

# Reconciling the Physical and the Phenomenal

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## Introduction

The term consciousness is overburdened, both in the literature and in everyday usage. It can refer to properties not limited to the state of being awake, awareness, and subjective experience. In the early to mid-1990s there was much literature centered on avoiding this conceptual tangle, which has resulted in many distinctions and dichotomies designed to help separate out the types of consciousness from the ambiguous term (Block, 1995)(Chalmers, 1995). The type of consciousness that will be discussed in this paper is phenomenal consciousness, which refers to subjective experience or “what it is like to be” (Nagel, 1974).

The most tangible and therefore the most recurring example of phenomenal consciousness is the experience of color. Though the physical basis of color is in particular wavelengths in the electromagnetic spectrum and how a brain interprets them, there is seemingly nothing in 532 nm light that causes it to appear so vividly green. Hence there is something that it is like to see green that cannot be captured by any proposition or piece of formal knowledge. This idea of subjective experience extends to many domains and encompasses phenomena ranging from the experience of a perfectly performed concerto to the feel of summer rain splattering on skin. These features of the world can be referenced and described, but not fully understood without the first person subjective experience. This, of course, leads to a fundamental mystery: if we exist in a physical world, how can these subjective qualities of experience be inaccessible to a physical and mathematical description of such a world?

This paper will ask the question of how this subjective experience relates to and interacts with the physical world and will take a similar line of derivation to David Chalmers' *The Conscious Mind* (Chalmers, 1996). However parallel much of the argument is to that of Chalmers, it will take a separate path that inevitably leads to some important differences from his conclusions. We will not require the same double aspect theory of information that Chalmers invokes, and the form of his panprotopsyism we end up with—in this paper known as universal phenomena—will raise some additional questions about how phenomenal consciousness relates to the physical world. We will then explore what gives rise to these problems and propose future paths of inquiry along which their solutions may be found.

# Background

## A Paradoxical Dilemma

The problem of how the physical and the phenomenal relate to each other has a long history in philosophy, and is most often associated with Rene Descartes<sup>1</sup>. In his *Meditations on First Philosophy*, Descartes develops an ontology where the mind and the body are separate entities that exist in separate realms<sup>2</sup>.

Descartes' view has many problems, which have been pointed out by a variety of philosophers. The Cartesian mind-body dualism requires that the realm of the phenomenal somehow communicates with the realm of the physical and that the phenomenal<sup>3</sup> must in some way be connected with the physical. Though there are other issues, the most direct opposition to Cartesian Dualism comes from the requirement that the physical realm be causally closed. There is a large body of literature discussing how this requirement of causal closure precludes the possibility of a metaphysical dualism, as well as a literature of opponents who believe that they can find some way to squeeze the phenomenal into a causal gap in the physical, but the basic argument is simple (Kim, 1993). It takes the form of a reduction: if the phenomenal world were able to influence the physical, then the effect of the mental on the physical would be causal and thus contradict the premise that the physical is causally closed.

The solutions to this problem can be grouped into four categories. The first category, physicalism<sup>4</sup>, essentially claims that there is no phenomenal kind or that what we call phenomenal is really just part of the physical. The second, idealism, claims that all that exists is the phenomenal and that the physical is somehow a feature of the phenomenal. The third, neutral monism, claims that there is a third substance that both what we call physical and what we call phenomenal are actually composed of. The fourth, dualism, holds that there is a way in which a metaphysical dualism can overcome the problems that plague the Cartesian view. The version of this latter argument that we will consider is epiphenomenalism, the idea that phenomenal states are caused by physical states, but that they do not themselves cause physical states.

Before continuing too far, we will be able to dismiss idealism. This is because idealism, which requires that the physical not exist, reduces to a form of solipsism or a skepticism about the external world. Though, as much literature in epistemology has shown, we cannot disprove this claim, we will not seriously consider it because of the fact that it contradicts so many prima facie ideas about the world and that the burden is therefore on the idealist to argue for it, not on us to disprove it (Moore, 1939).

However, there is a conflict between the physicalist and the epiphenomenalist views that gives rise to a need to compose a dualist theory, to subscribe to a form of solipsism, or to embrace a form of neutral monism. We will play out this paradox and show that the most agreeable solution lies in a particular form of neutral monism called universal phenomena.

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<sup>1</sup> Although it can be shown to have existed in some form before him and as early as the Greek philosophers.

<sup>2</sup> The realms distinction was later discussed by Immanuel Kant in his work on the phenomenal and the noumenal.

