I Am, Therefore I Think:
Consciousness as an Adaptation

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Abstract

There was a time when there was no such thing as consciousness. Then there came a time when there was. There is no doubt that consciousness exists and it has evolved. A standard view from evolutionary theory is that consciousness evolved because it conferred its bearers an adaptive advantage, just as any evolutionary change does. However, it is no easy task to prove this in any great detail except by prima facie evidence. It is necessary to explain the evolution of consciousness and the adaptive advantage of consciousness. It is necessary, as well, to make sure that there is a distinction between the two; a distinction between the formation of consciousness and its adaptive influences. The distinction is crucial because the existence of the former does not give sufficient cause for the latter. This paper serves to give an overview of this subject.

How Did Consciousness Evolve?

If we postulate the notion of consciousness being an adaptation, it is helpful to gain a good understanding of adaptations in general. Generally, adaptation is thought of in terms of evolution by natural selection although that is not the only way to look at it. There are other mechanisms that may serve to explain adaptation, but selection has generally been considered the most scientifically legitimate method. So the question is: how does consciousness come to be part of natural selection? What were the environmental factors that led to the development of consciousness? And then, in a much different question, we can ask how this new development came to be adaptive. Adaptation is most easily described as that fit between certain organisms and their environment. So what was it in the nature of the organisms and in the processes of the natural environment that made consciousness such an adaptive quality?

We have to consider that some conscious states do appear to be adaptive. As just one example, we can consider the conscious state of pain. Consider the situation where someone accidentally puts his or her hand in an open flame. The nerves in the hand register pain. The state of "pain" becomes a conscious state that causes the person (hopefully) to remove their hand from the fire. In this case the conscious state of "pain" has certain effects relative to human and animal bodies that figure in explanations of an overall capacity to avoid serious injury. The same can be said, in a certain sense, for the plant kingdom, wherein plants will attempt to grow in the direction of sunlight so as to stave off serious injury (in the form of dehydration and death). However, we have to consider that this "conscious state" of plants is certainly different in kind from that which we consider in the human and animal kingdoms.

Prima facie, the conscious state of pain in humans is an adaptation for causing us to remove our hands from open flames as well as avoiding other sources of injury. Intuitively this claim seems very plausible. Despite this plausibility and despite the idea that consciousness might be an evolutionary adaptation, it is by no means easy to show that pain and other varieties of conscious states are products of evolution by natural selection. In fact, there is no widely accepted, credible adaptationist account of consciousness. That is not to say that there are no credible (and perhaps complete) explanations of consciousness, but there are certainly not many that give a full adaptationist explanation. The most notable attempts have been done by Thomas Polger and Owen Flanagan (Polger and Flanagan, 1996). In this paper I attempt to provide such an explanation, at least in the barest forms of a hypothesis, mainly based on the work of Flanagan and Polger. It is left to the reader to determine the viability of what I have to say.

Evolution of Consciousness by Natural Selection

In this section I give a possible account of the evolution of consciousness. It is my hope that the account is plausible since much of the argument will be used to bolster my main thesis of consciousness being an evolutionary adaptation. So let us consider a finite population of interbreeding organisms, and further lest us consider that random mutation in that population caused a portion of the population to have some sort of conscious states

(i.e., for these states, there is something that it is *like* for the organism to be in the state[1]). In each case, the new phenotypic trait (which I am calling *consciousness*) was heritable. There is no reason to think that at the earliest stages organisms displaying consciousness (or rudimentary conscious states) would have necessarily fared much better than their non-conscious brethren, especially in an early, harsh world that did not so much favor consciousness as it did strength and agility. And, yet, there was just enough of an advantage, such that natural selection allowed those with the trait of consciousness to survive and pass it on.

Throughout history there have been known catastrophic events that resulted in the destruction of large parts of the biosphere. It is at least plausible that organisms with a fairly well developed sense of consciousness (in the form of recognition of conscious states) would begin to take on the notions of self-preservation and that they could base this self-preservation concept on calamities that had befallen the species in the past. (To a certain extent, this concept of self-preservation was the forerunner of the ability to anticipate future events.) On the other hand, that might even be attributing too much to such early organisms. It could have been much simpler than that in the sense that the organisms simply responded better to environmental changes with a more acute sense of conscious states that registered problems with the environment, such as lack of oxygen, overheating, etc. In any event, we can now imagine a catastrophic event that occurred at some point in the past that the more consciousness-endowed organisms were able to survive much better than the non-conscious organisms.[2] Because of their growing penchant for survival, the conscious organisms survived and reproduced very successfully and continued to pass on their traits. Consciousness slowly, albeit inevitably, evolved.

