

Epiphenomenalism, the Problem with Property Dualism

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Abstract

We show that theories of qualia based upon “property dualism” (sometimes called “natural dualism” and “dual aspect theories”) lead to a form of epiphenomenalism, the situation where our behavior does not causally flow from our subjective experiences. That would mean that our claims, beliefs, and memories about our subjective experiences do not directly arise from our real subjective experiences. We will show that this ultimately leads to what I call “zombie solipsism” and to cognitive instability. This argument should allow us to reject “property dualism” in all its forms. If we reject property dualism, we must continue to search for some other explanation for subjective experience.

Keywords: Qualia, Property Dualism, Epiphenomenalism, Consciousness, Causation.

1. Introduction: Qualia and Subjective Experience

What do you experience when you see something that is bright and vivid red? What do you feel when you hold your lover’s hand? When you taste salt? When you smell a rose? When you hear a symphony? When you experience the intense pain of a serious injury? When you experience the intense pleasure of sexual intimacy? What is it *like* to have these experiences? How would you describe them to someone unfamiliar with them?

Why we have these experiences has proven to be by far the most difficult and perplexing of the many questions posed by consciousness[1][2]. As Nagel famously proposed in his paper “What is it Like to be a Bat,” for something to be conscious there must be something it is subjectively *like* to be that thing. Internal experiences are inherently subjective and arise from the first person perspective. Science, on the other hand, is normally concerned only with objective things that are observable from the third person

perspective[3]. From the third person perspective one can explore the brain of a bat and potentially explain and understand all the causal laws that govern their behavior. However, Nagel and others have argued that this understanding would tell one little of the subjective first person experiences of the bat[4][5]. Thus, he argues that there must be something *more* at work beyond the causal laws that govern the bat’s behavior[6]. As David Chalmers wrote “No amount of neuroscience and cognitive modeling can explain the qualitative nature of a sensation-of-red, or even why such a subjective sensation should exist.”[7] But if this is so, it would mean that science may ultimately fail as a tool for understanding the nature of subjective experience.

On the other hand, many researchers deny the subjective nature of qualia and claim that qualia can indeed be known and understood objectively. They see the problem of the subjective/objective divide as primarily a problem of communication, and not as a fundamental epistemological obstacle[8]. Others have denied the very existence of qualia, claiming that they are just an illusion[9][10]. However, if we properly define qualia as the subjective experiences that we *feel* like we have, *believe* that we have, and *remember* having had in the past, then it appears that there is little doubt left as to whether they exist or not. Even if some aspects of qualia are illusory, saying that qualia therefore do not exist is like saying that illusions do not exist because they are illusions. A magic show is just as real regardless of whether the magician is performing real magic or whether she is using clever illusions. The very real question still remains, what is it in the brain, mind, or soul that causes us to have these subjective experiences, illusory or not? Thus, the debate about the existence of qualia depends mostly on how we define qualia, and the qualia deniers (such as Daniel Dennett) do not actually deny the existence of qualia, as much as they deny the existence of certain debatable properties of qualia[10].

Using a combination of introspection and brain imaging, Ramachandran and Hirstein[8] have determined a set of neurological and functional properties that qualia laden experiences all share. They call them the three laws of qualia, and they may be a first step towards ending the debate about

the properties of qualia. First, qualia are largely immutable (in the sense that you can not look at a green card and produce red qualia through mental effort). This implies that there is an immutable, sub-conscious, non reportable pre processing element to the production of qualia. Second, we are aware of qualia consciously (in the sense that having qualia is a reportable experience) and qualia laden experiences all impact our short term memories. Third, our reactions to qualia are largely mutable (in the sense that although we can not produce green qualia from a red card, we can consciously decide how we want to respond to the presence of the red qualia). This is in contrast to reflex reactions. When you put your hand on a hot stove, you have a qualia free reflex reaction that pulls your hand away, which is only afterward followed by the qualia of pain, which is then followed by the ability to make a conscious decision about what to do about the pain.