<sup>3</sup> In some bodies of literature (mostly historical) the phenomenal is known as the mental. However, the concept of mental is often not developed as precisely as the concept of the phenomenal.

<sup>4</sup> Physicalism is sometimes known as materialism, though in some bodies of literature there is a bit of a distinction between the terms.

### First Horn

The first horn of this dilemma lies within physicalism. Physicalist theory entails either that experience does not exist or that it is a physical property. Neither of these claims, however, can be consistently held. The first claim amounts to eliminativism (Kim, 1993). It argues that the phenomenal is just an illusion or that it does not exist at all. This does not seem to be tenable, if only for the reason that we have a priori evidence of it. Our experience seems to be the most fundamental property we can have, and therefore it exists *prima facie*. Another interpretation of this claim of the nonexistence of the phenomenal is that it is reducible to the physical<sup>5</sup>. This theory, known as reductionism, fails for a number of reasons, including the existence of an “explanatory gap” that prevents us from understanding the phenomenal in terms of the physical (Levine, 1983).

The second claim can be refuted with the idea that “what it is like to be” is not a factual property. Frank Jackson establishes this with his knowledge argument, which demonstrates how no account of the properties of 650 nm light is sufficient to explain why red appears the way it does (Jackson, 1986). He frames this argument by juxtaposing someone who has heard every fact that there is to know about red, but who is colorblind, with someone who has seen and experienced red. He claims that this latter person clearly knows something that the former does not. While I am hesitant to agree that this is knowledge<sup>6</sup>, it is certainly something that the former person could not have understood and therefore demonstrates a feature of the world that is not describable by physical facts. Though there are myriad interpretations of physicalism that argue that Jackson’s theory does not undercut their argument, they still fail to account for why experience cannot be understood in terms of the physical.

### Second Horn

The second horn of this dilemma emerges from the epiphenomenal argument. It comes from the idea that some things are conscious and others are not. If consciousness is not a physical property, then there is no way to account for differences in physical form giving rise to the existence of consciousness. The problem is that we know that some things such as rocks are not conscious and that other things such as humans are. These differences are physical, and therefore they show that the physical is linked in some inextricable way to the phenomenal.

This problem is seen most clearly if we observe that conscious beings such as people and non-conscious things such as dirt are made up of the same stuff. Therefore, whether these things are conscious or not cannot have to do with physical components, but with properties of physical organization. Imagine a scenario with the basic components of living things—molecules, atoms, quarks, etc.—metamorphosing slowly and continuously: the particles of the earth, soil, air, and water organizing themselves into a human being. On one end of this transformation the substance is not conscious, yet on the other end it is. Therefore, there must be a line crossed at some point during this transformation, a point at which the unconscious dirt, air, and water began to have subjective experience. At this point, it would seem that something is created out of nothing. Phenomena now exist where none did before. A world of experience has arisen out of the mud. T.H. Huxley remarked on the subject, “how it is that anything so remarkable as a state of consciousness comes about as a result of irritating nervous tissue, is just as unaccountable as the appearance of Djinn when Aladdin rubbed his

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<sup>5</sup> Here I am referring to the claim that it is reducible to the physical in an epistemic sense, not a metaphysical one.

<sup>6</sup> At least in a certain sense of knowledge

lamp (Block, 2002).” This appearance of something out of nothing is just this—unaccountable—and so it shows how an ontology where the existence of phenomena is contingent upon properties of physical organization results in absurdity.

Because the physicalist and the epiphenomenalist theories explain something separate that we observe to be true and because they contradict each other, the choice between these theories results in a paradox. Luckily, we still have another option at our disposal, and we will see in the next section why a particular interpretation of neutral monism resolves this contradiction.

## Universal Phenomena

### Resolution

This paradox is resolved by realizing that consciousness<sup>7</sup> is a particular form of a broader class of subjective experience. This broader class of phenomena includes things that are not consciousness and that we might not traditionally understand as subjective experience. Therefore, though the existence of consciousness may be contingent, the existence of phenomena is not. Consciousness is a particular human-like type of phenomenon, and phenomena are a universal property. It is either intimately related to the physical, or the physical and the phenomenal are part of one metaphysical realm where they both arise. This later characterization fits the theory into the category of neutral monism<sup>8</sup>.

There are many properties that make up our consciousness and that are essential to having the experience that is to be human. They are essentially the ability to self-reflect, the ability to reason, the ability to perceive, the ability to experience, and the ability to be in control of oneself<sup>9</sup>.

