What is it to be Conscious?

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In The Music of Life (Noble, 2006), one of us argued that consciousness and the self should be viewed as processes rather than as objects.¹ That theme was repeated in more recent articles, including one which deliberately used the title Mind over Molecule in the context of systems biology and neuroscience (Noble, 2010). Two of the authors (DN & RN) of this article interacted extensively during the writing of those ideas. As will be clear from this chapter, all three authors share the same perspective.

In our brief contribution to this book on the functional neuroanatomy of the claustrum, we will try to clarify some of those ideas, and relate

¹The distinction between “object” and “process” is an important one in this chapter. But like many ways in which we have difficulty matching language to what we conceive as reality, the distinction is not absolute. It can be context dependent. A spiral storm cloud is a process in the sense that it is formed as an attractor from many component elements. Seen from a space satellite it appears as an object, as does a spiral galaxy. At the smallest scale, fundamental particles are more like processes (with fuzzy or no boundaries) than they are like discrete particles. The particle-wave duality in physics nicely expresses the non-absolute nature of the distinction. In biology, the context depends very much on the scale from which one is viewing. From the viewpoint of cellular or organ scales, consciousness is not an object, in the sense that the necessary processes are not limited to the objects at those scales.
them to some of the more specifically philosophical issues raised by the work of neuroscientists interested in the following questions:

1. How did we come to reify the self and to refer to consciousness?
2. Are the questions that are then thought to follow from this real ones?
3. Do we need to identify a region of the brain where it all “comes together”?
4. If we regard the self or consciousness as a process, does that commit us to epiphenomenalism, i.e. are they impotent, or can such processes exercise causality?

**HOW DID WE COME TO REIFY THE SELF AND TO REFER TO CONSCIOUSNESS?**

There is a long and extensive history in philosophy and science on questions relating to the mind, the self, and consciousness (Bennett and Hacker, 2003, 2008; Crick, 1994; Damasio, 1994; Davidson, 1970; Hacker, 2012; Hampshire, 1956; Kenny, 1969, 2009; Kim, 1993, 2000; Montefiore, 1989; Noble, 1989a, 1989b; Parfit, 1986; Ryle, 1949/2000; Sherrington, 1940; Strawson, 1959; Williams, 1976). There have been many different approaches to the questions, but it seems clear that Western thought has not always reified the self and consciousness, and that such reification may be a development of our languages as much as of our thought, though the two go together of course: our language reflects as well as constrains our thought. Some traditions of Eastern thought have also avoided reification, including notably the no-self (anātman) traditions of Buddhism and Daoism. One of us has drawn on these traditions in several ways in recent work (Noble, 2006, 2009, 2011, 2012).

Minimally, we can say we are conscious. We are conscious in the sense of being aware of many things and processes. It may seem a small step from that observation to the idea that something (other than the organism itself) must be the subject of such awareness. In fact it is a significant step. The transition is encouraged by most human languages since it is usual to include the subject in sentences in which we refer to awareness. “I think” could be interpreted to mean “thinking is happening,” without specifying that there is any organic process other than the

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2 For an extensive account of the origins of consciousness, and cognate words, and the development of their meanings, see Chapter 1 in Hacker (2013).

3 We refer here to being transitively conscious, i.e. conscious (aware) of something. The word is also used intransitively to mean “being awake,” which is a necessary, even more minimal, condition for all other forms of awareness of things, ideas, etc., to be possible. The different forms of “conscious” are often conflated. They should not be.
animal/human involved. It is significant therefore that there are languages in which this step is not so necessary, in which it is natural and normal to omit the subject. Such languages, which include Japanese and Korean, are for this reason called pro-drop languages. “I am going” can then be simply “going” or, to be slightly more correct, “going is happening.” Similarly, “I think” can be expressed as “thinking is happening.” The significance of this way of expressing things is then best brought out by noting that Descartes’ famous philosophical statement “I think, therefore I am” (cogito ergo sum) could be more minimally expressed as “thinking, therefore being.” “Thinking” requires that a process exists, just as “going” does, but it does not require that we should reify that process. On this way of thinking, the mistake involved in referring to consciousness lies in the last part of the word, i.e. the “ness” part. This is the reification we should avoid.

ARE THE QUESTIONS THAT ARE THEN THOUGHT TO FOLLOW FROM THIS REAL ONES?

