Acta Neurochirurgica (2023) 165:833–839
https://doi.org/10.1007/s00701-022-05179-w

MINI-REVIEW (BY INVITATION) - NEUROSURGERY GENERAL

Consciousness, philosophy, and neuroscience

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Received: 28 February 2022 / Accepted: 3 March 2022 / Published online: 23 March 2022

Abstract
The aim of this mini-review paper is to present an overview of work on consciousness from a philosophical perspective, and to argue for the continuing relevance of philosophy in consciousness research. After introducing some major philosophical positions about the relationship between consciousness and matter, we argue that the problem of consciousness that many authors have focused on—the mind–body or mind-brain problem—is only one among several problems of consciousness. We illustrate the idea that the perplexities about consciousness go beyond its relationship with matter by discussing the relationship between consciousness, self-consciousness, and selfhood. This discussion also indicates ways in which philosophy and neuroscience can learn from each other.

Keywords Consciousness · Neuroscience · Philosophy · Self-consciousness · Selfhood

Introduction

In his book *The Astonishing Hypothesis*, Francis Crick attempts to tackle the problem of consciousness head-on and observes that "[t]here is no justification for the view that only philosophers can deal with it" [3, p. 258]. The idea that consciousness can and perhaps even should be subject matter of a plurality of disciplines is hardly controversial. It still leaves it an open question, however, what the role of philosophy might then be. According to one view, one explicitly defended by Crick himself, at most a very minor one.

Consider the following line of reasoning, aimed at supporting this conclusion. If consciousness is real, and not some sort of super-natural or other-worldly construal, it must fall within the purview of the natural sciences. They offer the ultimate measure of what counts as real and are in the business of explaining it. However, although philosophy has had a long-standing interest in consciousness, it has shown very little progress explaining it. Instead of philosophical speculation from the armchair, one would do better to turn to the empirically testable hypotheses of the natural sciences—and of the neurosciences in particular. Given the undeniable and impressive track record displayed by the natural sciences in many domains, it is a safe bet to assume that they are in a much better position than philosophy to explain consciousness. For sure, philosophy might still play a role assisting the natural sciences in this explanatory enterprise, say, by offering certain conceptual distinctions, but its role will remain minor.

This line of argument is problematic for several reasons. One issue is that the explanatory ambitions of a science of consciousness presuppose a proper characterization of what is supposed to be explained. Without a characterization of the explanandum, the whole enterprise would risk being doomed from the outset. Now, although philosophy is not the only discipline that has been concerned with characterizing consciousness, it has had a long-term preoccupation with different varieties and aspects of it. Philosophers have introduced distinctions between different notions of consciousness, such as phenomenal consciousness and access consciousness [2][1]; they have provided wide-ranging investigations of the relationship between consciousness and intentionality [see 25], as well as of the relationship between consciousness and normativity [4]. In light of these (and other)

This article is part of the Topical Collection on Neurosurgery general

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[1] Our focus throughout this contribution is on phenomenal consciousness. This notion of consciousness aims at capturing the qualitative character of experiential states, such as, say, perceptual experiences of everyday objects, feelings of pain, and experiences of joy.

contributions, it seems odd to simply dismiss the available philosophical resources for characterizing and describing the topic of a science of consciousness.

But perhaps it is all simply a question of time. Eventually, one might think, a comprehensive neuro-scientific understanding of how the brain works will unravel the mystery of consciousness. The more scientific progress is being made, the less use there will be for philosophy. Ultimately, one might think that "the need for a philosophy of consciousness will recede—until it will disappear and be entirely replaced by the science of consciousness" [17, p. 1]. Perhaps unsurprisingly, such an idea can be found especially in some neuroscientific quarters. It has been suggested by Semir Zeki, who writes that "[t]he study of the brain's capacity to acquire knowledge, to abstract and to construct ideals […] is a philosophical burden which neurobiology has to shoulder" [29, p. 2054]. On this view, it is neurobiology that will finally address with success the age-old philosophical problems.

However, one general problem with this way of thinking is that it fails to realize to what extent philosophical assumptions continue to pervade even the supposedly most rigorous scientific investigation of consciousness. At the end, even someone who agrees with Crick that philosophers "have had such a poor record over the last two thousand years that they would do better to show a certain modesty rather than the lofty superiority that they usually display" [3, p. 258], will have to accept that there is no reason at all to believe that philosophy will at some point become dispensable in consciousness research.