Though we must have these to be human, there are other possible forms of subjective experience—other possible forms of phenomena—that may not include all or even some of these properties. This can be seen quite well through the lens of the now classical example given in Thomas Nagel’s seminal article, “*What is it like to be a bat?*”. A bat might not have these properties of human consciousness, and we might not be able to understand what it is like to be a bat from the perspective of a human, but it seems likely that there is something that it is like to be a bat. Moreover, if we cannot hope to understand the experience of others, then we cannot have an intuitive prima facie argument for why these other types of experience do not exist. We may therefore hypothesize that everything physical has an associated phenomenal experience<sup>10</sup>. This resolves

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<sup>7</sup> In this paper consciousness is used in a slightly different way than in much of the literature. In the section “Consciousness vs. Phenomenon” I explain this usage and why it results in a clearer picture of our metaphysical ontology.

<sup>8</sup> Though I claim here that the theory is probably neutrally monistic, whether this is true or if the theory is a naturalistic dualism instead makes little difference within the present scope. This is because the theory as it stands does not make explicit claims about the metaphysical nature of the physical or the phenomenal; it only specifies a relation into which they must enter. It is important to note that, in talking separately about the physical and the phenomenal, we are making a conceptual distinction, not a metaphysical one. Though a specific metaphysical instantiation of the theory may be discoverable, it is not immediately entailed by the present work.

<sup>9</sup> Though the contents of this list are somewhat debatable, the specifics are not important here. What matters is that there are contingent properties that comprise the specific character of human phenomena.

<sup>10</sup> If this seems difficult to accept right now, then read on, for it will be shown to be quite natural.

our paradox because the existence of the phenomenal is no longer dependent upon physical organization; only the form of the phenomenon is dependent upon the form of the physical. This resolves the paradoxical snags in the epiphenomenalist arguments. Moreover, it also resolves the physicalist's inability to support the existence of phenomena because it shows how phenomena can exist alongside the physical, supporting its influence without causing a problem of how to attribute causality.

To explain why these universal phenomena does not conflict with our understanding of the physical world or our theories of physics, we have to invoke the concept of exchangeability. This is similar to the idea of independence, and I am borrowing the term from Judea Pearl's work on causal inference (Pearl, 2000). That feature A is exchangeable with feature B with respect to feature X means that the state of X has no predictive power over whether A is true or B is true. This is the case with respect to our observations of the phenomena of others. The idea, called the philosophical zombie hypothesis, is that there is nothing that one could measure that would give her any insight as to whether another being has an inner experience or phenomenology. They could physically appear exactly the same and actually be devoid of any experience without us being able to empirically test. The one caveat to this is that we know that we have experience. This sole fact is sufficient to allow us to show that others have experience, given that we believe that the physical determines the phenomenal—a premise that we must hold for other reasons discussed below. However, the point is that we have no way to test or to verify whether others have phenomena. We can only deduce this from our own experience. The phenomena of others are exchangeable with respect to the physical if we have no knowledge of our own phenomena.

Why must the physical determine the phenomenal?

In the above paragraph, we relied on the fact that the physical must determine the phenomenal, yet we failed to establish it directly. This fact comes from empirical evidence that the physical is causally connected with the phenomenal. If we are hit, we feel pain. If we are blinded, we no longer see. If an area of our brain responsible for a certain type of perception is removed, then we no longer have the experience associated with this perception. This connection shows that our experience is tied to the physical world. In order for us to know about the physical world and to perceive the physical world, our perception and our experience has to be tied in some way to the physical world. The fact that we can experience the physical world is reason enough to believe that there is a causal connection between the state of the physical world and the associated phenomenal experience. This provides the premise for our argument above for the necessity of the phenomena of others.

Of course, there is no way to prove that we cannot be solipsists and claim that the physical world does not exist. In this case, the physical world need not be tied to experience and the phenomena of others need not exist. But, as we discussed above, the mere possibility of skepticism with respect to the external world is not sufficient to overturn our arguments. As G.E. Moore argues, the theory more at odds with the *prima facie* has the burden of proof (Moore, 1939).

