Mental Activity Considerations

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Abstract

This work has the objective of presenting a panel of theories that embrace scientific explanation for the nature of the mental states under the sight of contemporary physics. It will present issues about mental activities that indicate that human capacity of intuition and the "qualias" are not characteristics that could be reproduced by high capacity computation machines.
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1. Introduction

Since Descartes the philosophers and scientists have debated the mind and body dichotomy on the one hand, the dualists who believe in something beyond the physical body that would be responsible for mental states and on the other hand, the monists or materialists who believe that all mental states are of physical nature, thus not having the entity "mind" in its perspective.

From the monistic line of thought, came in the 1960s the Functionalism with its precursor Hilary Putnam basically saying that mental activities were functional in nature, and could even be performed even by a computer. Thus, the mind would be for the brain just as the software would be for the hardware of a computer. This theory was relatively well accepted, especially since the computer is something new and its potential and limitations have not yet been properly established (João Fernandes de Almeida, 2000).

There were scholars who opposed this theory as Roger Penrose and John Searle. The first going beyond, seeking principles of quantum physics to explain mental phenomena.

We also have more recently the work of quantum physicist Amit Goswami, with his theory known as monistic idealism.

The main objective of this work is to present some theories about the tangibility of the mental states, being able to reconcile the concepts of monism and dualism.

2. Functionalist cognition theory

Functionalism starts from three basic assumptions:

a. The reality of mental states

b. The idea that mental states are not reducible to physical states

c. Mental states are defined and characterized by *the functional role* they occupy in the path between *the input* and *the output* of an organism or system

Thus functionalism becomes a neutral theory that favors neither dualism nor materialism, the great debate of the last decades, because it establishes a non-reductionist materialism, not seeking to map each mental activity to a brain activity in a reductionist process, due to the complexity of mental states and their cerebral correspondences, if such integral correspondence exists, but postulates that no matter the nature of the system or organism that performs a given function, but rather the function itself. In this way, if a machine and the mind perform the same functions, we can consider them equivalent. The possibility of varying the type of material with which we can build minds opens up very interesting horizons, such as artificial intelligence (João Fernandes de Almeida, 2000).

3. Objections to Functionalism

He sets forth four views about the relation of conscious thought and computation:

a. All thinking is computation with computer science.

b. All thinking is computation, but without computer science.

c. There are mental states that, although originating from physical states, cannot be simulated computationally.

d. Mental states cannot be explained scientifically.

Penrose adheres to alternative "c". Position contrary to functionalism.

He presents a few examples to support his position of objection to functionalism, one of which refers to the reasoning of one of a powerful computer Deep Thought in the face of a game of chess. The position of the parts follows:

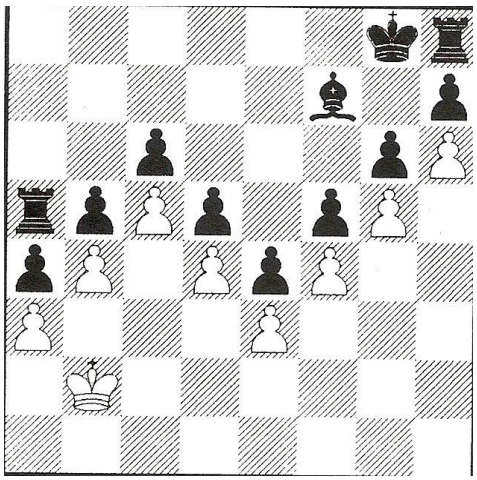

Figure 1 – William Hartston Problem

As we can see there is a barrier of white pawns, so white could only be exchanging their king of position forcing a draw, but the computer took the black tower, thus opening the pawns barrier, thus yielding victory to the black pieces.

For a human with a basic knowledge of chess, the pawns barrier is evident, but not for a computer, because in Penrose's view computers lack the capacity for understanding and intuition of the human being (Penrose, 1996).

The mental states responsible for the meaningful or semantic nature of the human mind cannot be reproduced by a machine. This is corroborated by Searle's famous hypothetical Chinese Room experiment.

The argument consists of an experience of thought in which we imagine a person who only speaks English enclosed in a room with a sophisticated manual that relates Chinese characters to other Chinese characters. This person practices the manipulation of these symbols, following the rules proposed in the manual. After some time, he is able to respond to messages sent by his Chinese guards with such effectiveness that they are not able to find out whether he is Chinese or not (Searle, 1980).

This argument states that there is a difference in the mental states of someone who only manipulates symbols and someone who speaks a language.

