

Studi - Commenti

Consciousness: Emergent and Real

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Abstract In this paper, we propose three lines of argumentation against Nannini's eliminativist approach towards consciousness and the Self. First, we argue that the premises he uses to argue for eliminativism can equally well be used to draw a completely different conclusion in favor of naturalistic dualism according to which phenomenal consciousness irreducibly emerges from a physical substrate by virtue of certain psychophysical laws of nature. Nannini proposes that in contrast to dualistic theses which represent the manifest image of the world, eliminativism represents the world's scientific image just as classical physics and theories of relativity respectively represent the world's manifest image and scientific image. And if developments in a scientific field reveal a conflict between these two images we should always vote for the scientific image. In our second line of argument, we challenge this claim by comparing two rival interpretations of quantum mechanics, i.e. the Copenhagen and Bohmian interpretation of quantum mechanics. Finally, we argue that Nannini's identification of consciousness and the Self as illusions does not shed any light on the hard problem of consciousness since illusions themselves are instances of phenomenal experiences and need to be explained.

KEYWORDS: Naturalistic Dualism; Hard Problem of Consciousness; Emergentism; Eliminativism.

Riassunto *La coscienza: emergente e reale* - In questo articolo proponiamo tre linee argomentative contro l'approccio eliminativista di Nannini rispetto alla coscienza e al Sé. Anzitutto suggeriamo che le premesse su cui fa leva per argomentare a favore dell'eliminativismo possono essere utilizzate anche per supportare una conclusione completamente differente che propende a favore di un dualismo naturalistico per cui la coscienza fenomenale emerge irriducibilmente da un sostrato fisico in virtù di certe leggi di natura. Secondo Nannini, contrariamente rispetto alle tesi dualistiche che descrivono l'immagine manifesta del mondo, l'eliminativismo rappresenta l'immagine scientifica del mondo. Il parallelismo è con la fisica classica e con le teorie della relatività che a suo avviso descrivono rispettivamente l'immagine manifesta e quella scientifica del mondo. Laddove queste due immagini confliggano – questa la posizione di Nannini – dovremmo sempre propendere per quella scientifica. Nella nostra seconda linea argomentativa criticiamo questa posizione sulla base della comparazione fra due interpretazioni rivali della quantomeccanica, ossia l'interpretazione di Copenhagen e quella di Bohm. Infine sosteniamo che la tesi proposta da Nannini per cui la coscienza e il Sé sono mere illusioni non getta alcuna luce sull'hard problem of consciousness poiché le illusioni stesse sono istanze delle esperienze fenomenali che devono essere spiegate.

PAROLE CHIAVE: Dualismo naturalistico; Hard Problem of Consciousness; Emergentismo; Eliminativismo.

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SANDRO NANNINI CLAIMS THAT TO overcome the hard problem of consciousness, as a non-scientific, philosophical pseudo-problem, a paradigm shift in the science of mind is required, just like the one we witnessed in physics regarding the transition from classical mechanics to the theories of relativity at the beginning of the 20th century.¹ This transition reconciled classical mechanics with the theory of electromagnetism. Once we identify similarities between the paradigm shift in physics and what is suggested by eliminativist cognitive neuroscientists, we may understand why reducing “consciousness” and “the Self” to physical aspects of brain dynamics appears to be implausible from the common sense perspective although the reduction is scientifically sound.

He then proceeds by proposing a naturalized theory of consciousness combining Bernard Baars’s² concept of the *Global Workspace* or, alternatively, Gerald Edelman’s concept of the *Dynamic Core*³ with the thesis of synchronization of oscillating neural circuits, initially proposed by Crick and Koch.⁴ Nannini concludes that “consciousness” and “the Self” as they appear to us are merely illusions that are biologically beneficial for our existence.

We propose three lines of argumentation, opposing Nannini’s claims. The first line takes Nannini’s premises for granted drawing, however, a completely different conclusion in favor of so-called “naturalistic dualism”⁵ according to which phenomenal consciousness is ontologically independent of physical properties but *arises* from a physical substrate by virtue of certain contingent laws of nature. Phenomenal consciousness, then, is a fundamentally new property ontologically and epistemologically irreducible to physical properties.

By taking another fundamental paradigm shift in physics into account, namely the transition from classical mechanics to quantum mechanics, our second line of argumentation targets Nannini’s claim that if the development of a science unveils a conflict between the “scientific image” and the “mani-

fest image” of the world, we should *always* vote for the “scientific image”. Comparing two rival interpretations of quantum mechanics, that is, the Bohmian interpretation and the Copenhagen interpretation of quantum mechanics, we argue that Nannini too hastily forces us to decide between the two “images”. We think it wise to opt for that “scientific image” which does most justice to the world’s “manifest image”, particularly if no other ‘scientific image’ is superior to it by purely scientific standards.