David Hume famously looked introspectively for the self and noticed that once one had eliminated the various things of which one is aware, there is, as it were, nothing left. The self can then be regarded as a bundle of perceptions, which would not exist without those perceptions. A more modern account of the “bundle of perceptions” idea is that of Parfit (1986). The problem with this approach is that it can make the existence or otherwise of the self appear to be an empirical question. A similar problem occurs in trying to characterize the Buddhist “no-self” idea as one arising from meditative experience, as though through meditation we can, as it were, make the self disappear. That would be a marvelous conjuring trick if we really could do that. Is there more than smoke and mirrors here? The way to answer this question, which is a question about whether there is a real question to be asked, is to first ask what it would

4People using such languages can, of course, deliberately insert the “I” word. In Japanese, for example, kakimasu (going) would become watashi-wa kakimasu (I am going) but that is done for emphasis or clarity and the sense is not really the same as “I am going,” where there is no emphasis. Note also that the subject is not identified in the declension of the verb, as it is in, for example, the Latin cogito. The verbs identify only an action, not who does it. It is also important to emphasize that, in all languages, whether pro-drop or not, there must always be a subject of thinking. Our point is simply a sociological one: that some languages encourage reification, others do not. The pro-drop languages focus on the action and de-emphasize the subject.

5It would be better characterized as making selfishness disappear. One of the aims is to remove anger, animosity.
be to identify the self in this way, and hence to know what we would mean by saying that we don’t find it. When we put the matter this way, it becomes obvious that we don’t know what we would mean by “finding” the self. As Hacker (2012) argues, we are just as likely to find the “East Pole.” There is nothing we could possibly call the “East Pole” and so it doesn’t add anything to our knowledge to say that we can’t find it.6

The “no-self” idea is then best regarded as a conceptual matter. There is no need for neuroscientists or anyone else to look for the physical seat of consciousness simply because there is no “…ness” to look for. Note that this does not mean that we cannot look for the physical basis of the processes involved, but it does warn us that it may be difficult to set boundaries to them. Focusing on one area of the body may be misleading. The processes may be distributed throughout our bodies and even beyond; they do not require boundaries in the way that objects require boundaries. In fact, the processes involved in intentional actions must usually go beyond our own bodies.

In Chapter 9 of The Music of Life, this approach was illustrated by imagining a debate between a neuroscientist and a philosopher concerning whether a full characterization of the physical (neuronal, muscular) processes involved in the act of pointing could count as having provided the neurophysiological basis of such an act in such a way that somehow explains away the idea of intention. Such a demonstration would be similar to the way in which the famous experiment by Libet et al. (1983) is often claimed to show that an earlier mechanical neuronal event was the real cause of an intention.

The problem here is that an intention is not that kind of thing, if indeed it is a thing at all. The best that the neuroscientist in the story can do is to explain the neuronal and muscular events that occur during the movement of pointing. That may be spectacular as neurophysiology but it is not to explain the act of pointing since being an act precisely requires the possibility of intention. Having an intention is a process and such processes necessarily involve social interactions. Their explanation therefore becomes one that “jumps out” of the context of neurophysiology to become an interpersonal question. To return to the story developed in The Music of Life, the best and only real explanation of the act of pointing was that someone wanted to know where the dog lead was. Of course, there were specific neuronal and muscular events that occurred, but looking for explanations at that level is rather like looking for the non-existent East Pole.

This view of intentionality and consciousness (if one insists on using “…ness” words in this context) bears some resemblance to the

6For a thorough-going demolition of the notion of the self, see Chapter 9.1–9.2 in Hacker (2010).
philosophy of Strawson in his book *Individuals* (1959) where he argued that one cannot ascribe consciousness to oneself without knowing how to ascribe it to others, which of course dissolves the solipsist case into a form of “East Pole” problem. This is necessarily true since what we are referring to is interpersonal, i.e. social. Once we know that the act of pointing was to show where a dog lead was to be found, we don’t need to look further for the cause of that act, *as an act*. Some scientists might still insist that the *real* causes must nevertheless lie in the neuronal and muscular events. We will deal with that question later in this chapter, when we consider causal relations and epiphenomenalism.

James Watson once quipped “there are only molecules, everything else is sociology.” Well, yes, but it will be clear from what we have written that we would put a totally different interpretation on that statement. “Everything else” is precisely where the “secret” lies.

**DO WE NEED TO IDENTIFY A REGION OF THE BRAIN WHERE IT ALL “COMES TOGETHER”?**

There are two questions here that sometimes get confounded:

1. Are there regions of the brain necessary for coordination of sensory experience and function?
2. Is there a specific region involved in pulling the function of the brain into a conscious state?