Taken as a whole, these observations come very close to specifying an outline of an algorithm. Sub-conscious immutable pre-processing of sensory information somehow produces a set of immutable qualia, which are then presented to the conscious higher reasoning faculties of the brain for mutable behavior producing analysis and potential report. Of course, even if this algorithmic analysis of qualia proves to be correct and is sufficiently fleshed out neurologically, this algorithm still lives in the third person, objective domain of the brain. We would still have to explain why subjective experiences should arise from this objective algorithm. Therefore, depending on how one views the subjective-objective divide, these three laws might not answer all critic's questions about qualia or why we have them, but it may point the way forward.

In order to make progress on producing a science of consciousness, it will eventually be necessary to confront the issues raised by this subjective vs. objective debate. Without this, we will be unable to answer questions like: Do certain algorithms produce subjective experiences in our artificial creations while others do not? If so, which algorithms produce qualia, and which do not? Are certain materials essential to the process, or can qualia be created in a substrate independent manner? Is some additional magical soul necessary? Will our machines have subjective experiences, and if so which ones? Which types of artificial intelligence should be given rights and which should not? What effect would reanimation after cryonic preservation have on our subjective sense of self, especially if that reanimation involved some variant of uploading? These are some of the most difficult questions in neuroscience, philosophy, ethics, artificial intelligence, and even theology. It would seem that getting reasonable answers to these questions will become increasingly important as our society begins to grapple with the many ethical and practical issues surrounding the seemingly inevitable technologies such as

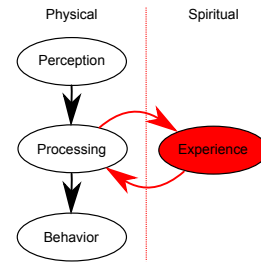


Figure 1. A representation of the causal chain proposed by one variation of the spiritualist explanation for qualia. The black arrows represent causation through natural causal laws or properties. The red arrows represent causation through super-natural interactions between the soul/spirit and the physical world. According to this variant of spiritual dualism, the *perception* process moves from physical light, to the firing of sensory neurons, to the resulting sub-conscious neural pre-processing activity (that performs tasks such as finding edges). It is then proposed that certain processing neurons interact with a spirit or soul through super-natural laws (the red arrows). The soul has the conscious subjective *experience*, and then causally impacts the further subconscious neural processing that eventually leads to the firing of motor neurons and thus to behavior. In this manner experience can directly influence behavior through super-natural means.

cryonics,[11][12][13] mind uploading,[13][14] and general artificial intelligence[15][14][11][16]. But despite their future importance, these questions are often ignored specifically because of their difficulty. As a researcher normally interested in the more immediately pragmatic aspects of artificial intelligence, it appears to me that we can ignore these difficult questions no longer.

We do not expect to solve all these problems in this paper. Here we will merely explore one small aspect of the subjective vs. objective debate as it relates to the theory of consciousness called “property dualism.” We will attempt to show why we believe that property dualism must now be rejected as a working theory for experience. Section 2 overviews several of the various theories that have been put forward in an attempt to explain the existence of qualia, including “property dualism.” Section 3 proposes several serious problems that we believe arise from property dualism and explain why we believe that it must ultimately be rejected. Section 4 steps back and takes a look at the theories and problems that remain.

2. Theories of Qualia

Several very different theories of the origins of qualia have been proposed. The two most popular theories are the spiritual dualism theory of qualia, and the materialist (sometimes called the functionalist, reductionist, or realist) theory of qualia. Spiritual dualists believe that qualia ex-

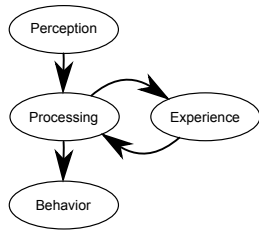


Figure 2. A representation of the causal chain proposed by one variation of the materialist explanation for qualia. The black arrows represent causation through natural causal laws or properties. There are no proposed spiritual or phenomenal laws or properties. The causal chain is very similar to that proposed in Figure 1, except that the experience is assumed to be just another type of processing. Here the “Processing” node represents the subconscious part of our mental activity, while the “Experience” node represents the part of our neural activity that produces conscious subjective experiences. In this manner, experience can directly influence behavior through natural, physical laws.