Consciousness vs. Phenomenon

Here I want to elucidate the distinction I have been making between the terms "consciousness" and "phenomenon." Consciousness refers to our experience. It is a human-centric term that denotes what it is like to be a human. It need not only refer to humans—we can use it to denote other things that might be able to

approximate human experience<sup>11</sup>—but it is defined by what it is like to be human. Phenomena, on the other hand, are a universal property. They are the “what it is like” associated with any physical matter whatsoever. It is the being form of anything physical that can only be seen subjectively, from the point of view of the thing itself. Though phenomena can take many forms, these forms are not understandable to us directly, only as facts that they exist. Because we are ourselves, we can only understand what it is like to be one of us. Therefore the existence of phenomena for matter such as rocks that may not seem to have associated experience is not an inconsistency in this theory. To understand what it is like to be a bat or a mollusk or a stone requires being that thing, and we are not those things. Consciousness is contingent upon the form of the physical world, but phenomena are universal.

Though it has not been made in previous work, this distinction is useful because it allows us to talk about theories of consciousness, which may be largely physical in nature and experimentally informed, separately from theories of phenomena, which are largely philosophical problems and lie more within the domain of metaphysics than in physics. With this distinction<sup>12</sup> we can now separate theories about how the contingent properties of consciousness emerge—such as Crick and Koch’s neurobiological theory of consciousness (Crick and Koch, 1990)—from theories of how phenomena relate to the physical such as those of Rene Descartes and David Chalmers.

Why we cannot hope to understand the experience of others, and why we “understand” the experience of similar others

Another loose end that may need some straightening and sealing relates to the exact nature of these universal phenomena. The existence of universal phenomena does not mean that we can understand the experience of all other things. It does not even mean that this experience will be anything that we would normally call experience. It just means that the property required for subjective experience is universal. The form of the experience and whether it becomes anything more than an absolutely basic proto-experience is entirely contingent upon physical form and organization. This is why David Chalmers called a similar theory “panprotopsychism” instead of simply “panpsychism.” Not everything has a mind, or something of any real substance that it is like to be, but everything has the basic requisite property. Everything has the phenomenal property, but consciousness and similar states are dependent upon the physical form.

Even though we may have reason to believe that everything has experience, we cannot hope to understand this experience directly, because experience is only extant for the being itself. Just as I cannot have your experience because I am not you, I cannot have the experience of a bat because I am not a bat. This might appear to be quite obvious, but it leads to some interesting conclusions. Because we cannot have the experience of others, we cannot directly know what it is like to be another thing. This means that everything we know about what it is like to be something other than we are at the moment, comes from some sort of inference and approximation. We are able to understand what it is like to be other people because we have reason to believe that their experiences are similar to ours. The consistency of our communication with each other gives us reason to believe that others can understand us, and the similar physical structure we all share gives us reason to believe that we share similar phenomena as well. We do not attribute this same similarity

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<sup>11</sup> An example of this usage would be “artificial consciousness.”

<sup>12</sup> It is not so much a change in the meanings of the terms but a further elucidation of what they tend to mean specified through formal definition.

of experience to animals because they are different in form and in relate-ability, although in some cases we attribute more features of consciousness than in others. A dog for example, can communicate with us in ways that we understand as conveying emotions that we are familiar with. Therefore, we have no difficulty in attributing basic emotions to dogs. We have less of an ability to perform this phenomenal empathy with creatures such as bats, and even less so with beetles. Furthermore, we do not attribute any experience to stones. This tendency to attribute experience to some things and not to others has stood in the way of our postulating a theory of universal phenomena, but it can be shown to be simply a heuristic. Though our understanding of the physical world and our hypotheses about how the phenomenal relates to the physical can help us to infer that a simple object such as a rock must have correspondingly simple phenomena, it cannot help us to know exactly what it is like to be granite.

It is interesting to note that the understanding of what it is like to be another human comes from our ability to take up forms that reflect those of others that are similar to us. If we see that someone is crying, this may stimulate an association of ours with the times that we ourselves we have cried and we may then take up an internal pattern of neural firing similar to that of our own sadness, which also happens to be similar to the sadness of another. This means of empathy allows us to communicate and to understand what it is like to be another. This “what it is like,” however, is different from directly experiencing the phenomena of another. We may be able to approximate what it is like to be someone else, but we can never know exactly what it is to be another person without actually being this person. If we were able to truly experience the phenomena of another, then the fact that this other might be a zombie would not be conceivable, because we could simply perform a test to find out.