Evolution, as a process in itself, occurs when there is phenotypic variation, heritability, and differential reproduction. This is the evolutionary explanation that I am positing for consciousness as well. But does the explanation, by itself, show that consciousness evolved because it was an adaptation? Going by the strict evolutionary process, the answer is no. Although *evolution of consciousness* undoubtedly occurred, it was not necessarily *evolution by natural selection* but perhaps by *random drift*. In other words, in the scenario that I gave, it was only really by chance in some cases that the conscious organisms out-reproduced their non-conscious counterparts. For example, it is possible (and perhaps even likely) that these conscious organisms might not have had any foresight whatsoever into the nature of the catastrophes and thus perished with them. It is equally likely that if the catastrophe was severe enough or global enough in nature that the chances for survival were exactly equal for both conscious and non-conscious organisms. In any event, what the strict evolutionary explanation seems to tell us is that it was *not* because these organisms possessed consciousness that they survived. It might merely have been good luck.

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[1] What I mean by this is when, for example, someone says, "I wonder what it is *like* to be a bat." In this case one is wondering what it would be like to have the conscious states of a bat. See Nagel (1974).

[2] This catastrophic event can be imagined as one that was worldwide in nature, such as a massive comet impact, or more localized to a given region, such as a major volcanic eruption.

Of course, random drift is a much different concept than evolution by natural selection. This is mainly because the natural selection environment requires something else: there must be a cause other than pure chance for the differential reproduction that leads to evolution. In other words, there must be something about a trait that accounts for the relative advantage of its bearer in a selective environment. It cannot be based solely on chance events. This point was brought forth very forcefully by Robert Brandon (1990). This is the view that I choose to take of the evolution of consciousness. I do not believe that random drift played the dominant part in the spread of consciousness. I feel that consciousness most certainly must have been an evolutionary adaptation via natural selection, and not a purely fortuitous adaptation. However, in order to give an adaptationist explanation of consciousness and also to explain why I do not feel it was a purely fortuitous one, I am going to have to specify what the adaptive advantage of the feature in question was for a particular type of organism in a particular selective environment, keeping in mind that adaptation is the fit between environment and the organism.

What needs to be shown is that the trait of consciousness has an *etiological function*.[3] If we assume that consciousness had some function (which it must have in order to be considered adaptive), it makes sense to look at etiological notions of function since this is the most common method of thinking about functions among biologists, anatomists, and physiologists. In this context this makes sense for the current investigation because the functions of a given thing can be considered those effects for which it was selected (Millikan 1989; Neander 1991; and Lycan 1996). In general, the details of etiological functions are somewhat disputed by various researchers and philosophers. We can at least take a look at one way of formulating the concept. The following example is from Neander (1991):

> It is the/a proper function of an item (X) or an organism (O) to do that which item's of X's type did to contribute to the inclusive fitness of O's ancestors, and which caused the genotype, of which X is the phenotypic expression, to be selected by natural selection.

This type of formulation has been referred to generally as the *selected effect* account of function (Amundson and Lauder, 1994). Others take a more broad view and formulate etiological accounts that are neutral as to the source of selection (Wright, 1973; Millikan, 1989). This latter approach is usually done so as to provide a more general framework of function that can also accommodate artifacts. Others have constructed a framework for etiological function such that the functions can be placed under more causal role functions, such as basic cause-effect relationships (Griffiths, 1993). However one chooses to look at them, etiological functions are those that figure in explanations according to the theory of evolution by natural selection. The etiological function of a trait is an effect that gave it an adaptive advantage. If a claim is being made that a trait

[3] *Etiology* is simply the study of causes or origins. It is basically the ability to assign a reason or cause for the existence or function of something.

(like consciousness) has an etiological function, then the claim is being made that it is an adaptation. That is the approach that I am taking with this paper.