The aim of this mini-review paper is to argue for this point, by presenting a broad and accessible overview of the topic of consciousness from a philosophical perspective. After introducing some major positions about the relationship between consciousness and matter, we argue that the problem of consciousness that many authors (philosophers, neuroscientists, and others) have focused on—the mind–body or mind-brain problem—is only one among several problems of consciousness. Important as that problem might be, a too narrow focus on it can lead to neglecting other problems of consciousness that are important in their own right. In a second step, we focus on one of those overlooked problems, pertaining to the relationship between consciousness, self-consciousness, and selfhood. Our overarching aim will be to show that, ultimately, the study of consciousness cannot avoid philosophy.

Problems of consciousness

Crudely put, the problem of consciousness is sometimes framed as the problem of understanding how the brain produces consciousness. As Christof Koch puts it: "What is it about the biophysics of a chunk of highly excitable brain matter that turns gray goo into the glorious surround sound and Technicolor that is the fabric of everyday experience?" [16, p. 11]. Neuroscientific research about this question has been traditionally framed as the quest for finding the "neural correlates of consciousness," i.e., those specific patterns of brain activity that would be selectively correlated with conscious activity [21]. In the last decades, technological advances have allowed for the development of increasingly refined measuring techniques of neural activity [see 22].

But finding the neural correlates on consciousness—if at all possible [see 19 for discussion]—will be, at best, only part of the resolution of the puzzle of consciousness. For even supposing that such correlates can be found, the ensuing question will be how exactly consciousness is supposed to be related to its neural correlates. It is at this juncture that some neuroscientific research seems to enter into slightly uncomfortable territory. The reason is that such a question is a distinctively philosophical question. It is not a question that can be answered only by appeal to empirical evidence, or by a better neurophysiological understanding of the inner workings of the brain.

To provide a rough mapping of the terrain, consider the following five metaphysical positions about the relationship between consciousness and the brain.

The first one is metaphysical dualism. In some formulations, this is the view—nowadays quite unpopular—that mind and body are fundamentally different and independent substances. More contemporary accounts of dualism are not fleshed out in terms of substances, but rather of properties. The central dualist claim is that conscious properties are over and above physical properties. Whereas this view seems to capture our common-sense intuition that there is an important difference between consciousness and matter, one worry that arises concerns the interaction between the two. If conscious and physical properties are fundamentally different, how exactly can they interact with one another? More specifically, if conscious experiences are over and above the physical, how could they have physical effects? This becomes a pressing problem if one accepts the idea that, in principle, all physical events could be explained only in terms of physical processes. If so, it seems, explanations of physical events that appeal to non-physical properties would be misplaced. This line of objection to dualism is known as the problem of mental causation, and it is standardly regarded as the most serious objection to it [see 11].

A second view, which represents a straightforward alternative to dualism, is physicalism. This is the view that all reality is, at a fundamental level, physical. One version of this view—sometime called reductive materialism—holds that consciousness is nothing but neurophysiological processes. The idea is that we can understand everything we need to know about consciousness by studying these processes and, at bottom, their physical properties. Physicalism

comes in different versions. Some proponents of physicalism hold that a complete account of a subject in terms of its physical properties entails, as a matter of conceptual necessity, how that subject is mentally (including, of course, the subject's conscious mental states) [11]. Others find this position too demanding, and in any case unnecessary to establish the truth of physicalism. But leaving these controversies aside, there is pressure for physicalism to say more about how the view can factor in the subjective or first-personal aspect of conscious experience, which is what makes consciousness puzzling in the first place. Supposing that consciousness is made out of non-conscious, physical properties, how should one understand the passage from a description of physical properties to a description of a subjective experience of, say, pain? Consciousness is experienced from within, whereas neurophysiological processes are not. But is it reasonable to expect that such an "explanatory gap" [20] can be closed? To claim that we can understand the experiential side of consciousness by studying the neurophysiology, is a bit like claiming that we can understand the meaning of a sentence by studying the chemical properties of the ink it is written with.