Why we cannot understand ourselves outside of the present moment

Just as this inability to directly understand others’ phenomena comes directly from the nature of phenomena, so does a necessary inability to understand our own past phenomena directly. Since our phenomena only exist for us in the present, all of our understanding of how we have felt in the past or will feel in the future must come from some sort of heuristic. To do this, we are able to call up little bits of our states in other times, through memories or thought or imagination. We are able to use these representations to feel things that come from the past. This process is similar to that of understanding others and the fact that we use similar mechanisms to understand our past selves, stories of others, and other people in our own lives may have something to do with the feeling that we understand others as if they were ourselves. Since our identities for ourselves range across time, in a way this is true.

## Some problems that arise from a theory of universal phenomena

However elegant the principle of universal phenomena might be, it still does not provide an explanation for how consciousness arises in certain beings and not in others. To get at this issue, we will have to solve some problems that relate to how certain features of human experience may be instantiated in the physical world. These problems are called cohesion problems, and while it is not clear whether their solutions will be philosophical or scientific, they must be solved before we can understand how such an organized and rich experience as consciousness emerges from universal phenomenal bases.

## Cohesion problems

### The problem of phenomenal spatial cohesion

So far, when we have discussed experience, we have discussed it from the point of view of objects such as rocks or bats or people. But this discussion contained an implicit assumption: that experience comes in thing-sized chunks. However, we might question whether things are really the unit in which experience is packaged. First of all, modern metaphysical theories of mereology do not agree on whether these objects are metaphysically privileged features (Varzi, 2012). We do not even know whether the existence of entities is independent of our conceptual systems. If entities are not conceptually independent in this way, then there is certainly no reason to believe that experience comes in units corresponding to objects as defined by our conceptual systems. Even if objects are independent of our conceptualization, the 1:1 correspondence of phenomenal units to object units is not something that can be taken for granted<sup>13</sup>.

The version of universal phenomena we have argued for so far claims that all matter has associated phenomena, but we have not yet been able to make any claims about how these phenomena are organized or how certain physical features yield phenomena like consciousness and others do not. Moreover, we observe that consciousness is attached to ourselves as objects. What properties of the physical world cause this to happen?

This set of questions can be explored by first approaching them from the idea that each elementary unit of matter has the experience of itself. That is, the experience associated with a piece of matter is only the experience corresponding to that piece of matter. A quark has its own experience, but not the experience of an adjacent quark. I do not have the experience of another person, nor do I have the experience of the rock under my feet.

The problem with this approach, however, is that it seemingly does not leave room for a unified experience. Each of the atoms composing my neurons does not have its own experience, nor does each of my neurons itself. I have a macroscopic unit of experience that includes much of my perceptual field as well as non-spatial phenomena such as pain and emotions. Such things are neither present in a single particle nor in a single neuron, but in a system of particles and neurons composing my brain and my being. The problem of spatial phenomenal cohesion asks: how is it that the individual component phenomena associated with each particle can come together in a unified macroscopic phenomenon such as consciousness?

On the other hand, we do not need to assume that each particle has a phenomenon of its own. Suppose instead that phenomena are not a universal property of particles, but a universal property of systems, in that it can only exist at the level of the system. The problem here is no longer one of cohesion, but of thresholding. It asks: why is my macroscopic phenomenon separate from that of another person? How are some systems macroscopically cohesive—stuck together—and others not?

As both of these perspectives lead to the same problem, we may choose to mount the discussion from either point of view. Here we choose to continue by discussing the problem of cohesion instead of the problem of

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<sup>13</sup> However, I will assume that objects are conceptually contingent (or contingent in a pre-conceptual way on our embodied human experience).



thresholding, simply because it is more straightforward to frame. We keep in mind that both perspectives are useful.

To further show the strangeness of this spatial phenomenal cohesion, we can give an example where it does not seem to be instantiated. Imagine the phenomena associated with a rock. Such a rock may be embedded in a larger rock, or it may stand alone. Furthermore, such a rock is made up of smaller grains and crystals. There seems to be no reason why the rock should have a phenomenon separate from the larger rock and consistent across itself, nor does there seem to be any reason why the rock should have a coherent phenomenon more so than an individual grain does. There is nothing that seems to unify the grains into a rock that would have a macroscopic phenomenon, nor does there seem to be anything that would separate the phenomenon of this rock from the larger rock. Moreover, the experience could come in units of different sizes altogether such as the left half of the rock and a sixpence in my pocket<sup>14</sup>. It seems that the only consistent metaphysical experience would be present in the separate atomic (used in the etymological sense of basic component) units of the physical or undivided across the universe. However, our experiences come from a macroscopic system, but do not extend beyond ourselves. The problem of phenomenal spatial cohesion seeks to understand why.