Finally, our third line of argumentation critically addresses Nannini’s claim that “consciousness” and “the Self” are *illusions* which are evolutionary beneficial for us. We argue that identifying “consciousness” and “the Self” as illusions does not shed any light on the hard problem of consciousness since “illusion” itself, as an instance of phenomenal experiences, needs to be ontologically and epistemologically explained. And if Nannini raises the same eliminativist argument in identifying “illusions” as reducible properties of brain activity, he will encounter our first two lines of argumentation against his claims.

Let us start with the story of electromagnetism in 19th century. There were electromagnetic phenomena which could not be explained in terms of current physical laws including mechanical principles and the like. In other words, there were electromagnetic phenomena which were not explanatorily reducible to Newtonian mechanics. To explain such phenomena, *new* features and laws other than what had already been introduced by Newtonian mechanics had to be taken as *fundamental*: “electromagnetic charge” and “electromagnetic forces”, for example, as fundamental features and Maxwell’s electromagnetic laws as fundamental laws.

The development of special relativity was also the result of the inconsistency of Newtonian mechanics with Maxwell’s equations of electromagnetism as well as the failure to confirm that the Earth travelled through a luminiferous aether. The paradigm shift

brought about by Einstein through his special relativity was first and foremost on the basis of the fundamental laws known as “postulates of special relativity” according to which the laws of physics are invariant in all inertial systems and the speed of light in a vacuum is the same for all observers. Although special relativity can be derived only from these two postulates, there are also some tacit fundamental assumptions, for example, the isotropy and homogeneity of space and the independence of measuring rods and clocks on their past history.

Now we can make a parallel between the above paradigm shift in physics and a new science of the mind, this time, however, not by embracing eliminativism, but by taking phenomenal consciousness as a fundamental property introducing a natural psychophysical law that brings out a crucial link between physical and phenomenal properties.

Through his thesis of naturalistic dualism, Chalmers introduces his “double-aspect theory of information” as just such a psychophysical law according to which information is realized phenomenally whenever there has already been corresponding physically realized information.⁶ More recently, proposing his *Integrated Information Theory* (IIT) Tononi⁷ adopts a similar approach to consciousness. He takes consciousness to be a fundamental property and links it to physical properties through axioms. Phenomenal consciousness, in this alternative account, can irreducibly emerge from brain dynamics implemented by synchronization of oscillating neural circuits, as its neural correlates, through a natural psychophysical law.⁸

As seen, it is possible to identify similarities between the paradigm shift in physics and what is suggested by the thesis of naturalistic dualism. Naturalistic dualism, as a sort of property dualism, is as scientific as eliminativism and no experimentation can confirm one thesis over the other. However, naturalistic dualism, we think, would be less counterintuitive and more plausible to common sense since it can address the first-

person transparent experiences to which we have immediate access.

And here comes another objection to Nannini’s proposal where he quotes Sellars⁹ claiming that we should vote for the “scientific image” against the “manifest image” of the world if the development of a science reveals a conflict between the two images. To show that this idea is biased we may take into account another fundamental paradigm shift in physics, i.e. the transition from classical to quantum mechanics.

Consider the double-slit experiment as a paradigmatic quantum experiment in which the bizarre quantum features are revealed. Nearly all interpretations of quantum mechanics are inspired by the latter experiment. Take two of the mainstream interpretations proposed, that is, the Copenhagen interpretation¹⁰ which is based on orthodox quantum theory and Bohmian interpretation corresponding to the so-called de Broglie-Bohm theory.

The Copenhagen interpretation counterintuitively *in principle* prohibits any attribution of any property to quantum systems and their behavior before, during and after the act of measurement. It is impossible, in this interpretation, to make a sharp separation between the behavior of atomic objects and their interaction with measuring devices.¹¹ According to this interpretation, *only the representations* of the *interactions* between quantum systems and measuring instruments are describable and publicly communicable in terms of classical concepts (linguistic terms). The Copenhagen interpretation, then, gives a central, but highly ambiguous and counterintuitive, role to the act of measurement.