About the qualia question, a computer may even functionally act or react as a human being, but this does not imply that it will have the same subjective sensations or conscious experiences of human nature. In short, the fact that a machine is functionally equivalent to man does not make it feel as a man (João Fernandes de Almeida, 2000).

4. Quantum Physics

From the 1920s, physicists have discovered that things on a small scale, in this case atomic and subatomic, do not behave like things on a grand scale. In fact, the behavior of quantum physics is totally contrary to common sense.

Quantum physics is very complex and comprehensive; thus, it will be just presented its fundamental points and what is in my capacity as a non-specialist.

An interesting principle of this discipline is that a particle cannot have its position and its momentum (velocity) measured at the same time. This is the famous uncertainty principle. What we can have then it is a composition of these two measurements by formula. An example of this would be when a crystal is cooled to absolute zero, but the atoms still do not stop to move, in a movement of zigzag. If they stopped moving we would know their momentum and position, something that is impossible, according to the uncertainty principle.

Another interesting aspect is that things, which in classical physics were considered as waves, also have the behavior of particles, based on the frequency at which they are working, there being no more clear distinction between wave and particle. A classic example is the photon, responsible for the phenomenon of light.

This fundamental theory of the interaction of light and matter, or electric field and charges is known as quantum electrodynamics, from which come all known electrical, mechanical, and chemical laws.

There are still many interactions and behaviors in the nucleus of the atom that need to be better understood.

Quantum electrodynamics is the theory of all chemistry and biology that it is reduced to chemistry, and consequently to physics because chemistry is already reduced to physics, at least in the main aspects.

Quantum physics has brought to the light the world of new particles, although much of the behavior, relationship, and connections between them is still unknown. Nevertheless, it seems that the fundamental principles of quantum physics apply to both the new and the old particles.

In synthesis, we can say that outside the nucleus, it seems that physics knows everything and within it quantum mechanics is valid, although incomplete (Feynman, 1963).

This leads us to suppose that mental activities within the context of cognitive theories could be explained or understood through quantum mechanics.

5. Penrose view of Neuronal activities

Penrose at first prefers not to work with the concept of consciousness because he finds it very complex, so he prefers to initiate with the concept of intelligence (insight) that seems to be intermediate and easier to approach.

Intelligence requires understanding and receptivity.

When we discuss the tangibility aspects of thought, we are talking about matter, massive objects, particles, space, time, energy, etc. "How could our feelings, our perception of red or happiness have anything to do with physics?

Penrose and Stuart Hameroff have constructed a theory in which human consciousness is the result of the effects of quantum gravity on the microtubules of neurons.

Not diving in the specificity of the theory, in short, by the constitution, shape, and isolation of the outer environment, microtubules would be propitious sites in which a coherent quantum activity on a large scale could occur, being itself responsible for mental activities. There are features in quantum activity that would be compatible with mental activities, such as nonlocal effects that would be a connection between particles being physically separated, without any kind of communication between them. This nonlocal effect is an activity of a global nature and consciousness, in its view, needs to be an activity of a global nature (Penrose, 1996).

5. The Monistic Idealism of Amit Goswani

Following a similar of thought of Penrose, but in a more metaphysical approach, Goswani establishes what he calls monistic idealism, rescuing the meaning of idealism in Western philosophy, a movement totally contrary to material realism. Idealism establishes that consciousness is the only real thing, but this western idealism tends to a dualism, establishing a separation between consciousness and matter. In using the term monistic idealism, he wishes to oppose the idea of a real idealism where only consciousness counts, being the origin of all things.

He states that mental states, or, as he calls them, "subtle bodies" are of quantum nature. He posits that consciousness would be the mediator between this subtle body and the physical body, so there is no interaction or exchange of energy.

Goswani uses the same arguments of nonlocal effects of quantum physics to support his theory as well as principles of eastern philosophy.

6. Conclusion

We have still a long way for reaching a consensus in this clash between dualistic and monistic currents with all their variants, but we can glimpse, with scientific advances such as neuroscience and quantum physics, new ideas and theories that can clarify the concepts and give answers to some questions that disturb the minds of philosophers, scientists, theologians and the human being in general who intuitively seek to understand the act of thinking and the reason of being.

There is a long way to go until reaching a final cognitive theory. Descartes' dualism still haunts many mind scientists and neuroscientists. Fortunately, this applies to virtually every branch of knowledge and science. The cognitive science compared to the most consolidated ones such as physics, mathematics, are only in its infancy.

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