In a spatially non-cohesive system, each particle has its own phenomenon, but the phenomena of each particle can only amount to the simplest possible properties and therefore cannot be rich in the way that a spatially cohesive system such as consciousness is. This observation is important for the understanding of why systems with phenomenal cohesion may have phenomena like consciousness, but non-cohesive phenomenal systems cannot. We will continue this discussion of the significance of phenomenal cohesion in a later section.

Though we do not yet have a strong argument for any particular solution, this is an essential problem to solve because it helps us to explain how we can have our own consciousness. It is so far unclear how this cohesion property might be instantiated, but some candidate solutions involve the existence of some sort of manifold upon which phenomenal experience exists and where separation can occur. Other candidates include arguments that physical bases for phenomena that are joinable, such as an electrical or oscillation-cohesion basis, may give rise to phenomenal cohesion. A final set of possibilities may contend that our experience is not actually cohesive, but that it simply appears to be<sup>15</sup>, or that our phenomena are not actually separate from that of the rest of the world, but highly uncorrelated in such a way that we do not notice the universal cohesion of our phenomena<sup>16</sup>.

The problem of phenomenal temporal cohesion

Interestingly, the temporal cohesion of phenomena also poses a problem. Recall the earlier observation that the only phenomena we know directly are those of ourselves in the present. However, we are able quite well to perceive and experience more than just the punctate present. How does this work?

Much of the background for this idea of existence in more than the present comes from William James' idea of the specious present. This concept refers to the idea that our experience does not take place in a temporally

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<sup>14</sup> I do not in fact have a sixpence in my pocket. This is an allusion to the mereology literature.

<sup>15</sup> This is simply stated as a logical possibility, I do not know how this might be possible and what might account for the illusion of this nonexistent cohesion.

<sup>16</sup> How this would work is also difficult to say, although it seems more likely to me than the possibility of no cohesion at all.

punctate moment, but in a temporally extended interval (Anderson & Grush, 2009). Though this interval has been demonstrated to be essential for various phenomenal experiences such as the perception of motion (Grush, 2004), it is not quite clear how such a feature could arise from phenomena that exist only for the being itself and for the moment at hand.

Just as with spatial cohesion, temporal cohesion presents a problem related to how it occurs in consciousness and how it is not present in all phenomena. Imagine the case of a sculptor and a piece of marble. Each piece of marble, once chipped from the block, has no further phenomenal relation to the block. There is no memory span, not even for an instant, and whatever phenomena arise from these pieces of marble exist only in the present moment. If a marble is chipped from the block one instant, for the marble it will be like it was never part of the block at all.

Another example comes from the perception of motion. In order for us to see the hands of a clock move, our perception must somehow be grounded in an extended interval. If we were to exist only in the present, then all we would see would be a stationary hand, even though the hand would be in a different place at each moment. For us to perceive this motion requires that the perceptions of the adjacent moments somehow be incorporated into the present.

Though one might be tempted to simply cite semantic memory as the cause of this, and though it may play a part in integrating broader temporal features of experience, it is not sufficient to account for temporal cohesion. Semantic memory allows us to recall concepts from our past, but does not explain how we perceive, not in, but through the present.<sup>17</sup>

The temporal cohesion problem, however, does not seem quite as difficult as the spatial cohesion problem. Though there is a contradiction between the claims of the specious present doctrine and the existence of phenomena only in the moment at hand, we can show that there exists a process by which these two can be reconciled.

#### Markov integration solution

This problem can be solved through a process of what I call Markov integration. The term Markov refers to the Markov property, and means that all of the relevant information is captured in the current state. In this case, we can define the phenomenal Markov property to simply reflect our understanding that phenomena exist only in the present state. Since phenomena have the Markov property, everything that is phenomenally perceived is in the present moment. In order to expand this phenomenal perception from a punctate moment to a temporally extended interval, information about adjacent and surrounding states must be incorporated into the present state. Just as a Markov-chain formulation of a naturally non-Markov process may include extra state variables to capture information not present in the natural state formulation, so must a phenomenal process capture non-basic state information if it is to incorporate the experience of a temporally extended interval into an experiential state. Though exactly how this is instantiated in the brain may not be known, such Markov incorporation must exist. We might further postulate that for a continuous process to extend beyond

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<sup>17</sup> An analogous idea comes from the idea of a differential in calculus. Though the differential may be specified at an instant, it is composed of the change over the instant at which it is derived. This open set about a point is larger than the point, just like perception of motion requires more than just the phenomenal instant.

an interval, there needs to be some sort of smooth convolution process or temporal-context-creating representation, however such a possibility must be explored more formally before it is accepted as true.