An Adaptationist Explanation for Consciousness

To specify what the adaptive advantage of consciousness might, in fact, be is somewhat difficult. However, even that is relatively easy when compared to finding evidence of how some variety of consciousness *actually* (as opposed to *possibly*) gave an organism an adaptive advantage in a selective environment. In order to get from the *possible* to the *actual*, even in terms of a hypothesis, requires some empirical data upon which to draw conclusions. One way to do this is to take the route I started with in this paper: look at one variety of consciousness (or state of consciousness). If we can specify the adaptive advantage of a given variety of consciousness, we can give an *ecological* account of its relative adapted-ness. That being said, even if it is possible to discover the adaptive advantage of a given variety of consciousness, we still really only have one pieces of an adaptationist explanation. In other words, there is no reason to believe that the adaptive logic applied to the variety of consciousness can necessarily be applied to idea of consciousness itself. Let us consider what makes an ideally complete adaptation explanation (Brandon, 1990; Polger and Flanagan, 1996):

1. Evidence that selection has occurred.
2. An ecological explanation of relative adapted-ness.
3. Evidence that the traits in question are heritable.
4. Information about population structure.
5. Phylogenetic information about trait polarity.

It is these five elements that routinely come to the fore in explanations in terms of evolution by natural selection. 1.) and 3.) from this list are fairly self-explanatory. Element 2.) is generally the one that most cognitive scientists, evolutionary psychologists, and philosophers of mind center on when discussing the evolution of some feature of the mind, such as consciousness. These types of ecological explanations of relative adapted-ness serve to indicate why some trait increased the fitness of its bearer in a particular selective environment. These types of explanation describe the etiological function of that trait. However, it must be realized that giving a plausible account that satisfies the demand for an ecological explanation of relative adapted-ness is *necessary* but not *sufficient* for giving an ideally complete adaptation explanation. We have to consider the other four elements in the list given above.

Consider the first element, that of evidence for selection. If one is going to present a hypothesis about why consciousness was favored by natural selection, there needs to be some evidence that *selection* for consciousness has occurred. This is different from the demand that some evidence for the *evolution* of consciousness occurred. If we go back to the catastrophic-random drift scenario that I brought up earlier, we get the idea of the *evolution of consciousness* but we do not, a priori, get *selection for consciousness*. What we need is evidence of some sort that the cross-generation change was due to some advantage that was conferred by the trait that was selected for. Evidence of this sort that

might work would be fossil evidence, particularly if that fossil evidence were from competing groups of early hominids.

Let us consider the idea of hominid fossil remains as possible evidence. There is thought among archaeologists and anthropologists that *Homo erectus* and *Homo sapiens* had roamed the Earth together. (There is also thought that the latter also roamed the Earth with another branch of the primate line, *Homo sapiens neanderthalensis*.) It is widely thought, by some, that *Homo sapiens* were favored because they were more intelligent than the other hominid groups, allowing, for example, for the development of linguistic capabilities or the ability to plan better and work together as a group.[4] In this scenario, what could possibly constitute evidence that a selection based on consciousness occurred? The idea is that "intelligence" gave *Homo sapiens* the edge, but we have to realize that consciousness does not necessarily imply intelligence. However, it would seem that the reverse is true: intelligence would imply consciousness. Intelligence is generally linked to encephalization and language is linked to specific cortical regions of larger hominid brains. If we follow that line of thought, the fossil evidence might be construed as providing support for the idea that selection occurred because it shows increased brain size in *Homo sapiens*, at least relative to other hominids. It also shows space being developed in those larger brains for certain areas, such as Broca's and Wernicke's.[5] However, there is the concern that even if we show that selection occurred for general intelligence and language, nothing has actually been established about consciousness itself. This is a concern because there are no theories about what sorts of fossils might be exhibiting signs of consciousness, as there are such theories for fossils that exhibit signs of intelligence and language. Thus we are left with what might be considered good circumstantial evidence, but not really evidence of the main idea of consciousness evolving through natural selection.

Having said that, we can realize that encephalization may not necessarily be the answer or the only place to look. For example, some researchers (Fink, 1996) say that we might look for evolution in the complexity of the pharynx. The idea here is that the brain structures that developed to support consciousness are very energy hungry and thus required a particularly large air intake (the pharynx). The point here is that a lack of soft tissue evidence or a lack of fossilized skulls does not necessarily derail the idea of looking for evidence of consciousness as an evolutionary adaptation.