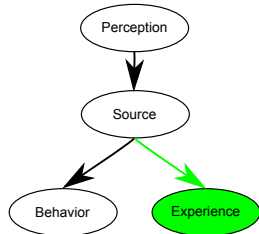


Figure 3. A representation of the causal chain proposed by property dualism. The black arrows represent causation through causal laws or properties (the laws of physics as we know them). The green arrow represents the way subjective experiences or qualia are brought about through phenomenal properties, aspects, or laws.

ist outside the realm of nature and natural laws. For many, this means the existence of a soul or a spirit that influences our behavior through super-natural means (see Figure 1). Although this theory is rejected by most scientists, it appears to be the most popular explanation for qualia among the general population. Materialists on the other hand believe that qualia arise because of the actions of the neurons in our brains, which are in turn a physical system that simply follows the laws of nature. So, for them, qualia are an emergent property of the laws of nature when organized into a physical brain (see Figure 2).

An alternative to these two competing theories known as “property dualism” is sometimes offered (Figure 3). This theory proposes that experience is somehow “fundamental” in that it does not reductively arise from the other properties of a system such as charge, mass, or spin, etc., but is instead a new axiomatic property of a system. David Chalmers, the

originator and chief proponent of property dualism, claimed that the “structure and dynamics” of physics, could lead to nothing but more structure and dynamics, and therefore something *more* must be necessary to explain experience, and that experience could not be reductively explained by the underlying structure and dynamics of physics. He therefore proposed property dualism, which he described as follows:

More likely, we will take experience itself as a fundamental feature of the world, alongside mass, charge, and space-time. If we take experience as fundamental, then we can go about the business of constructing a theory of experience. Where there is a fundamental property, there are fundamental laws. A nonreductive theory of experience will add new principles to the furniture of the basic laws of nature. ... These [new] *psychophysical* principles [the phenomenal properties] will not interfere with physical laws, as it seems that physical laws already form a closed system. ... This position qualifies as a variety of dualism [property dualism], as it postulates basic properties over and above the properties invoked by physics. But it is an innocent version of dualism, entirely compatible with the scientific view of the world. Nothing in this approach contradicts anything in physical theory; we simply need to add further bridging principles to explain how experience arises from physical processes. There is nothing particularly spiritual or mystical about this theory—its overall shape is like that of a physical theory, with a few fundamental entities connected by fundamental laws. It expands the ontology slightly, to be sure, but Maxwell did the same thing. Indeed, the overall structure of this position is entirely naturalistic, allowing that ultimately the universe comes down to a network of basic entities obeying simple laws, and allowing that there may ultimately be a theory of consciousness cast in terms of such laws. If the position is to have a name, a good choice might be *naturalistic dualism*[1].

It is unfortunate that Chalmers chose to explain his proposed theory in English terms, instead of formally and mathematically. This can make it difficult to determine exactly what Chalmers means. We suppose that the “structure” of physics refers to a state (likely something akin to the wave function in quantum mechanics). In property dualism the structure of the universe has separate, non-interacting properties: causal and phenomenal. The causal properties of the structure determine how elements of the structure interact with the rest of the structure through

causal properties such as electric charge, mass, or spin, etc. The “dynamics” of physics likely refers to a transition function (either deterministically or else probabilistically, depending on your interpretation of quantum mechanics) that explains how the structure evolves through time[17]. This can be written formally as $s_{t+1} = f_c(s_t)$, meaning that the structure or state of the universe at a future time is a causal function of the state of the universe at the current time, where s is the state, and f_c is the (potentially random) causal function governing the dynamics. Because behavior is ultimately manifest in the physical world, it is the causal properties of the source which eventually lead to *behavior*.