Much of the enthusiasm for physicalism derives from its reductive credentials. Physicalism promises to account for something prima facie elusive, i.e., conscious properties, in terms of something else, namely physical properties. Projects of naturalization of consciousness are typically propelled by trust in reductionism. But not all varieties of physicalism are reductive [see 1]. According to a third view, non-reductive materialism or emergentism, we should start by recognizing that material reality has several layers of complexity. The higher layers are based on the lower layers from which they emerge, but they cannot be reduced to nor be explained by these. One possible advantage of this position is that it seeks to accommodate the idea that consciousness is different from the physical, while at the same time recognizing that it is grounded in it [26]. But one challenge for this view is to specify in a convincing way what the notion of emergence amounts to. Saying that conscious properties emerge from physical properties doesn't really assuage the perplexities about the relationship between consciousness and matter. At worst, if emergence is conceptualized as a brute fact, the emergentist view risks becoming explanatorily vacuous.

Debates about the relationship between consciousness and the brain haven't been restricted to the positions surveyed so far. An interesting development of more recent discussions is the rise of two seemingly bizarre views. Such rise might be taken to indicate a disenchantment with the traditional and more standard positions. At the same time, it shows how the recalcitrant question of how to understand consciousness leads to the exploration of quite unexpected horizons.

The first position is a variety of physicalism that goes beyond the two varieties referenced above. In contrast to these two, the position at stake—sometimes dubbed eliminative materialism or illusionism—claims that consciousness is an illusion [see 7]. You may think that you are conscious, but you are mistaken. The obvious consequence of this view is that it gets rids of all the perplexities about consciousness by denying its existence. But the view that experience is an illusion, that, say, although one might feel pain or grief, ultimately one is mistaken about this, is a highly counterintuitive position. Breaking off with common sense is not a price that some illusionists are unwilling to pay, though. But one worry about this position is how exactly to make sense of the illusion of there being conscious properties—such as feelings of pain, and the like—without that illusion of phenomenality involving the conscious properties whose existence illusionism denies. At the end, it seems that the illusionist position would have to explain how that illusion arises in the first place [12, p. 361].

At the other end of illusionism is the view that, far from being eliminable, consciousness is a fundamental and irreducible part of material reality. This view, called panpsychism, arises partly out of the unsatisfaction with presuppositions operative in the standard positions. It seeks to combine a materialist position with a firm commitment to the irreducibility of consciousness and is ultimately committed to the view that consciousness can be found everywhere, including in the molecules making up objects such as tables and stones. Panpsychists do not hold, of course, that consciousness is present in inanimate objects in the same way it typically figures in the mental life of human beings. Rather the claim is that consciousness is not homogeneous, and that it comes in degrees, in such a way that, for example, atoms are proto-conscious. The panpsychist view provides an intriguing approach to the puzzle of the relationship between consciousness and matter, but, again, it seems highly counterintuitive.

Discussions about these and other positions on the mind–body or mind-brain relation continue, and it is far from our purposes to provide a comprehensive review of these intricate and sophisticated debates [see 18]. But let us make two central points that matter for what follows. The first one is that the discussions presented above pertain primarily to the philosophy of consciousness. They are not discussions that can be settled once and for all by finding new neuroscientific evidence or by developing better measuring techniques. The second point is that, independently of how one adjudicates these discussions, they all focus quite narrowly on the metaphysical question of the mind–body or mind-brain problem. However, what is thereby overlooked is that this particular problem is only one among several problems of consciousness. Consider the following questions:

(1) What is the relationship between consciousness and language?
(2) What is the relationship between understanding one's own consciousness and understanding the consciousnesses of others?
(3) What temporal structure does the stream of consciousness possess?
(4) What is the link between consciousness, self-consciousness, and selfhood?

On the face of it, all these questions are about consciousness. Moreover, they are important questions. Answering them would not only extend our understanding of what consciousness is, but might also have practical implications in different domains.

For example, the question about the relationship between consciousness and language invites considering the possibilities that some forms of consciousness might be dependent upon culture (rather than simply on nature), and that some pre-linguistic or non-linguistic beings might have experiences. The latter possibility might have ethical consequences for how we relate to such beings and for their moral status as bearers of some rights. Take now the second question. This question has implications for how one thinks about interpersonal understanding and, more broadly, the structure of the social world. Is understanding the consciousnesses of others a matter of projecting features of one's own consciousness onto them? Or is it possible to understand other consciousnesses as radically different from one's own? Concerning the third question, a better understanding of the temporality of consciousness may shed light on some psychopathological conditions, such as schizophrenia and depression, and may also contribute to designing better diagnostic tools and strategies of intervention [8, 9]. Finally, the questions about the relationship between consciousness and self-consciousness may again have implications for attributions of consciousness to cognitively unsophisticated agents or non-human agents, depending on whether or not one is willing to attribute self-consciousness to those agents.