Moving along, we can consider the third element in the list above, that of the evidence for the trait of consciousness being inherited. In this we run into similar problems that we ran into with the evidence for selection. The problem with this is that the population samples we have (i.e., all modern humans) are conscious to greater and lesser degrees. In other words, besides in cases of coma or other extreme states, we do not have non-conscious

[4] Note that a lot of the modern evidence indicates that other versions of primates were not quite as primitive as had previously been believed. In particular, Neanderthal cultures have shown a great deal of social acuity and there is even some evidence of the possibility of advanced linguistic abilities.

[5] Broca's area is a frontal language-related cortical area. Wernicke's area is a loosely circumscribed cortical area in the temporal region that handles aspects of language comprehension.

humans as a normal part of development. Because of this we cannot observe selection for consciousness in the same way that we can look for selection in terms of things like skin color, eye color, height, etc.[6] In general, we cannot observe selection in terms of consciousness, per se, because we do not have phenotypic variation in terms of consciousness, per se.

The idea of population structure, the fourth element in the list, requires that we have information about the frequencies of different traits in the population in order to determine whether selection is at work rather than some other force, such as random drift. In the context of this fourth element we can consider that some evolutionary models, like group selection models, refer directly to the frequency of a trait in a given population. The idea behind those types of models is that some traits are group traits (rather than those that operate on individuals) and are sensitive to population density.

Finally, the fifth element in the list, that of trait polarity, requires looking at what evolved from what. In the case of looking for the evolution of consciousness by natural selection, we need plausible evidence that non-conscious creatures evolved into conscious creatures, and not vice-versa. It should noted that some researchers, like Brandon (1990), have put forth the suggestion that trait polarity, while necessary for the overall idea of evolutionary adaptation, may not play a role in the case of consciousness. For my own research, I see no reason to make that assumption.

The Specification of Traits

One thing that has been avoided thus far is specifying what exactly is meant by consciousness. This is, in fact, one of the major evidential problems of an adaptationist explanation for consciousness. We have to say what consciousness is and yet, often, we cannot, at least in exact terms. We certainly know what consciousness is in terms of its first-person phenomenal description but when attempts are made to describe consciousness in terms of non-phenomenological terms, we run into conceptual problems. Should we consider consciousness a single, global trait? Should we consider consciousness a superordinate name for a host of traits that have certain commonalities? Are conscious states realized in only one way within the brain or are there many ways in which such states are realized?

How can we answer questions like these? To a certain extent, we can do so by trait specification. This is very similar to the manner in which it was discovered that whales and dolphins are, in fact, fish and not mammals as had been assumed for quite some time. This was discovered via very precise trait specification and the same thing must occur in relation to consciousness. If we can determine how consciousness is realized it would be possible to give consciousness a neural specification (supposing, in this case, that consciousness were realized in one characteristic manner). Finding such a neural property would be quite a coup in terms of neurological research, whether it was a single property or a distributed set of properties. This research has been referred to as the search for the

[6] It should be noted, however, that certain conscious states can be looked at in terms of selection in modern times. Examples would be color vision and color blindness. We do not generally think of these as conscious states but they in fact are.

"neural correlate of consciousness," indicating the neural system (or systems) that are associated with consciousness (Chalmers, 1996). The manner in which such neural correlates are sought is by looking for the neural underpinnings of states that share what is called the *Nagel property*. This indicates the property of there being something *that it is like* to be in that state (Nagel, 1974; Sloman, 1996). Conscious states have the Nagel property because it can be postulated what it must be *like* to be that conscious thing. Non-conscious mental states do not have the Nagel property because non-consciousness is outside our realm of experience (and is different from the idea of unconscious states).

So what kinds of consciousness do we want to consider? There is certainly consciousness in the sensory modalities. There are, for example, emotions, moods, dreams, and conscious propositional attitude states. There are various kinds of neuroses and psychoses that could be considered. These are all kinds or types of conscious states. Note, however, that this is not a broad definition of *what consciousness is*, something that I said was a problem earlier. What we are doing here is picking out certain phenomena that points to consciousness and attempting to explain that. It is the case that, at present, we really do not have a way of specifying the trait of consciousness in any other way than simply using broad phenomenological concepts. However, this does not mean that the idea of looking at consciousness as an adaptation (by giving a complete adaptation explanation) is impossible. But it does mean that any such attempt at explanation will be uncertain and, at least initially, fraught with uncertainties. It must be realized right from the start that an assumption cannot be made that a kind (or type) of consciousness exists because it is adaptive. In the same vein the assumption cannot be made that all kinds of consciousness have etiological functions.