This solution outlines a feature that any metaphysical and physical basis for the specious present must incorporate. I believe that a further investigation into the specifics of how this century-old idea of the specious present is physically instantiated, as well as a deeper exploration of the metaphysics of phenomenal temporal cohesion would be worthwhile.

The temporal integration process can be described as a sort of convolution of the information from the present moment with discounted information from adjacent moments<sup>18</sup>. Such a convolution<sup>19</sup> will provide the perceptual connective tissue required for a smooth temporal context around the present. In this formalization, the discount structure might be represented by many possible functions, but the simplest example case comes from the use of a Gaussian. These discount structures represent how the influence of the present moment is spread over time. It allows us to take into account the idea that information from the present moment will have more of an influence in the present moment than information from moments further in the predicted future or further in the past. Convolution of a punctate delta function representing the information of the present moment with a Gaussian discount function will result in a smoothing of the influence of this moment over time in the shape of a Gaussian with the peak centered on the present moment. If such a process applies to all moments, then the result is a specious present, where all moments are connected by a weighting structure that favors the influence of the present stimuli and discounts the temporally adjacent stimuli as captured in past representations and projected by models of expected future representations<sup>20</sup>.

What follows are some illustrations of the difference between a temporally non-cohesive phenomena and a temporally cohesive phenomenon with a Gaussian discount structure. The examples represent a discrete case of information from four moments in time. A continuous version, though mathematically describable through simple calculus, is more difficult to illustrate.

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<sup>18</sup> By discounting, I mean that the perception of moments further from the present will be less visceral.

<sup>19</sup> Which could be formalized using the convolution operator (integral transform)

<sup>20</sup> If these temporal incorporations were to apply to more than just the physical bases for conscious phenomena—which is plausible given that neural properties tend not to be domain specific—then this type of theory might also explain the discounting of rewards in domains of human goal-seeking behavior.

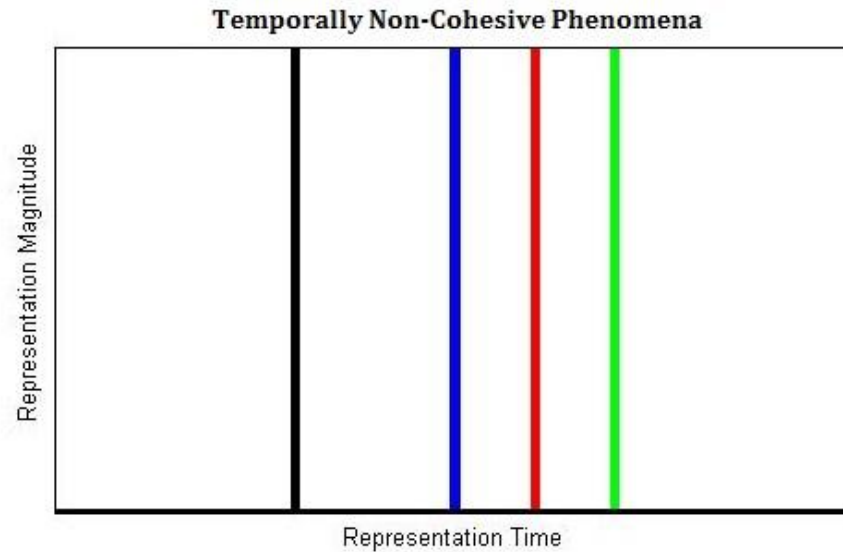


Figure 1: Representation of temporally non-cohesive phenomena. Representation time is given by the horizontal axis, represented time by the color of the Gaussian, and the strength of the representation by the y axis. The center of each Gaussian corresponds to the time of occurrence/perception.