Because Chalmers thinks that experience is related to the structure of the universe (for example, to match the neural correlates of consciousness), we must suppose that these new laws that he is proposing somehow connect the state of the system to experience. Formally: $e_t = f_p(s_t)$, where the experience at a given time (e_t), is a function of the state at that time (s_t), and determined through his new phenomenal properties and natural laws, expressed by the function f_p . Thus, the state of the universe has causal properties, that impact the future state of the universe through the function f_c , and phenomenal properties, that impact the experience of an observer through the function f_p , but which do not impact the future state of the universe, because those laws are “closed.” We suppose that when Chalmers says that physical laws already form a closed system, he is claiming that no other entity, property, rule, or law influences the evolution of the state of the universe, and thus, that behavior is a result of the causal properties of the structure of the universe alone, independent of the proposed phenomenal properties of the structure. Therefore the phenomenal properties would not affect the behavior that would be produced by any proposed source.¹ These two properties of the structure of the universe (causal and phenomenal) are the dual properties of the property dualism theory.²

Different flavors of property dualism disagree about the exact way in which the state space impact subjective experience. Specifically, they disagree about which elements of the state space are tied to subjective experiences. Therefore, for now we will simply call whatever each theory proposes the “source.”

¹Some variants of property dualism deny this part of the theory and propose that the phenomenal properties of a given source can indeed impact the causal properties of the source. What follows would not apply to such variants of property dualism, however, we believe that such theories would be best described by a name other than property dualism because they would necessarily abandon the idea that things have separate, non-interacting properties. We believe that most of these theories can be invalidated for other reasons, but that is beyond the scope of this paper and would depend upon the details of each theory.

²represented by the two different colored arrows in Figure 3 that both leave the source but which do not interact with each other. In this sense *properties* are represented by arrows, and what they *do, produce, lead to, or influence* is represented as a node in the graph.

There are two main flavors of naturalistic or property dualism. In *material property dualism* (or MPD), some special substance (most often hypothesized to be either a quantum effect, or something like a neural transmitter) functions as the source and has the dual properties. The more common flavor of property dualism preferred by Chalmers is *functional property dualism* (or FPD), where the functional properties of the brain (its information processing algorithms, or sometimes the information contained in the functional processing[7]) serve as the source.

It can be very helpful to think about these things in terms of a causal chain. Suppose that light bounces off an object, and reflects either red or blue light which then hits the eye and causes neural firings. In MPD the pattern of these firings releases the source which is a special chemical element (say glutamate for red and aspartate for blue), and the subjective experience is then “painted” upon the brain itself. What that subjective experience is like depends upon the immutable phenomenal properties of the substance, but those properties are completely separate from the causal properties of the substance, and therefore do not play any causal role in how the substance interacts with its physical environment or the rest of the brain. The phenomenal properties of the substance would therefore have no impact on how the neurons in the brain fired or behaved, and thus no impact on how the individual acted. They would only impact what the individual experienced. We can therefore summarize the above chain of events as we did in Figure 3: the perception process causes the release of the source, which then causes both the subjective experience and the physical chain reactions that lead to behavior through its dual properties. Behavior could then be said to share a *common* source and cause with subjective experience, but one does not cause the other directly. MPD is problematic because no substance released or utilized in the brain’s processing has yet been found which has been shown to differentiate between the perception of certain colors, tastes, or smells. Instead, these experiences seem to be differentiated based upon which neurons fire independent of the substances involved. However, we must admit that there is much that is still left to discover about how the brain works.

The more popular functional property dualism proposed by Chalmers shares the same causal diagram with MPD. However, in FPD the perception process causes a substrate independent functional *pattern* of information processing to appear in the mind. Instead of some special substance, the information processing pattern itself serves as the source, causing both behavior and subjective experience through the physical and phenomenal properties of the substrate independent pattern. As before, experience and behavior can be said to share a common source and cause, but they do not influence each other directly.

We believe that this feature of property dualism, where

behavior and experience share a common cause through separate non-interacting properties, is highly problematic in that it ultimately leads to epiphenomenalism.

