Atomistic and Systems Approaches to Consciousness

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Abstract

The approach to consciousness taken by most philosophers is very different from the approach taken by most cognitive psychologists, so different that one could be forgiven for wondering if they are talking about the same thing. Most philosophers focus on individual psychological states. By contrast, most psychologists focus on properties of cognitive systems as a whole such as global workspace or attention. (Some philosophers favour this approach, too, Dennett and P. M. Churchland for example.) We will expose some of the peculiarities of the dominant philosophical approach and, by looking briefly into what is needed to give an adequate account of consciousness, advance some reasons for favouring the approach dominant among psychologists.

Two Approaches to Consciousness

Reading recent writings on consciousness by philosophers and cognitive psychologists, one could be forgiven for wondering if they are talking about the same thing. Most philosophers focus on individual psychological states – individual perceptions or feelings or imaginings – or at most tiny combinations of such states (Rosenthal, 1991; Chalmers, 1996; Tye 1995). Experimental psychologists by contrast focus on properties of cognitive systems as a whole: global workspace (Baars 1988), intermediate level of processing (Jackendoff 1987), or attention. Attention has been particularly singled out for ... attention. For Posner or Mack and Rock, for example, to be conscious of something simply is to pay attention to it (Posner 1994; Mack and Rock 1998).

First we will lay out the main contours of the two dominant approaches, starting with the one favoured by most philosophers (though not all: both Dennett (1991) and P. M. Churchland (1995) favour the approach taken by psychologists). Then we will assess them. There are serious *prima facie* shortcomings in the dominant philosophical approach, but there is also a serious worry about the dominant psychological approach. To bring out these shortcomings and this worry, we will need to distinguish two kinds of consciousness and lay out some of the things that an adequate account of consciousness must explain.

The dominant approach in philosophy

Two things characterize the dominant approach to consciousness in recent philosophical work on the topic. The first is a kind of atomism. These philosophers tend to talk about conscious states one by one ('what is it like for something to look red?') or at most in tiny groups. In both cases, the cognitive system that has them is pretty much ignored. (Theorists may add, '...look red *to me'* but they do nothing with the addition.) Almost the whole of the massive literature on *qualia* exhibits this feature. (*Qualia* are the felt quality of conscious states, 'what it is like to have them', in Thomas Nagel's (1974) famous phrase.) The thing that has such states, the subject of conscious states, is ignored. Let us call this view of consciousness *atomism.*

> **Atomism** – the view that conscious states can be studied one by one or in small groups, without reference to the cognitive system that has them.

When you think about it, this atomism is remarkable. It seems obvious that consciousness does *not* come in atomically separable states in this way.

This atomism about consciousness goes with another view that we will call *local realism.* Local realism is the view that consciousness or what is distinctive about consciousness, for example that in virtue of which it is like something to have a psychological state, is a property of individual psychological states or tiny groups of psychological states.

> **Local realism** – the view that consciousness or what is distinctive about consciousness is either a non-relational property of individual psychological states or a relationship among very small numbers of psychological states.

Specifically, this approach to consciousness views it as either a nonrelational property of single psychological states or, though a relational property, one that ties only very small groups of psychological states to one another. A relationship between one state and another single state would be an example. This account is not very precise but it is precise enough for our purposes. What matters is the contrast with the kind of properties that figure centrally in theories that view consciousness as a relationship between a great many psychological states and a conscious being

whose states they are.

Local realism is a realist view because it takes the states in question to be real, not postulated abstract entities that we believe in merely because of certain concepts or explanatory strategies or something of the kind.

There are (at least) three types of local realism. In one type, appearing red to me would be a property of an experience of red, being painful would be a property of a pain, and so on. We find a second type in what have come to be called transparency theories, theories holding that we see right through conscious states (hence transparency) and are conscious only of what such states are about. In this approach, something appearing red is not a property of any experience, it is a matter of experiencing something that appears to be red, feeling pain is a matter of experiencing something painful, and so on. In the third type, a representation of red gets to be conscious by being related to another psychological state, for example by being the object of a thought about that representation (Rosenthal's 1991 higher-order thought view of consciousness).

It might seem that atomism requires local realism but in fact that is not clear. Some atomists about consciousness are simply neutral about whether qualia, for example, are local or nonlocal properties of the states they discuss. This neutrality is a bit curious because these theorists believe that they can say other important things about qualia, e.g., that when it is like something to have a representation, this quale, this being like something, is radically different from other aspects of the representation, but neutral they have been. Nonetheless, local realism would certainly promote atomism: if consciousness is a local property of certain states, it would be at least very tempting to hold that one could study such states one by one and in isolation from the system that has them.