For our current purposes, the important point is that it is very far from clear that progress on answering these four questions (and others could be added to the list) depends necessarily on a prior resolution of the question about the relationship between consciousness and the brain. Why would this be so? Why, for example, would an account of the relationship between self-consciousness and the consciousness of other subjects depend on one's metaphysical view about the mind-brain relation? Again, this is not to say that neuroscientific evidence is irrelevant for addressing such a question. A good example in this regard is research on mirror neurons [10]. This research illustrates well how neuroscientific findings can influence philosophical research about the relationship between self-understanding and the understanding of others. But one can very well accept that this and other questions about consciousness can be enriched by neuroscientific findings, without thereby accepting the view that the mind–body problem is by default *the* problem of consciousness. In light of the discussion above, this assumption should not be taken for granted.

Consciousness, self-consciousness, and selfhood

By way of further illustration that the perplexities about consciousness are not restricted to its relationship with matter, consider the question about the relationship between consciousness, self-consciousness, and selfhood. Consciousness is normally taken to be characterized by its object-directedness. One is never simply perceiving or thinking. One is always perceiving or thinking something. I can hear a thunderstorm, see some Lego blocks, or think about far away galaxies. But the fact that consciousness can be directed at objects that are different from itself, should not make us overlook that it also has another important feature, namely self-consciousness. I cannot only hear the *thunderstorm*, I can also be aware that *I* am *hearing* it. The fact that consciousness is (or can become) aware of itself, does however give rise to a number of perplexing problems. Is self-consciousness a special case of object-consciousness? Is it simply a question of consciousness taking itself, rather than anything else, as its object? Or is self-consciousness by nature different from object-consciousness? And what is the role of the subject or self? Is self-consciousness a question of consciousness being aware of itself, or a question of consciousness being aware of a self? Or to put the question in a slightly different manner, are experiences always owned, do they always belong to somebody, or do experiences normally occur anonymously and ownerless? And is the reference to a subject of experience, to an I, a post hoc fabrication? Getting clear on questions like these is central to a proper understanding of consciousness, and it is by no means evident that a solution to the mind–body problem would automatically provide the answers.

Within philosophy, the questions just outlined have been discussed for a very long time. One outcome of this lengthy treatment has been the realization that neither self-consciousness nor selfhood are univocal terms. There are in fact many different types of self-consciousness, just as it might be necessary to distinguish different dimensions or levels of selfhood. Consider for a start, the difference between introspectively scrutinizing one's ongoing experience, thinking about one's past performance, critically assessing one's persisting character traits or taking pride in one's ability to fulfill a chosen social role with integrity and dedication. All these accomplishments might qualify as

forms of self-consciousness, but it is by no means obvious that they are all of the same kind.

Consider the difference between a normative account of selfhood and an embodied cum experiential notion of selfhood. For some, who I am is a question of what matters to me and what I care about. This is why knowing that I am, say, pro-life and pro-gun rather than pro-choice tells you something about who I am. If I change my interests, political views, etc. I change as well. It is precisely by living a life in accordance with certain normative guidelines that I develop my own point of view on matters and thereby an individuality of my own. For others, the very fact that I experience the world from an embodied point of view already provides a self-anchoring. The objects I perceive are perceived as being to the left or right of *me*, as being within reach or further away from *me*. When experiencing thirst, pain, pleasure, drowsiness or happiness, such experiences are not experiences as free-floating anonymous events, but as self-concerning experiences. When having a headache, I am not faced with a two-step process in which I first detect the presence of an unpleasant experience, and then wonder whose experience it might be. Rather, experiences are necessarily like something *for* a subject, they necessarily involve a point of view, they come with *perspectival ownership*. On such an account, it might consequently be argued that a minimal form of selfhood is a built-in feature of experiential life [27].

Distinctions like these are not of purely philosophical interest. They can actually make a difference to neuroscience as well, and might even exemplify ways in which philosophy and neuroscience can learn from each other.

In various articles, Keenan and colleagues have claimed that the search for the localization of the self in the brain has been the goal of consciousness research for centuries [6, p. 661], and that this problem remains one of the great mysteries of science, philosophy, and psychology [15, p. 99]. In an attempt to solve this putative mystery, Keenan was led to a study of facial self-recognition, and to the discovery of right frontal lateralized activation for self-face recognition — there is more than twice the activity for self-faces compared to familiar faces [6, p. 673]. It was then claimed that this empirical evidence provides support for the right hemisphere model of self-awareness [23, p. 119].