Spandrels of the Brain

We need to consider that there are many features of organisms that are not adaptations, meaning that they really do not have any strict evolutionary function. An example of this would be the popular case made about chins (Gould and Lewontin, 1978). For our purposes, we are considering consciousness to be a trait just like any other trait. But we are also considering varieties (different types and kinds) of consciousness and, in that vein, it would not be terribly surprising if some of those varieties had no evolutionary function, meaning they might not be adaptations in themselves.

Traits of an organism that are not in themselves adaptations but are byproducts of other traits that have been selected for by evolution have been given a name: *spandrels* (Gould and Lewontin, 1978).[7] These types of traits are said to lack an etiological function because they do not have to serve a specific purpose or even be there for a specific reason. One conscious state that is familiar to all and that is a plausible candidate for a type of consciousness lacking etiological function is that of dreams. Dreams are a conscious state that occurs during another type of conscious state known as sleep.[8] Dreams, however, are just byproducts of brains doing what brains do during the state

[7] These have also been referred to as "exaptations."

[8] It may be odd to consider sleep a state of consciousness and yet it is. The mind is very active and even aware during sleep. It is, strictly speaking, not really a form of unconsciousness.

known as sleep. Some brain activity and processes that occurs during sleep can be considered an adaptation (Flanagan, 1995), however the phenomenal mentation that occurs, although it is a direct effect of those brain processes, is an evolutionary by-product of those brain activities for which sleep was selected. In other words, the dreaming experience makes no difference to the inclusive genetic fitness of organisms that dream. By contrast, the neurochemical processes going on in the brain during sleep, including those that cause dreams, *do* in fact make a difference to inclusive genetic fitness. Thus, *dreams as such* make difference, but the processes that cause dreams to occur, do make a difference. Flanagan (1995, 1996) has presented this idea well and I quote him to further expound upon the concept:

> Sleeping has an elegant neurophysiological profile, exemplified by reliable changes in brain waves and in the release-ratio of aminergic versus cholinergic neurochemicals. There is good evidence that what the brain is doing during different stages of sleep is implicated in cell repair, hormone adjustment, learning, and memory consolidation.
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> Dreaming during NREM sleep is rationally preservative and relatively non-bizarre. A person might think that she did not sleep because she could not stop worrying about the exam tomorrow. In fact, she did sleep. NREM sleep is like being awake in many respects and it is easily confused with being awake. NREM mentation is what gets left over from a normal brain gone to sleep. If one were awake on would first worry about the exam and then study. Since the brain does not turn off one continues to worry, but, being asleep one doesn't get up. The preservative dream rut doesn't affect the brain's ability to get one into a hypometabolic state in which cell repair and hormone adjustment can take place.
>
> If one sleeps eight hours, then during two of those hours, one's eyes are bolting around under the eyelids. This is REM sleep. Neurochemically the NREM to REM shift marks (roughly) the shift from labor devoted to cell reparation to labor devoted to memory consolidation and storage. The mechanisms required to turn off certain neurons and to turn on others cause waves that activate "thoughts" throughout the brain, especially in the visual areas.
>
> Suppose the conscious brain is *independently* prone to try to make sense of thoughts it has. If so, there is no surprise that it tries – and in part succeeds – to supply a coherent story line to the noise it generates while the system as a whole is doing what it does during sleep.

What the above is saying is that if being an adaptation is having an etiological function, then we may call the denial that consciousness is an adaptation *etiological epiphenomenalism*. This is a term that Flanagan has used and according to this argument, dreams are etiological epiphenomena. Dreams are the spandrels of the state known as sleep.

This etiological epiphenomenalism is an empirical claim. The claim is being made that the presence of certain types of consciousness have no adaptationist explanation. In other words, there is no effect for which that type of consciousness was selected. We should consider that it is possible to consider types of etiological epiphenomenalism: that applied to certain types of consciousness and that applied to consciousness as a whole. In the case of saying that dreams (a specific type of consciousness) are etiological epiphenomena is saying that there is no effect of dreams for which they have been selected. The position of etiological epiphenomenalism with respect to dreams does not bring into question the existence of dreams or the causal role of dreams. All the position says is that, as a matter of historical fact, having dreams is not a trait that is a result of natural selection.