In the non-relativistic domain of quantum mechanics, the de Broglie-Bohm theory reproduces all predictions of orthodox quantum theory. Contrary to the Copenhagen interpretation, Bohmian interpretation provides a full ontological description of the mechanisms involved before and after the appearance of the interference pattern (bright and dark bands) in the double-slit experiment giving no special role to the act of

measurement.¹² Although the Bohmian interpretation also has some non-classical, counter-intuitive elements,¹³ the interpretation is much closer to common sense than the Copenhagen interpretation. In this interpretation quantum particles move along the so-called Bohmian trajectories under the action of a novel “quantum force” which, in the double-slit experiment, affects every quantum particle making each particle follow a particular path and go through one of the slits leaving an individual spot on the photographic plate placed behind the slits. The spots collectively form an interference pattern.¹⁴

Note that none of the two rival interpretations can be confirmed experimentally with complete precision. Granted that the Bohmian interpretation is closer to the “manifest image” of the world and given that the de Broglie-Bohm theory reproduces all predictions of orthodox quantum theory, the question is: how do we choose between these two theories and the associated interpretations?

We, in that case, would opt for the theory that does more justice to the “manifest image”, although the majority of physicists regard orthodox quantum theory and the associated interpretation as *more* scientific than the rival interpretations. Giving more scientific significance to the Copenhagen interpretation, however, is not based on real scientific grounds, but on social, historical and psychological ones.

Furthermore, what may be a less acknowledged “scientific image” *now* may turn into a strongly acknowledged “scientific image” in the future. For instance, recently, the Bohmian interpretation has acquired more scientific credit in terms of attracting scientists’ attention. In 2011, Kocsis and colleagues reported the experimental observation of the “average trajectories of single photons” in a double-slit experiment.¹⁵ This research was selected as the top breakthrough in physics in 2011 by *Physics World*. Also, in a highly publicised paper, Menzel and colleagues¹⁶ claimed to have identified the path of each particle without any adverse effects at all on the interference

patterns generated by the particles.

One may now draw a parallel between the two rival interpretations in the philosophy of quantum mechanics and naturalistic dualism and eliminativism in the philosophy of mind. As we saw, Nannini’s line of argumentation in favor of eliminativism can also be used in favor of naturalistic dualism and there are no scientific grounds to give significance and priority to one over the other. This would highlight the *Hard Problem of Consciousness* in a different manner. And again, we would opt for the scientific theory that does more justice to the “manifest image”.

The third line of argumentation against Nannini’s proposal targets his identification of “consciousness” and “the Self” as “illusions” biologically beneficial for our existence. First of all, by such identification, he can’t mean that we are wrong about having phenomenal experiences; at best, we might be wrong about some further facts we infer from having phenomenal consciousness – e.g., that we are Cartesian subjects with some life-long personal identity. However, we may not be wrong about inferring that our phenomenal experiences irreducibly emerge from a physical substrate by virtue of certain contingent laws of nature. The reason for the plausibility of such a naturalistic dualistic thesis is – as we saw – that it can be equally plausibly inferred from the same premises that Nannini’s eliminativist argument is inferred from and no experimental evidence can confirm one thesis over the other.

Secondly, if we take for granted that, as Nannini maintains, “consciousness” and “the Self” are identified as illusions, the question, then, is: does such identification shed more light on the hard problem of consciousness from Nannini’s eliminativist point of view? Our answer to this question is negative. An illusion is a phenomenal experience which itself cries out for explanation; it is not anything ontologically independent of our qualitative experiences. Therefore, as an instance of phenomenal consciousness, the notion of illusion in Nannini’s argument must be onto-

logically and epistemologically explained, it does not explain anything regarding phenomenal consciousness.

All Nannini can do in response to this objection is, once more, to raise an eliminativist argument identifying “illusions” as being ontologically and epistemologically reducible to brain dynamics, just as he did when reducing “consciousness” to brain processes. In this case, our first two lines of argumentation would come into play again. Hence, contrary to what Nannini intends to show, the *Hard Problem of Consciousness* has not been dissolved, it remains indispensable.¹⁷

Notes

¹ See S. NANNINI, *Time and Consciousness in Cognitive Naturalism*, in: «Rivista Internazionale di Filosofia e Psicologia», vol. VI, n. 3, 2015, pp. 458-473.

² See B.J. BAARS, *A Cognitive Theory of Consciousness*, Cambridge University Press, New York 1988; B.J. BAARS, *In the Theater of Consciousness: The Workspace of the Mind*, Oxford University Press, New York 1997; B.J. BAARS, *The Global Brainweb: An Update on Global Workspace Theory*, in: «Science and Consciousness Review», vol. II, 2003 – Guest Editor's Presentation.

³ See G.M. EDELMAN, *Wider than the Sky: The Phenomenal Gift of Consciousness*, Yale University Press, New Haven 2004.

⁴ See F. CRICK, C. KOCH, *Towards a Neurobiological Theory of Consciousness*, in: «Seminars in the Neurosciences», vol. II, 1990, pp. 263-275.