At one point, Keenan then modifies his initial claim by conceding not only that modules of the brain do not exist in isolation, and that one has to view the brain in its entirety [6, p. 673], but also that it might be more appropriate and correct to opt for the more modest claim that the right hemisphere is dominant for certain aspects of self, than to make the stronger claim that the self actually resides in the right hemisphere [6, p. 675]. We would agree with this latter amendment. It is indeed far better to label the search for the neural correlates of self, a search for those neural structures and mechanisms that enable self-recognition and self-experience, than to describe it as an attempt to locate the self in the brain. The latter claim is simply a category mistake. Nevertheless, when reading the various publications, one is immediately struck by the almost complete absence of an actual working definition of both self and self-awareness. Is it really convincing to claim that self-face recognition is the paradigm of self-awareness (or self-consciousness — the two terms are often used interchangeably) and that creatures that lack the capacity to recognize their own faces lack self-awareness [see 24, 28]?

A much more sophisticated discussion of consciousness, self-consciousness, and selfhood can be found in the work of Antonio Damasio. In his book, The *Feeling of What Happens*, Damasio has argued that a sense of self is an indispensable part of the conscious mind. As he writes: "If 'self-consciousness' is taken to mean 'consciousness with a sense of self,' then all human consciousness is necessarily covered by the term—there is just no other kind of consciousness as far as I can see" [5, p. 19]. Damasio also insists, however, that it is necessary to distinguish two types of consciousness and two senses of self. He first distinguishes a simple, foundational kind, which he calls *core consciousness*, from a more complex kind, which he calls *extended consciousness*. Core consciousness has a single level of organization and remains stable across the lifetime of the organism. It is not exclusively human and does not depend on conventional memory, working memory, reasoning, or language. In contrast, extended consciousness has several levels of organization. It evolves across the lifetime of the organism and depends on both conventional and working memory. It can be found in a basic form in some nonhumans, but attains its highest peak only in language-using humans.

According to Damasio, these two kinds of consciousness correspond to two kinds of self. He calls the sense of self that emerges in core consciousness *core self* and refers to the more elaborate sense of self provided by extended consciousness as *autobiographical self* [5, pp. 16–17, 127]. As Damasio then points out, neuroscience, in particularly neuropathology, can provide empirical evidence in support of his distinction:

> The results of neurological disease validate the distinction between core consciousness and extended consciousness. The foundational kind of consciousness, core consciousness, is disrupted in akinetic mutisms, absence seizures, and epileptic automatisms, persistent vegetative state, coma, deep sleep (dreamless), and deep anesthesia. In keeping with the foundational nature of core consciousness, when core consciousness fails, extended consciousness fails as well. On the other hand, when extended conscious-

> ness is disrupted, as exemplified by patients with profound disturbances of autobiographical memory, core consciousness remains intact [5, pp. 121–122].

One of the examples discussed in more detail by Damasio concerns a patient whose temporal lobes had sustained major damage from a case of encephalitis. The patient's memory was limited to a window of less than one minute; he was unable to learn any new facts and unable to recall many old facts. In fact, the recall of virtually any unique thing, individual, or event from his entire life was denied to him. Whereas his autobiographical memory had been reduced to a skeleton, and the autobiographical self that could be constructed at any moment was severely impoverished, the patient did, however, retain a core consciousness for the events and objects in the here and now and, therefore, according to Damasio, also a core self [5, pp. 115–119].

From a philosophical point of view, Damasio's work is not only of interest in so far as it provides evidence for the multi-dimensional nature of self, but also, and primarily, because it offers information about the relation and interdependence between the different dimensions of self.