Defending the notion of the etiological epiphenomenalism of dreams does not commit one to any particular conclusion about other varieties of consciousness. For example, one is not committed to saying the same thing about those varieties of consciousness that might activate during dreaming. This is one advantage of adopting a view of consciousness as made up of an array of various states, all of which share the Nagel property. This is as opposed to viewing consciousness as a single unified entity and thus applying etiological epiphenomenalism to the whole. In other words, it allows one to postulate that some sorts of conscious states are epiphenomenal (like dreams) while other conscious states may have etiological functions.

As a sidelight to this discussion about dreaming, some have suggested that the fact that dreams can be "interpreted" suggests some sort of etiological function. Polger and Flanagan (1997) posit an answer to this claim:

> Culture may select for dream interpretation. But it is unlikely that sleep activity, say, dopamine reuptake, is enhanced by dreaming things that can be interpreted as having certain significance rather than other, or by a population becoming virtuoso dream interpreters. …
>
> We could put the main point this way: The effects of dreams are not functions relative to the nervous system, like dopamine reuptake. Rather they are effects relative to the whole-person system. If those individuals who engage in dream interpretation are able to improve their self-understanding, and if this aids them in carrying on with their lives, and this leads to differential reproductive success (and is heritable) then it could be that there *are* selective pressures for dreaming, and for recalling and interpreting dreams. Though dreaming may not have been selected for in the past, it may come to be selected for in the future. Dreams could come to have an etiological function. Unlikely perhaps; but possible.

Conscious Inessentialism

In an attempt to discredit the idea of positing an adaptive advantage of consciousness, Daniel Dennett issued a general challenge to this with the idea of "health inessentialism" (Dennett, 1995; Polger and Flanagan, 1996). Essentially this was designed to be a

reductio ad absurdum type argument. Dennett is trying to show that consciousness as a general concept does not and should be looked at in terms of being fitness enhancing, simply because consciousness is not a single conceptual entity. Dennett's idea of "health inessentialism" is basically the consideration for a given activity B in a given domain D, one needs the state of "health" in order to do B in D. An example Dennett gives is pole vaulting. A human doing this needs to be relatively healthy and yet we can consider a machine designed to do a pole vault activity that does not require the state of "health." The same logic is used to consider Mount Everest. A climber of the mountain would need a certain amount of health although a motor vehicle or robotic machine could, in principle, also climb the mountain and would not need the state of "health."

Dennett thus says: "So what is health *for*? Such a mystery!" The idea being that since, in principle, health is not required for these activities, health cannot be posited as having come about because of the need to do these activities. The same logic is then applied to the "need" for consciousness. If we need consciousness (in terms of it being selected) then, presumably, it is something we need to do certain activities that other organisms or things do not have and thus cannot do those same activities. Thus the idea is to look at what activities might those be.

There is the idea of "conscious inessentialism" which holds that "for any intelligent activity *i*, performed in any cognitive domain *d*, even if *we* do *i* with conscious accompaniments, *i* can in principle be done without these conscious accompaniments" (Flanagan, 1992). The idea behind this is usually that of artificial intelligence, where the contrast is made between a biological system (like a human) and an inorganic system (like a computer). However, the case is that right now while a computer might display something along the lines of what could be called intelligence, it cannot display consciousness. As Polger and Flanagan assert, and I agree: "It is a matter of *a posteriori* necessity that certain actions we perform, e.g., lying, require conscious motivation. An unconscious system might mislead but it can't lie" (1997). The idea is even simpler if you consider a chess-playing computer or program. Humans require consciousness to play chess. Computers can play chess but do not require consciousness. Thus consciousness is not required for playing chess.

And, in this case, the idea of "health inessentialism" and "conscious inessentialism" seem to agree. However, we have to consider the different organisms we are talking about. A human does require consciousness to play chess just as a human requires health to climb Mount Everest. However, a machine does not require consciousness to play chess just as a machine would not require health to climb Mount Everest. Thus we are talking about a difference in kind. The key here is that "health inessentialism" does not apply to both contrastive cases: organic creatures and inorganic creatures. The notion of health between humans and machines is not the same. On the other hand, "conscious inessentialism" does apply both to organic creatures and inorganic creatures, mainly because we can imagine organisms that do not have the same type of consciousness acting in a fashion that might appear to be intelligent. (Just as we can see a computer playing a chess game and assume that it is exhibiting some form of intelligence even thought is really not.) By contrast, we cannot imagine a non-healthy human (or organism) climbing Mount Everest.