⁵ See D.J. CHALMERS, *The Conscious Mind: In Search of a Fundamental Theory*, Oxford University Press, Oxford 1996.

⁶ See R. MALEEH, *The Conscious Mind Revisited. An Informational Approach to the Hard Problem of Consciousness*, 2008, chap. 6, Ph.D. Dissertation, online available at URL: <https://repositorium.uni-osnabrueck.de/bitstream/urn:nbn:de:gbv:700-2009071511/2/E-Diss905_thesis.pdf>; R. MALEEH, *Pragmatic Information as a Unifying Biological Concept*, in: «Information», vol. V, n. 3, 2014, pp. 451-478 - doi: 10.3390/info5030451.

⁷ See G. TONONI, *An Information Integration Theory of Consciousness*, in: «BMC Neuroscience», vol. V, 2004, art. n. 42 - doi:10.1186/1471-2202-5-42; G. TONONI, *Consciousness as Inte-*

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⁸ See A. STEPHAN, *Phenomenal Emergence*, in: «Networks. Rivista di filosofia dell'intelligenza artificiale e scienze cognitive», n. 3-4, 2004, pp. 91-102, online available at URL: <<http://www.swif.uniba.it/lei/ai/networks>>.

⁹ See W. SELLARS, *Philosophy and the Scientific Image of Man* (1962), in: W. SELLARS, *In the Space of Reasons. Selected Essays of W. Sellars*, edited by K. SHARP, R.B. BRANDON, Harvard University Press, Cambridge (MA) 2007, pp. 369-408.

¹⁰ The Copenhagen interpretation is not a unified view. In this paper we take the later Bohrian version of the interpretation (see R. MALEEH, *Bohr's Philosophy in the Light of Peircean Pragmatism*, in: «Journal for General Philosophy of Science», vol. XLVI, n. 1, 2014, pp. 3-21 - doi: 10.1007/s10838-014-9274-4; R. MALEEH, P. AMANI, *Pragmatism, Bohr, and the Copenhagen Interpretation of Quantum Mechanics*, in: «International Studies in the Philosophy of Science», vol. XXVII, n. 4, 2013, pp. 349-363 - doi:10.1080/02698595.2013.868182).

¹¹ N. BOHR, *Discussion with Einstein on Epistemological Problems in Atomic Physics* (1949), in: N. BOHR, *The Philosophical Writings of Niels Bohr*, vol. II - *Atom Physics and Human Knowledge*, Oxford Press, Woodbridge (CT) 1987, pp. 32-66, here pp. 39-40.

¹² See R. MALEEH, P. AMANI, *Bohm's Theory of the Relationship of Mind and Matter Revisited*, in: «Neuroquantology», vol. X, n. 2, 2012, pp. 150-163 - doi: 10.14704/nq.2012.10.2.536.

¹³ In this interpretation, quantum particles are guided by the ψ -field, moving on continuous trajectories and having a well-defined position at every instant. However, field-particle interaction violates Newton's third law of motion: particles remain passive and do not exert reciprocal reactions to the action of the quantum field on them. Quantum potential also affects particles non-locally which is prohibited in the macroscopic world. Also, contrary to the notion of a classical field, the effect of quantum potential on particles depends only on its form not on the intensity of the quantum field.

¹⁴ See D. BOHM, B.J. HILEY, P.N. KALOYEROU, *An Ontological Basis for the Quantum Theory*, in: «Physics Report», vol. CXLIV, n. 6, 1987, pp. 321-375.

¹⁵ See S. KOCSIS, B. BRAVERMAN, S. RAVETS, M.J. STEVENS, R.P. MIRIN, L. KRISTER SHALM, A.M. STEINBERG, *Observing the Average Trajectories of Single Photons in a Two-slit Interferometer*, in: «Science», vol. CCCXXXII, n. 6034, 2001, pp. 1170-1173 - doi: 10.1126/science.1202218.

¹⁶ See R. MENZEL, D. PUHLMANN, A. HEUER, W.P. SCHLEICH, *Wave-particle Dualism and Complementarity Unraveled by a Different Mode*, in: «Pro-

ceedings of the National Academy of Sciences», vol. CIX, n. 24, 2012, pp. 9314-9319 - doi: 10.1073/pnas.1201271109.

¹⁷ See A. STEPHAN, R.C. RICHARDSON, *What Physicalism Should Provide Us With*, in: C. PENCO, M. BEANEY, M. VIGNOLO (eds.), *Explaining the Mental: Naturalist and Non-Naturalist Approaches to Mental Acts and Processes*, Cambridge Scholars Publishing, Newcastle 2007, pp. 207-221.