Concluding remarks

In light of the astonishing progress made by the neurosciences in our days, it might come as a surprise that, by way of conclusion, we go back to some observations made by Karl Jaspers about one hundred years ago. Jaspers makes these comments in the context of a discussion about the relationship between philosophy and the psychiatry of his time, which was heavily influenced by neuroscientific research:

> Many a psychiatrist has said that he did not want to burden himself with a philosophy and that this science had nothing to do with philosophy. Nothing can be said against that, inasmuch as the correctness of scientific insights in general […] is not proved by philosophy. But the exclusion of philosophy would nevertheless be disastrous for psychiatry: […] if we are not clearly conscious of our philosophy we shall mix it up with our scientific thinking quite unawares and bring about a scientific and philosophic confusion. [14], p. 769]

Jaspers is clear that it is not up to philosophy to determine the scientific standards of psychiatry. One can easily extend this observation also to philosophy vis-à-vis the neurosciences. But the problem that Jaspers notes is that philosophy cannot really be taken out of the picture. As he later points out, "[i]f anyone thinks he can exclude philosophy and leave it aside as useless he will eventually be defeated by it in some obscure form or other. From this springs the mass of bad philosophy in psychopathological studies" [14, p. 770]. Extrapolating this observation to consciousness research, the conclusion to gather is that, ultimately, the latter cannot avoid philosophy. The only choice available is between good or bad philosophy.

Declarations

Ethics approval Work on this article did not involve any use of data or biological material, and no ethical approval has been required.

Conflict of interest The authors declare no competing interests.

References

1. Baker LR (2009) Non-reductive materialism. In: A Beckermann, B McLaughlin, S Walter (Eds.) Oxford University Press. https://doi.org/10.1093/oxfordhb/9780199262618.003.0007
2. Block N (1995) On a confusion about a function of consciousness. Behav Brain Sci 18(2):227–247. https://doi.org/10.1017/S0140525X00038474
3. Crick F (1994) The astonishing hypothesis. Touchstone, London
4. Crowell SG (2013) Normativity and phenomenology in Husserl and Heidegger. Cambridge University Press, Cambridge, New York
5. Damasio A (1999) The feeling of what happens. Harcourt, San Diego
6. Feinberg TE, Keenan JP (2005) Where in the brain is the self? Conscious Cogn 14(4):4. https://doi.org/10.1016/j.concog.2005.01.002
7. Frankish K (2016) Illusionism as a theory of consciousness. J Conscious Stud 23(11/12):11–39
8. Fuchs T (2013) Temporality and psychopathology. Phenom Cogn Sci 12(1):75–104. https://doi.org/10.1007/s11097-010-9189-4
9. Fuchs T, Pallagrosi M (2018) Phenomenology of temporality and dimensional psychopathology. In: M Biondi, M Pasquini, A Picardi (Eds.) Dimensional psychopathology. Springer International Publishing, Cham, pp 287–300. https://doi.org/10.1007/978-3-319-78202-7_10
10. Gallese V, Goldman A (1998) Mirror neurons and the simulation theory of mind-reading. Trends Cogn Sci 2(12):12. https://doi.org/10.1016/S1364-6613(98)01262-5
11. Gertler B (2020) Dualism: how epistemic issues drive debates about the ontology of consciousness. In: U Kriegel (Ed.) The Oxford handbook of the philosophy of consciousness. Oxford University Press, pp 276–300. https://doi.org/10.1093/oxfordhb/9780198749677.013.13
12. Irvine E, Sprevak M (2020) Eliminativism about consciousness. In: U Kriegel (Ed.) The Oxford handbook of the philosophy of consciousness. Oxford University Press, pp 347–370. https://doi.org/10.1093/oxfordhb/9780198749677.013.16
13. Jackson F (2020) A priori physicalism. In: U Kriegel (Ed.) The Oxford handbook of the philosophy of consciousness. Oxford University Press, pp 370–386. https://doi.org/10.1093/oxfordhb/9780198749677.013.17
14. Jaspers K (1963) General psychopathology. Manchester University Press, Manchester
15. Keenan JP, Gallup GG, Falk D (2003) The face in the mirror: how we know who we are. Harper Collins, New York
16. Koch C (2018) What is consciousness? Nature 557(7704):S8–S12. https://doi.org/10.1038/d41586-018-05097-x