We can certainly imagine a machine doing it, but, again, the same concept of health does not apply to the machine.

Dennett feels that since consciousness is not one giant monolithic entity, it is mistake to ask what the adaptive advantage of it can be since it is a cluster of various types. To this Polger and Flanagan reply, "the fact that some feature has multiple realizations, that its name refers to a 'huge complex' of capacities, does not render foolish the question of its adaptive advantage. It just means that there has to be an answer for each instantiation--and very possibly not the same answer" (1996). What we have to keep in mind is that when we ask about the adaptive advantage of consciousness to an organism, we are asking for some of those reasons to be specified for some type of conscious state – whether the mechanisms of consciousness turn out to be of one type or of many variant types.

The question being asked is what etiological functions those various kinds of phenomenal consciousness have in a given organism. It may be the case that consciousness was selected as a single phenomenological trait of the brain. If this were the case, then consciousness (at least at the general level) would have an etiological function. But that still leaves open the possibility that many of the lower-level types of varieties of consciousness might not have etiological functions. Those latter types would correspond to etiological epiphenomena.

Varieties of Epiphenomenalism

The overall problem, as I have been discussing it, is still providing a plausible account of the etiological function of consciousness. What has not been discussed is the causal role of consciousness or the current fitness of consciousness (i.e., how it works for the organism now as opposed to how it originally came to be selected for). Even if we assume that consciousness is a spandrel in the mold of Gould and Lewontin, we could still ask about the causal role and current fitness.

The idea of current fitness is a good one to consider because many people look at the argument of consciousness being an evolutionary adaptation and the consider consciousness in relation to the ability to think highly abstractly, to compose poetry and stories, to perform general relativistic equations, etc. Then the thought is: why would evolution select do so such activities? Obviously it is highly unlikely that evolution would do this. These abilities are most likely not the result of specific selection pressures (although we could assume they are by-products of selection for other traits of consciousness).

The causal role idea also deserves some consideration. The causal role indicates that consciousness has some causal effect on the organism. In general, physical systems have causal powers and, thus, causal effects. Some effects of a system are functions of the system, although others might not be. When we talk about the functions *of* a system we are talking about the effects of something that play a causal role in an explanation of an overall capacity of a system. In fact, it is generally the capacities of a system (what the system can do) that we refer to when we posit an explanation for the system.

There is a school of thought referred to as *causal-role epiphenomenalism,* where the idea is that consciousness depends on the physical substrate in which it is present. This serves as one variation to the idea of etiological epiphenomenalism. In this view, consciousness does have physical effects but those effects are not of the functionally mechanistic variety – meaning they do not have causal role in the organism. A good example of this, given by Polger and Flanagan (1997), is the "thumping" sound that a heart makes as it pumps blood. The "thumping" sound plays no causal role function in hearts; and the "thumping" also plays no causal role function in any explanations of the capacities of biological organisms.

Another school of thought refers to *metaphysical epiphenomenalism*. In this concept, consciousness does depend on the physical substrate but has no physical effects. The idea here is that mental properties are non-physical and cannot have an effect upon the physical. This view, however, seems to fly in the face of something that most anyone can do with ease: think about moving your arm up and then do that. The conscious thought of moving your arm up combined with the motivation (and the muscular ability) to do so is one example of a non-physical entity (a conscious thought) having a causal role on a physical entity (your arm). This is better thought of in terms of instinctual events, such as pulling your hand away from an open flame or recoiling from a particularly bad smell.

What these two examples show is that there are other ways of looking at the concept of epiphenomenalism rather that just in terms of etiological functions.

Conclusion

Research into this topic will no doubt continue to produce amazing results that will probably change how we have to look at consciousness in some respects. As this research continues it will be very important to keep in mind the different types of function, as I have tried to show in this paper. It is very possible for a given organism to lack certain kinds of function under a certain description and yet possess those functions under another description, or even possess totally different functions under a different description. As the differences in epiphenomenalism shows, something can be an etiological epiphenomenon without being considered an epiphenomenon in a causal role sense. In other words, it is possible to say that something is a functional by-product that has no causal role at all.

My hope is that this paper presented some of the concepts that are being used to determine whether consciousness is an evolutionary adaptation and at least provided some insight into the path that must be taken if such an assertion is to be rendered as a full hypothesis, one that could be put to some form of empirical test.

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