It is important to note that *local* realism about consciousness is not necessarily the same thing as *realism* about consciousness. Even if consciousness is not a local property of individual psychological states, it could still be a real property of cognitive systems as a whole. We mention this now because there have been influential treatments of consciousness recently that back off from any form of cognitive-system realism about consciousness, for example Davidson's (1996) view. In Davidson's view, consciousness arises out of a complex triangular interaction among oneself, other purposive beings, and the world. By itself, this triangulation picture need not depart from realism; the result of the triangulation, consciousness, could still be a real property of cognitive systems. For Davidson, however, not only does consciousness arise out of triangulation, it is (roughly) nothing more than triangulation. When triangulation results in stable attributions of consciousness to self and others, that is what consciousness is. And *this* view *is* incompatible with most versions of realism about consciousness.

One central issue in this atomist, local realist literature is the relationship of consciousness to representation. At minimum, being conscious of something is *one way* of representing something. Of course, things can also be represented unconsciously. In fact, probably the vast bulk of our representations never make us conscious of anything. Certainly a representation does not need to make us conscious of anything to be cognitively active. But now ask: can the difference between conscious and nonconscious representation *be captured* by appealing to representational properties or are the properties that make a state conscious nonrepresentational properties? Here there is a major split in the atomist, local realist camp, with some researchers opting for the representational alternative (Lycan 1987, Tye 1995), others insisting on the nonrepresentational one (Block 1995, Chalmers 1996). For the anti-representationalists, the difference between a state that is conscious and one that is not is *not* a difference in how that state represents anything or a difference in the kind of representation it is or a difference in anything else representational. Since we will eventually come to raise some doubts about anti-representationalism, let us flag the view explicitly:

> **Anti-representationalism** – the view that the difference between a state that is conscious and one that is not is not a difference in how that state represents anything or a difference in the kind of representation it is or a difference in anything else representational.

Here is how the anti-representationalist view can arise.

When something appears to us to be a certain way, the representation in which it appears that way can play two roles in our cognitive economy. On the one hand, the representation (or the contents of the representation) can connect inferentially to other representations: if the stick appears to have two straight parts with a bend in the middle, this will preclude representing it as forming a circle. The representation can also connect to belief: if the stick appears straight with a bend in it, we will not form a belief that it bends in a circle. And to memory: we can compare this stick as it appears to sticks I recall from the past. And action: if I want something to poke into a hole, I might reach for the stick. In all these case, so long as I am *representing* the stick in the appropriate way, it would seem to be irrelevant whether I am *conscious* of the stick or not. My representation could do these jobs for me just as well even if I were not aware either of the stick or of my representation of it. But I am also *conscious* of the stick – it does *appear* to me in a certain way. This can easily seem to be something different from any representational properties of the representation, at any rate properties such as those we just considered.[1]

[1.] Chalmers' well-known (1995) distinction between what he calls the easy problem and the hard problem of consciousness starts from this distinction between the cognitive role of

Arguments for this conclusion often take the following form: the felt quality of a state could change while its representational properties remain the same. The arguments are usually based on thought experiments such as the inverted spectrum argument (how colours appear to us could be inverted without changing how our representations of colour function as representations) or the zombie argument (there could be creatures for whom it is not like anything to represent anything whose representations nevertheless function cognitively just as representations function in us).

Sometimes such arguments go so far as to conclude that what is distinctive to consciousness is not just not representational, it is not even physical. One way of arguing for this to make one's zombie a microphysical duplicate of conscious beings. If a zombie such as this is possible, then qualia are not a physical property of conscious beings. Another is Jackson's (1986) famous thought experiment concerning Mary, the colour scientist. Mary knows everything there is to know about the experience of colour, therefore everything *physical* there is to know about the experience of colour, but she has never experienced colour herself. Then she experiences colour. Clearly she gains something she did not have before. However, she knew everything physical about colour. Therefore, what she gains must be something nonphysical.

It is not clear that any of these thought experiments establish real possibilities, or, if they do, entail the conclusions drawn from them. For reasons of length, in this paper we will pass on that issue. Instead, we will turn to alternative approach to consciousness introduced earlier, the one found more often in the work of experimental psychologists.

The dominant approach in psychology

In sharp contrast to atomism and local realism (whether in its representational or its anti-representational form), the dominant approach to consciousness in experimental psychology holds that consciousness is a property of the cognitive system as a whole. Let us call it the *system approach to consciousness:*

> **System approach to consciousness** – approaches to consciousness that view it as a property of whole cognitive systems, not individual or small groups of representations.