17. Kriegel U (2020) Introduction: what is the philosophy of consciousness? In: U Kriegel (Ed.) The Oxford Handbook of the philosophy of consciousness. Oxford University Press, pp xiii–13. https://doi.org/10.1093/oxfordhb/9780198749677.013.32
18. Kriegel U (Ed.) (2020) The Oxford handbook of the philosophy of consciousness. Oxford University Press. https://doi.org/10.1093/oxfordhb/9780198749677.013.12
19. Kriegel U (2020) Beyond the neural correlates of consciousness. In: U Kriegel (Ed.) The Oxford handbook of the philosophy of consciousness. Oxford University Press, pp 260–276. https://doi.org/10.1093/oxfordhb/9780198749677.013.12
20. Levine J (1983) Materialism and qualia: the explanatory gap. Pac Philos Q 64(4):354–361. https://doi.org/10.1111/j.1468-0114.1983.tb00207.x
21. Metzinger T (ed) (2000) Neural correlates of consciousness: empirical and conceptual questions. MIT Press, Cambridge, Mass
22. Morales J, Lau H (2020) The neural correlates of consciousness. In: U Kriegel (Ed.) The Oxford Handbook of the philosophy of consciousness. Oxford University Press, pp 231–260. https://doi.org/10.1093/oxfordhb/9780198749677.013.11
23. Platek SM, Keenan JP, Gallup GG Jr, Mohamed FB (2004) Where am I? The neurological correlates of self and other. Cogn Brain Res 19(2):2. https://doi.org/10.1016/j.cogbrainres.2003.11.014
24. Rochat P, Zahavi D (2011) The uncanny mirror: a re-framing of mirror self-experience. Conscious Cogn 20(2):2. https://doi.org/10.1016/j.concog.2010.06.007
25. Siewert C (2021) Consciousness and intentionality. The Stanford Encyclopedia of Philosophy. [Online]. Available: https://plato.stanford.edu/archives/fall2021/entries/consciousness-intentionality/
26. Silberstein M (1998) Emergence & the mind-body problem. J Conscious Stud 5(4(1)):464–482
27. Zahavi D (2014) Self and other: exploring subjectivity, empathy, and shame. Oxford University Press, New York
28. Zahavi D, Roepstorff A (2011) Faces and ascriptions: mapping measures of the self. Conscious Cogn 20(1):141–148. https://doi.org/10.1016/j.concog.2010.10.011
29. Zeki S (1999) Splendours and Miseries of the Brain. Philos Trans Biol Sci 354(1392):2053–2065

Comments

As neurosurgeons we are routinely confronted with disorders of consciousness and brain function. Having to focus on pathophysiological mechanisms can lead us to neglect what attracted many of us to our specialty in the first place, the wonder and mystery of the human brain as it relates to cognition, experience, and imagination.

In this article León and Zahavi present a concise review of the varying approaches to the philosophy of consciousness highlighting the complexity and problematic of the subject matter. They convincingly argue that philosophical methodology allows for categorization and more precise descriptions of different aspects of consciousness and selfhood, thereby allowing for more specific neural correlations. The study of consciousness needs good philosophy to lead to good neuroscience.

I commend this mini-review and its references to neurosurgeons who are intrigued by the mind inside the brain.

Zvi Harry Rappaport

Petah Tiqva, Israel

From early on in our careers as neurosurgeons we deal with issues of consciousness from a variety of perspectives. Extrapolating from the concluding remarks made by the authors it might be argued that in doing so we often intuitively albeit sometimes unconsciously, tend to adapt a philosophical understanding of the problem. So, for instance one might imagine that a resident on call, dealing with consciousness from the point of view of present-absent using a 8 or 15-point scale, might find either a simple dualist or physicalist approach useful. Consciousness is either there—attached to the body and brain—or to different extents absent (if you are a physicalist) or released (if you are a dualist). On the other hand, as we perform procedures that affect specific parts of the brain we may become more concerned with changes and reorganizations of consciousness, neurological function and the sense of self. After a neurosurgical procedure consciousness may still be present but the neurosurgeon may intuitively experience it as a pattern or property that may have become rearranged if parts of the building blocks that form the property were affected by our procedure. Such experiences may unconsciously tilt some of us in the direction of emergentism. Finally, if electric stimulation of the brain can apparently induce memories or movements and actions that are perceived as voluntary and controlled by consciousness this might for some of us seem to suggest that an electrode might perform the same function as consciousness. From this, the leap to the idea that consciousness is an illusion may not seem far.

There is currently, (despite decades of neuroscientific interest in the issue,) not one evidence based philosophy on consciousness that can be proven to be the right one, that responsible neurosurgeons should be required to use. However, the fact that our work is often relevant to these theories and that these theories are relevant to our work is still good reason for us to strive to make our use of them reasonably sophisticated. The present paper provides an excellent help in doing so by outlining the basic issues on philosophy consciousness and neuroscience.

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