An affirmative answer to the first question does not necessitate an equally affirmative answer to the second. Indeed, an affirmative answer to the second question creates more problems than it solves. If there is a specific part of the brain that “experiences” then what is the neuronal basis of this experience? It creates an absurdity of a part of the brain that “sees” the seeing, “hears” the “hearing”, “experiences” the “experience”. An “eye” in the brain that “sees the seeing” would require a replication of the processes involved in being an “eye”. This is not the same as requiring any part of the brain to coordinate brain function. It may be that the brain has no specific conductor to orchestrate its activity. An orchestra may need a conductor to bring all the parts together to create the dynamics and emotion of the performance. The string section is made up of individual violins, violas, cellos; the brass of trumpets, etc. But this may not be the best way of considering brain function. Regional “specialization” is not the same as “being a violin.” When neuroscientists talk of the visual or auditory cortex, are these totally dedicated to those sensory inputs? A conductor “knows the sound

7 www.edge.org/conversation/the-astonishing-francis-crick
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of a violin” and indicates his instruction to the violinist; but is there a part of the brain that in the same sense “knows” apart from the process itself, the playing of the violins? The brain is not an aggregate of individual sections as we might consider an orchestra – indeed, when an orchestra performs a piece is each “unaware” or uninfluenced by the function of other sections? The visual areas of the brain do what they do as part of an integrative process involving other regions. They don’t produce a “violin sound” that is then added to a “cello” sound. Perception is not a jigsaw puzzle of aggregate fields; nor is it a passive process; it is dynamic and interactive.

This view is supported by the findings of neurological imaging, which show that the brain is approximately as active in the absence of performing any tasks as it is while performing tasks, albeit largely involving interactions of cortical regions other than those strongly associated with performing tasks. Since we remain just as conscious whether performing tasks or not, while being reflective or reviewing thoughts or memories, this is unsurprising. However, it undermines the idea that consciousness depends on an assemblage of activity from task-specific locales. Furthermore, when performing tasks, the default network switches and different cortical regions are recruited into different networks depending on the type of task. Yet we are conscious in all of these, again pointing to consciousness as dependent on the network interactions rather than having a causal locale.

IF WE REGARD CONSCIOUSNESS AS A PROCESS, DOES THAT COMMIT US TO EPIPHENOMENALISM?

Some parts of this section are taken, with modification, from another article (Noble, 2013), which analyzes the supervenience principle in the context of multi-scale systems biology.

A process can be viewed as an activity of a system, such as an attractor that draws the system towards one of its maintained states. There is then a question about whether such processes could coherently be viewed as epiphenomena, in some sense not so “real” as the components of the system, and possibly therefore lacking in any causal role. Consciousness has often been represented as an epiphenomenon. In this section, we will show that this idea is not correct. Note first that the problem of epiphenomenalism was created by the dualist idea that mind and body are separate objects. That view commits one to answering the question how the mind can have causal influence on the body. Rejecting that view already distances us from the problem. Modern neuroscience has largely abandoned the dualist view of mind and body, but many of its philosophical consequences still remain to haunt our ideas and interpretations.
In relation to mind, the self, and consciousness this issue can be phrased in terms of the supervenience principle, which was introduced by Davidson in 1970 (see also Kim, 1993) as a principle in mental philosophy. But it can be generalized to any theory of the relationships between events at different levels. Davidson’s statement of it in relation to the mind was: “supervenience might be taken to mean that there cannot be two events alike in all physical respects but differing in some mental respects, or that an object cannot alter in some mental respects without altering in some physical respects” (Davidson, 1970). Applied to multi-level biology the principle asserts that if two states are identical at a lower level, they cannot be different at a higher level.

A very similar idea was proposed by one of us some years ago (Noble, 1967a, 1967b) as a criticism of Charles Taylor’s work on teleology in The Explanation of Behaviour (Kenny, 1969; Taylor, 1964, 1967). At that time, the ideas were developed under the assumption that the lower levels were naturally where causal effectiveness would lie. If differences necessarily exist at lower levels when differences exist at higher levels, then it would seem that primacy in causality must be given to the lower levels.

What has developed since that time is clarification of the concept of downward causation; that is, the view that the processes of the body involve circular causality and that such interactions necessarily require causal efficacy at higher levels (see for example the set of articles in Interface Focus (Ellis et al., 2012)).

Downward causation from a high-level process might then be thought to break the supervenience principle. It does not, and it is important to demonstrate why. Downward causation can be defined in terms of the influence of boundary conditions determined by a higher scale (Noble, 2012). It is then clear that supervenience is always satisfied, provided that the boundaries of the system being studied are taken to include the processes determining those boundary conditions and that all events within these (even more extensive) boundaries are included. It is then trivially true that supervenience is satisfied since the lower scale has become extended to include the larger scale.

