction of intermediary forms explains the presently obvious large step from animal to human.

Concluding Remarks [See also Figure 3: Flowchart of paper]

Central to my argument is the suggestion that feels are the ultimate building blocks of our conscious experiences. Feels, in this meaning, are extremely numerous, small and short-lived, each one appearing in the brain when a corresponding microprocess is actualised. Feels are evolved and come in rich spectra, changing only in evolutionary time, thus appearing as nearly eternal. In conscious experiences, they are distributed in space-time, changing distributions at extreme speed, not by movements but by flashing actualisations. The suggestion is compatible with recent ideas in neuroscience, as well as with Whiteheadian process philosophy, supplemented with natural evolution.

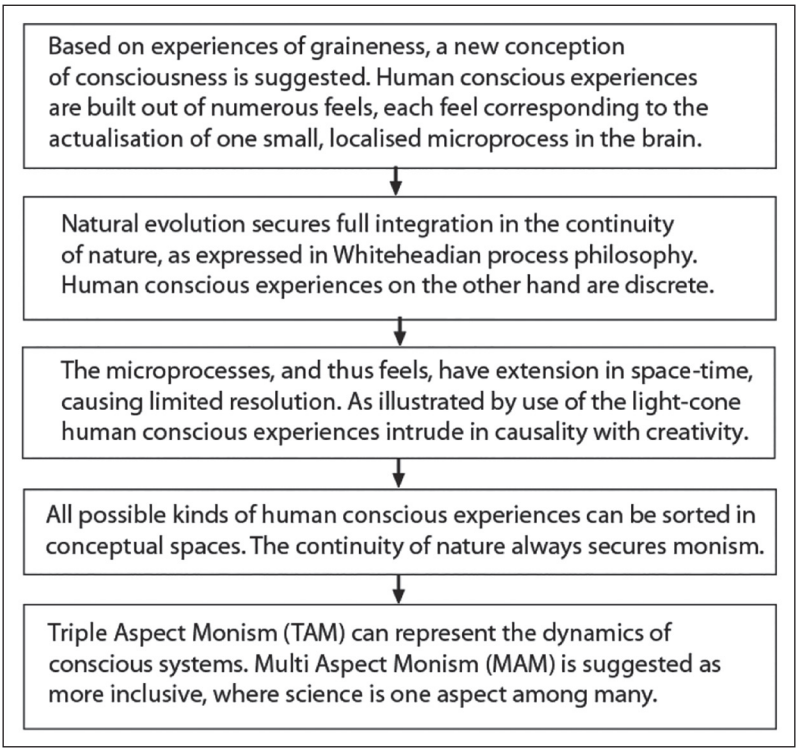

Figure 3: Flowchart

Our conscious experiences actualise in continuous nature, providing information in the shape of discrete entities. Thanks to natural evolution, the information we attain is largely reliable, even though it is partial. Human cognition is a rather recently evolved function in the human brain that allows us to drastically widen understanding, and to manipulate nature with large efficiency and creativity.

Take home message

Natural evolution is crucial for the understanding of human conscious experiences. Nature is continuous, while our conscious experiences are discrete and partial. All that we know comes to us through conscious experiences, which ultimately can be analysed as feels distributed in space time.

Conflict of interest

None declared.

Declaration

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Questions that this Paper Raises

1. Would the suggested understanding of consciousness influence the understanding of quantum theory?

2. Can the suggested extensions of feels in space-time explain the need for extensions of ultimate units e.g. in string theory?

3. Can taxonomy for conscious experiences in the form of conceptual spaces become a feasible reality?

About the Author

Jan Holmgren is Architect SAR/MSA, graduated at Chalmers University of Technology, Sweden. Alongside a long architectural career, he has followed and taken part in discussions on consciousness since before 1980. Retired since 2000 he is engaged in research on birds, especially the Common Swift Apus apus. He has published on swift phylogeny, swift behaviour, and recently, with co-authors from Lund University, on results of application of geolocator technique on the Common Swift.