There is a great diversity of opinion as to what the relevant property is. We cannot begin to explore the whole range of options but here are a few examples. Baars (1988) holds that consciousness consists in a global workspace of a certain kind. Jackendoff (1987) urges that it is an intermediate level of representation, a phonetic or similar level between acoustic or visual input and full-blown conceptual content. Many theorists link consciousness very closely to attention. For example, Mack and Rock say that, "Attention [is] the process that brings a stimulus to consciousness" (Mack and Rock 1998), "if a ... percept captures attention, it then becomes an explicit percept, that is, a conscious percept" (Mack 2001, 2). Posner (1994) captures the spirit of this line of thinking about consciousness nicely:

> an understanding of consciousness must rest on an appreciation of the brain networks that subserve attention, in much the same way as a scientific analysis of life without consideration of DNA would seem vacuous. [Posner 1994, 7398]

Nor is this approach without its philosophical allies. Dennett's (1991) multiple drafts model in which states become conscious by seizing control of cognitive resources is a similar approach. (Curiously, he says almost nothing about attention.) Paul Churchland is another example. Here is how Churchland summarized his approach recently:

> [Consider] the brain's capacity to focus attention on some aspect or subset of its teeming polymodal sensory inputs, to try out different conceptual interpretations of that selected subset, to hold the results of that selective/interpretive activity in short-term memory for long enough to update a coherent representational 'narrative' of the world-unfolding-in-time, a narrative thus fit for possible selection and imprinting in long-term memory. Any [such] representation is ... a presumptive instance of the class of *conscious* representations. [Churchland 2002, 74]

This is a different conception of consciousness from the atomist one! Are there reasons to favour one over the other? There are. First reason: the systems approach has the potential to account for two kinds of consciousness, the atomist approach only one.

Two kinds of consciousness

The variety of different things that we can have in mind when we use the word 'consciousness' is a big topic, too big a topic to explore here. However, we can make one distinction fairly briefly and when we do, something quite interesting about the two approaches becomes apparent.

The distinction we have in mind is between consciousness of the world around us and consciousness of our own psychological states. Blindsight is sometimes invoked to illustrate this distinction but what is tendentiously called 'inattentional blindness' works better. (Tendentiously because there is actually a huge debate about whether the phenomenon in question has anything to do with attention [Mack, http://psyche.cs.monash.edu.au/v7/psyche-7-16-

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representations and something appearing to be like something in them.

mack.htm].) In inattentional blindness research, the subject fixates on a point and is asked to note some feature of an object introduced at or within a few degrees of fixation. After a few trials, a second object is introduced, in the same region but clearly distinct from the first object. Subjects are not told that a second object will appear. When the appearance of the two objects is followed by 1.5 seconds of masking, at least one-quarter of the subjects and sometimes almost all subjects have no awareness of having seen the second object.

Yet – and this is what makes inattentional blindness better for our purposes than blindsight – when the second object is a word, subjects clearly encode it and process its meaning. Evidence? When asked shortly after to do, for example, a 'stem completion task' (i.e., to complete a word of which they are given the first two or three letters), they complete the word in line with the word they claim not to have seen much more frequently than controls do. In short, in inattentional blindness, subjects' access to the word they are not aware of seeing is nevertheless very deep-running.

In inattentional blindness, it is important to note, objects *appear* in a certain way to the subject, as is evidenced by the subject processing semantic information provided by it.[2] What we have here is not merely Block's A-consciousness, "a state ... poised for direct control of thought and action" (Block 1995, 233). The access to the unattended object is Block's -consciousness or something very much like it: the object actually appears to the subject. (Note that if this claim is correct, it poses a considerable problem for attention theories of consciousness – something else we don't have space to go into.) In these or similar cases of access without attention, subjects can, for example, point to the items in question. The objects can increase the subject's level of alertness, especially the level of alertness concerning the objects themselves. And ensuing behaviour is often appropriate, not to the way the object actually is, but to how the objects looked to the subject (Dennett, 1978). Let us call the kind of consciousness that can be present in cases of inattentional information access and so on *consciousness of the world.* By contrast, let us call the consciousness that we have when we are *conscious* of representing items in the world *consciousness of self.*[3]

Consciousness of the world – the kind of consciousness that can be present in cases of inattentional information access and so on

Consciousness of self – the consciousness that we have when we are conscious of representing items in the world

Now a reason for favouring the systems approach: all anti-representational versions of atomism and many representational versions (e.g., higher-order thought or experience models) have anything to say only about consciousness of self, the felt quality of psychological states, what it is like to have them, and cannot say anything about consciousness of the world, i.e., the way the world appears to someone. Systems approaches not only have something to say about consciousness of the world, they generally focus on it. When theorists talk about paying attention to something, for example, they generally have in mind paying attention to something in the world, not paying attention to one's own states.

What a theory of consciousness must explain

A second reason for favouring a systems over an atomistic approach to consciousness: what a theory of consciousness actually needs to be able to explain.

If consciousness is a matter of things appearing – just appearing, in the case of consciousness of the world, consciousness that they are appearing in the case of (one kind of) consciousness of self –, then consciousness is a property of the activity of representing, not of individual representations. Consciousness is a matter of *something being conscious* of something. If so, an adequate theory of consciousness has to address the question: What is *a system* capable of consciousness like?