3. Epiphenomenalism

Epiphenomenalism is the view that subjective experiences are caused by physical events in the brain, but cannot affect physical events[4][5]. In this theory, behavior is caused by muscles that contract upon receiving neural impulses, and neural impulses are generated by input from other neurons or from sense organs. However, in epiphenomenalism this entire causal chain is not impacted by subjective experiences[18]. Our use of causal graphs makes epiphenomenalism easy to spot. Some form of epiphenomenalism will exist whenever there does not exist a series of directional edges (arrows) that lead *from* subjective experience *to* behavior. If experience and behavior have a *common* cause, that alone is not sufficient to avoid some form of epiphenomenalism (as we shall see). From this definition, it becomes clear that property dualism embodies a form of epiphenomenalism (see Figure 3).

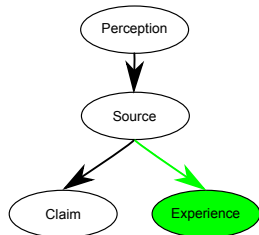


Figure 4. Property dualism, highlighting one type of behavior, namely the behavior where humans claim to have subjective experiences.

But why is epiphenomenalism such a problem? Critics of epiphenomenalism claim that it can not be observed, because it has no causal outcomes. Defenders of epiphenomenalism claim that there is a single exception to this, namely that we can indeed observe our own first person experience. Thus, our own experience of our first person experiences are said to form a window into the otherwise unobservable world of epiphenomenal subjective experience. However, Ramachandran and Hirstein’s three laws of qualia imply that the experience of qualia is reportable, and that they (whatever they are) impact our short term memory so that we are reportably aware of the subjective experience[8]. The fact that humans *claim* to have subjective experiences is part of our behavior, not our experience. Neurons instruct our mouth to move, and our speech physically moves the molecules in the air. Thus, under epiphenomenalism the *claim* of subjective experience would have to be produced by the causal properties of the brain, not by the brain’s

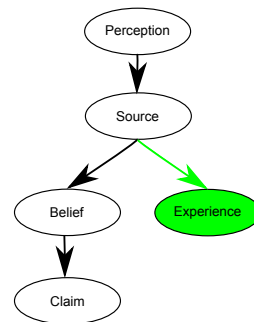


Figure 5. The causal chain of property dualism that expands behavior to include our beliefs, which are stored in our neural patterns, and thus should be influenced only by the causal properties of the source. Therefore our beliefs about our subjective experiences would not arise *from* our subjective experiences.

epiphenomenal experiences (see Figure 4). Thus, the claim to subjective experience provides no window into epiphenomenal experience.

Although it is impossible to be sure, normally we accept the claims others make concerning the existence of their subjective experience[15]. But under epiphenomenalism, there is a good reason why we should *not* trust other people’s claims regarding their subjective experience, since those claims did not arise because of their actual subjective experience. Therefore, if this theory is accepted then every person’s claims to have subjective experiences would make equal sense whether they actually have them or not, and so would the rest of their behavior. This can lead to a lesser form of solipsism (philosopher’s jargon for the belief that my mental state is all that really exists) which I will call “zombie solipsism.” This is the belief that I am the only truly conscious individual with qualia, and that all others are philosophical zombies[19] (philosopher’s jargon for an individual that behaves as if they had subjective experiences, but who is actually devoid of any real subjective experiences).

It has been argued that the only absolutely sure way to determine that another individual has subjective experiences is to *be* that individual[3][15][6], so that first person beliefs and memories can form a window into first person experiences. But if beliefs and memories are to form an accurate window into subjective experience, beliefs and memories about subjective experiences must arise *because* of subjective experiences. It is not enough for these beliefs and memories to be simply accompanied by epiphenomenal subjective experiences. Numerous studies on the brain have shown that human memories and beliefs are stored in neural connections and patterns[20][21][8]. These too are physical systems, and so according to epiphenomenalism,

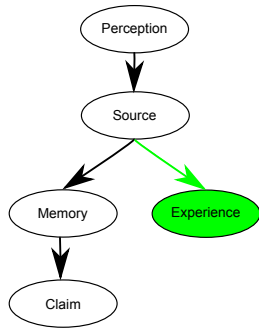


Figure 6. The causal chain of property dualism that expands behavior to include our memories, which are stored in our neural patterns, and thus should be influenced only by the causal properties of the source. Therefore our memories about our subjective experiences would not arise *from* our subjective experiences.

they are influenced only by causal laws, and not by subjective experiences (see Figure 5 and 6).