In what sense then can the causation involved be characterized as downward? The downward nature here is clearly between different scales. The issue is then a matter of definitions of scales and boundaries, and how we identify events occurring at the different scales. Moreover, since we are dealing with open rather than closed systems, we cannot know in advance how far out we should extend the boundaries in order to include everything that could determine the boundary conditions. In practice, in biology, we must deal with finite systems with boundaries open to events beyond the boundary of the system. This, after all, is what we mean by an open system. Another way to explain why downward
causation does not break the supervenience principle is to note that it follows from the fact that a process at a larger scale can cause the components at a smaller scale to behave differently than they would otherwise do. This automatically guarantees that downward causation will always be reflected in differences in behavior at the lower scale.

The principle of biological relativity is then simply a statement of the fact that this does not mean that we must always regard the events at lower scales as determining those at larger scales. On the contrary, the structure of a differential equation model of an open system shows the importance of the causal influences of the boundary conditions (Noble, 2012). Without those conditions the equations would have an infinite set of solutions. It is a mistake to think that downward causation exercised through determining boundary conditions requires the supervenience principle to be broken.

It is important to note that this argument applies regardless of the level at which the causes of the boundary conditions are identified. All that is required is that those causes should depend on processes at a larger scale. The difference can be understood by noting that even events at the largest scale possible (i.e. the universe) could be claimed to depend entirely on the properties of small-scale components. In principle, though certainly not in practice, the universe could be modeled at, for example, a molecular, fundamental particle, or even lower level. Looked at from this grand perspective it is hard to see why the molecular or cellular levels should be regarded as privileged. If the justification is that we should always attribute causality to the smallest level, then we should go down to strings, or whatever we think there may be at the “lowest” level. As an explanation of living systems, this would be absurd except in the general sense in which the stuff of the universe must have whatever characteristics are necessary for life to occur.

In the context of the present chapter, the relevant boundaries must be set to include the social and environmental interactions that enable intentions to arise and be fulfilled. Intentions cannot be interpreted as functions of a brain alone.

A further important question is what counts as a causal explanation. This is where the concept of level becomes important. Thus, pacemaker rhythm, whether in the heart or in neurons, is integrated at the level of a cell. It doesn’t really make sense to refer to this rhythm at a lower level since it necessarily depends on a global cell property, the electrical potential. The utility of the concept of level (as distinct from that of scale) results from its use in causal explanation.

This difference provides an important clue to the ways in which explanations at different levels can relate to each other. This was also a conclusion of the debate with Charles Taylor in Analysis in 1967: That the primacy of explanation at one level rather than another is a conceptual
question rather than an empirical one (Noble, 1967a). Processes observed and modeled at different scales inevitably refer to different entities since they occur within different chosen boundaries. The conditions for the identification of a particular causal entity may not be satisfied at too small a scale. The system may display the characteristics of a disparate and unexplained set, and the explanation for those characteristics will then require observation at a larger scale.

Causation and causal explanation do not necessarily refer to the same processes. For example, the supervenience principle requires that there must always be differences at, say, a molecular scale if there are differences at the organism scale. Molecular causation could be said to operate at all scales. But molecular events may not provide a causal explanation for a higher-scale function (e.g. that of the organism in interaction with others) if the molecular events form a disparate set which we would find difficult if not impossible to organize conceptually into a schema that may provide a satisfactory explanation.

CONCLUSIONS

The main theme of this chapter is that consciousness is better viewed as process. This idea is not new of course, and many other scientists and philosophers have explored the same approach. Our main contribution to the debate is to explore some of the philosophical consequences of that view. The main one is that, once we refer to processes rather than to objects, the boundaries become fuzzy. Organisms are interaction systems. Any bodily process may, usually does, include events in the environment as well as within the organism. This is necessarily true since intentions and other functions of the conscious state must refer to social and environmental interactions as well as to processes within the body. They have causal efficacy through necessary involvement in the situational logic of those interactions.

It will be clear from this chapter that we do not take issue with the impressive neurophysiological science presented in this book. On the contrary, the evidence that the claustrum plays an important role in neurophysiological integration is increasingly strong. As we argued in the third section, this does not mean that it should be interpreted to be the seat of consciousness. In fact, we have difficulty understanding what that could possibly mean. We can identify processes that are essential for conscious states to occur, but we don’t even know what a part of the brain acting as a seat of consciousness could conceivably look like. We suspect that the neurophysiological mechanisms that underpin the relevant processes are distributed and that they must include processes that are not restricted to the brain.
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References