Here are some of the features of such a system:

- It is aware of whole groups of representations in one 'act of consciousness'
- Often when it is aware of whole groups of representations, it is also aware of itself as the common subject of these representations.
- Its consciousness can be faint, full, etc.
- It has many global cognitive faculties and some of

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2. Change blindness, attentional blink, and visual neglect and the double dissociation between the ventral and the dorsal streams in the brain discovered by Milner and Goodale (1995) are related phenomena. In all these phenomena, information that the subject is not conscious of having nevertheless enters into cognitive tasks that use semantic information , disambiguation tasks, for example.

3. Consciousness of self needs to be broken down into consciousness of one's psychological states and consciousness of oneself, the thing having those states. Moreover, there are radically different views afoot about what consciousness of one's psychological states consists in. Some theorists even maintain that it is nothing more than consciousness of the world plus a shift of attention (Dretske 1995, Tye 1995). We have to ignore all these issues here.

them are closely linked to consciousness, memory, for example, or attention, or language.

- In particular, attention is closely linked to consciousness.
- For consciousness, a system simply having information as a result of representing this, that or the other is not enough; the system must make cognitive use of the information.
- Consciousness in a cognitive system can be independent of sensory inputs
- Its consciousness disappears in deep sleep, and . . .
- reappears in dreams.[4]

When faced with issues like these, the atomistic approach to consciousness has so far just clawed the air – and it is hard to think of circumstances under which it could do any better.

Take, for example, the unity of consciousness. Conscious subjects are aware at the same time, indeed in a single act of consciousness, of a great many items. A theory of the conscious subjects has to be able account for this unity.

The unity of consciousness comes in a number of kinds. Mental unity in general comes in at least six different kinds and four of them are kinds of unified consciousness:

1. unity of our cognitive elements (we can bring, for example, beliefs, desires, perceptions, intentions, and many other things to bear on a single situation);

2. unified consciousness of our world (we are aware of a whole host of things around us in a single, unified representation) and

3.unified consciousness of one's own representations;

4. unified consciousness of self (one is aware of oneself as the "single, common subject" of one's experience, as Kant put it),

5. unified focus of a number of cognitive resources on a single item of attention;

and,

6. unified behaviour (our behaviour is highly and multiply unified – think of a concert pianist playing a sonata).

Set items (i) and (vi) aside. Items (ii) to (v), the various kinds of unified consciousness, have a common core:

Unity of consciousness – a group of representations being related to one another such that to be conscious of any of them is to be conscious of others of them and of the group of them as a single group.

Given how central unified consciousness is to the conscious mind, it is remarkable how little attention it is has received in recent writings on consciousness, especially philosophical writings. Paul Churchland (1995, p. 209) includes it as one of his Magnificent Seven, the things that a theory of consciousness has to explain, and the notion is mentioned by a few other philosophers but in general it has received little attention (the topic and what has been done with it is reviewed in Brook 2000).

That consciousness is unified has immediate implications for atomism and local realism. If consciousness is unified, consciousness cannot be a property of single representations or tiny groups of representations (e.g., a representation and a thought directed at it on the HOT model) by themselves. Nor it is something that could fruitfully be studied by studying single representations in isolation. At present, we don't think that there is a theory of consciousness, representational or nonrepresentational, that provides an adequate account of the fact that consciousness is unified. To pay attention to it is to see the prospects for atomism about consciousness immediately plummet.

A Problem for the Systems Approach?

If the systems approach to consciousness seems more likely than atomism to be able to explain what a theory of consciousness has to explain, it also faces some problems. In particular, many theorists worry that it may leave out just the most crucial element, the consciousness itself. This worry arises in the following way. 'Surely', an objector will say, 'a cognitive faculties and capacities central to your favourite systems approach to consciousness could exist, and not only exist but function as they do, in the absence of consciousness?' This line of objection is the home of zombie thought-experiments: surely something could be just like us behaviourally, or (as in this case) functionally, or even physically, and yet not be conscious. All we can say here is that *if* zombie thought-experiments are coherent, then the systems approach is in trouble, as is every other representational theory of consciousness. But that is a big 'if'. Since the price of buying the idea that zombie thought-experiments are coherent is that consciousness has to be something deeply mysterious, maybe beyond cognitive ken altogether, we want to make very sure that zombie thought-experiments *are* coherent.

Adjudicating that issue and the background issue of the merits of anti-representational atomism vs. the systems picture of consciousness is a task for another occasion. Here we have merely tried to introduce the two approaches, lay out one reason to favour the systems approach, and look briefly at one difficulty it faces.

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[4] This list started from but goes beyond Churchland's list of the Magnificent Seven requirements on a theory of consciousness in (1995), pp. 213-14.

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