But if epiphenomenalism were true, then my very *beliefs* that I have subjective experiences do not arise because of my actual experiences (See Figure 5). Similarly, my memories of my past experience of qualia were not formed because of my past experience of qualia (see Figure 6). What that means is that we would have no reason to trust our beliefs and our memories about even our *own* subjective experiences. This is far worse than zombie solipsism. If epiphenomenalism were true, we would have no reason to believe in the existence of subjective experience (my own or that of others), and thus no reason to believe in epiphenomenalism in the first place, since the theory was proposed to account for the richness of our subjective experiences that seem to transcend the structure and dynamics of physical systems. This situation is best described as a type of “cognitive instability,” the condition we face when a set of assumptions undermines the very reasons we might have used to justify those very assumptions[22][17]. Most scientists consider it to be a reasonable assumption that we should avoid hypotheses that lead to such cognitive instabilities.

And yet, we defined qualia as those very subjective experiences that we actually claim to have, believe we have, and remember having. So under that definition qualia *must* exist. According to the three laws of qualia,[8] qualia physically impact the neurons that form our short term memory, our reportable awareness, our beliefs, and our higher reasoning functions so that we can determine a proper response. For these things to be true, qualia *must* be causally efficacious. Therefore, we have shown that epiphenomenal qualia must not be the type of qualia that we really claim, remember, and believe that we have.

Numerous philosophers have pointed out that there is no way to prove that epiphenomenal qualia do not exist. How-

ever, if these epiphenomenal qualia are not the qualia that we claim to be having, or that we remember having, or even that we *believe* that we are having, then they are not the subjective experiences that we are trying to understand here. Nor is there any real reason for us to care about them in any way, whether or not they exist. In other words, if epiphenomenal qualia exist, they do not *matter* in any conceivable way. Although we can not definitively prove that epiphenomenal qualia do not exist, there is clearly no evidence that they do, because *all* our evidence for their existence (even our own claims, and our first person beliefs, and memories), are precluded from being influenced by epiphenomenal qualia.

It turns out that the supposed first person exception to epiphenomenal qualia’s un-observability does not actually exist. It appears that we can not even experience our own epiphenomenal qualia for any reasonable definition of experience.

3.1. The Epiphenomenalism of Property Dualism

It is easy to see from Figure 3 that any flavor of property dualism will result in epiphenomenalism according to our definition that epiphenomenalism arises whenever there is not a direct set of causal links *from* experience *to* behavior (see Figures 3, 4, 5, and 6).

David Chalmers seems to be aware of this epiphenomenal aspect to what he is proposing. He wrote: “It is almost a version of epiphenomenalism, as we can imagine the subjective aspects ‘hanging off’ the non-subjective aspects, allowing the complete autonomy of the physical – while at the same time allowing that subjective states can be causally efficacious, as they are but another aspect of the objective states. (You might say: epiphenomenalism where mind can matter)”[7]. In other words, Chalmers seems to be trying to avoid the major problems with epiphenomenalism by proposing that experience and behavior share a common source, which he claims causes epiphenomenal qualia to be causally efficacious (or, to “matter”).

The problem with Chalmer’s analysis is that although the *source* does indeed matter in the causal chain, its subjective aspects do not matter. We would get the same causal behavior whether or not those subjective properties existed or changed in some manner. If we view the causal diagram as a Bayesian network,[23][24] then it becomes clear that behavior and subjective experience can indeed be statistically correlated through their shared source. However, there is no reason to suppose that this correlation is not an *inverse* correlation. In this situation, it would be possible for a stimulus that causes us to claim, believe, and remember feeling pain to be actually accompanied by an epiphenomenal experience of pleasure which is not reportable or rememberable. More importantly, even if my claim of experience is somehow forced to be statistically correlated with the cor-

rect experience, under this theory I am still not making the claim *because* I am truly having those experiences, but for some other reason which just happens to be positively correlated statistically with my true experiences. Ultimately, this approach to connecting experience and behavior through a common cause seems to fail to produce a theory that avoids the zombie solipsism and cognitive instability problems of epiphenomenalism.

The problem with property dualism is not that it expands our ontology as is often claimed, but rather it is that it does so in a way that leads to a theory of qualia which live outside the causal chain, leading to epiphenomenalism. It would appear that the only way for property dualism to avoid epiphenomenalism would be to give up on the idea that the laws of physics are truly “closed.” But such an approach does not result in a theory that could accurately be described as a “dual property” theory, because it would necessarily abandon the idea that things have separate, non-interacting properties.

4. Conclusion

Although we can not claim here to have concretely shown how qualia arise, we can whittle down the set of theories that should remain in contention. Property dualism was appealing, since it allowed us to take subjective experience “seriously”[1], without forcing us to appeal to the supernatural. However, we have shown that it ultimately leads to epiphenomenalism, and thus to zombie solipsism by forcing us to question the subjective experiences of others. We have also shown that it leads to cognitive-instability by causing us to question our own feelings, beliefs, and memories of our own subjective experiences. Which in turn undermines the very reason that property dualism was proposed in the first place (to try and account for the richness of our subjective experiences). Furthermore, this theory violates the three laws of qualia proposed by Ramachandran and Hirstein [8], which require that qualia be causally active.

So what theories are still acceptable given our requirements for causally active qualia? Any theory that has a direct set of causal links between the subjective experience and behaviors such as our claims and memories of qualia would meet this standard. Of the currently proposed theories for qualia, which can meet this criteria?

There are several variants of spiritual dualism that could meet this criteria (for example, see Figure 1), but at the cost of forcing us to accept the existence of causal relationships with the super-natural, which have not yet been observed in any reliable way. But since these interactions *must* be causally active to meet our criteria, they *should* be objectively observable if they are to avoid epiphenomenalism. However, if we are being truly honest (as a good scientist must) we must admit that the fact that we have not yet ob-

served them has not yet conclusively proved that they do not exist. The probability of their existence is simply reduced by Occam’s razor, and is becoming increasingly less likely as we make more detailed observations of the brain which continue to fail to find the predicted interaction.

There are also several variations of materialism that could meet our criteria (for example, see Figure 2). However, it currently appears that any theory of materialism that met this criteria could no longer claim that there is any real distinction between the subjective and the objective. Certain physical objective active patterns would have to *be* subjective experiences, and not just produce them from the first person perspective. This might imply that the famous hypothetical color blind super neuroscientist Mary would indeed learn nothing new upon experiencing color for the first time[25]. In fact, it may no longer even be rational to distinguish between what it is like to fully observe these patterns from the outside, from what it is like to *be* the brain experiencing these patterns from the inside without risking a similar form of property dualism and thus epiphenomenalism. But this also appears to be a difficult supposition to accept, since it at least appears to us that our subjective experiences are not *just* the structure and dynamics of a physical process alone[1]. It *appears* to us that there really is something *more* to what it is like to have them[3][4][5]. Of course, our intuitions on this matter could be seriously mistaken[10].

We must also leave room for some completely unexpected and as yet unexplored theory, so long as its causal graph has a set of directed edges leading from experience to behavior.

It would seem that although we can remove the middle ground of property dualism from consideration as an acceptable theory of qualia, the remaining possibilities each have their own difficult aspects. For now, qualia still represent one of the deepest mysteries of neuroscience, philosophy, ethics, artificial intelligence, and theology. Although it is a problem that we will eventually be forced to face, that does not mean that its solution has yet become clear.

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