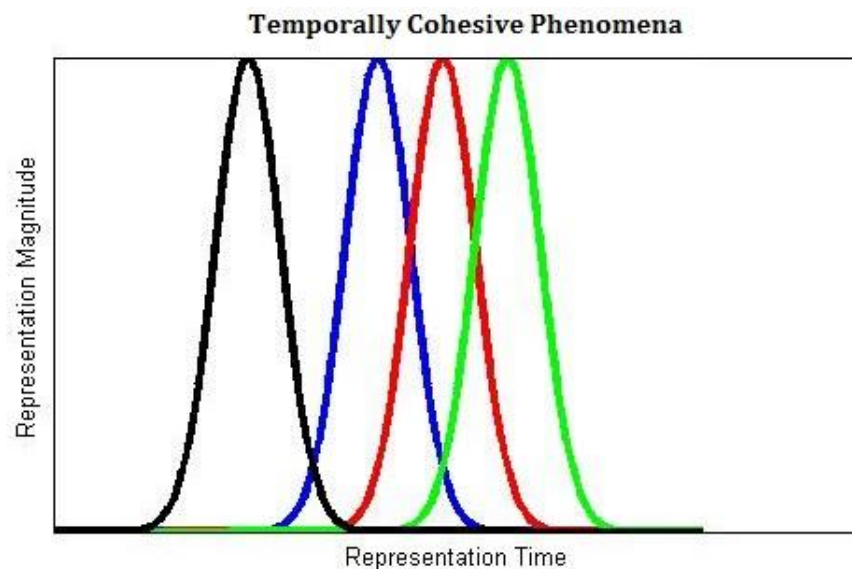


Figure 2: Representation of temporally cohesive phenomena<sup>21</sup>. Representation time is given by the horizontal axis, represented time by the color of the Gaussian, and the strength of the representation by the y axis. The center of each Gaussian corresponds to the time of event occurrence/perception.

<sup>21</sup> Different components of experience need not blend together, but can be represented by independent neural mechanisms. It is also possible to represent the difference between the representation time and the time of event occurrence. See Grush 2004 for more on this.

It is essential, however, that we note that this process must work on a physical substrate. As phenomena are contingent upon a physical basis, the Markov information incorporation must not only function within the abstractions of mathematical or formal computational representations, but by temporally convolving the information in the physical basis for the present phenomena with the same types of phenomena-realizing physical states adjacent in time.

Of course this was about as brief an overview as is possible to give, and an expanded theory will need to take into account some specific questions that arise with a formal analysis of this Markov incorporation process. However, I do not envision this as being overly difficult.<sup>22</sup>

### Phenomenal entities

Though we have seen that it is not metaphysically necessary that phenomenal experience come in thing-like chunks nor that it is persistent across time, we do know of at least one case of a phenomenon that does have these properties: consciousness. Consciousness is what we will call a phenomenal entity<sup>23</sup>. It is united across a certain amount of local space and time, yet also separate from the rest of the world. Such an entity invokes the spatial and temporal phenomenal cohesion properties, yet is seemingly not spatiotemporally bound to the rest of the world. How exactly this contingent cohesion is achieved is not quite clear, but we do know that these properties are essential for experience as we know it. Moreover, any type of experience that we can hope to understand as experience from our perspective must have these properties. They are what we naturally use to determine whether something has phenomena. In this proposal for a theory of universal phenomena we have shifted this attribution of empathize-able experience from its previous connection with the question of whether a being has phenomena<sup>24</sup>, to whether a being is a phenomenal entity. Such a shift eliminates the paradox that arises when we posit that the phenomenal is contingent upon the physical, yet it allows the existence of consciousness or similar forms of experience to be entirely contingent upon the physical. By showing that spatial and temporal phenomenal cohesion are necessary for phenomena like ours, we can begin to investigate what properties of the physical world are required for consciousness.

To cement an understanding of why the properties of phenomenal entities are essential for the realization of consciousness-like phenomena, we can give examples of experiences that we can imagine, and which are based in phenomenal entities, as well as examples of experiences that we cannot imagine, and which are based in beings that are not phenomenal entities.

Example of a bat's phenomena (a phenomenal entity):

Though we cannot entirely understand what it is like to be a bat, we may gain a rough idea by understanding the experience of a bat through our own phenomenal experience. The experience of sonar might be like adding an extra sense, and the experience of flying might not be so alien after all. A bat has a mammalian brain, at

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<sup>22</sup> However difficult or otherwise it may be, determining the neural mechanisms for such processes and doing a formal analysis of this would be incredibly interesting. I do think that this is biologically plausible, and that, despite the nontrivial mathematics that may be required to formalize the process, it is quite a natural thing to do.

<sup>23</sup> I was first tempted to designate them "phenomenal objects", as this was most intuitive to me, but it seems as if the name was already taken to refer to another concept. To avoid re-baptizing yet another term, I have simply decided to call them phenomenal entities, which is sufficient—although a little less intuitive—and avoids introducing unnecessary possibilities for conflation into the literature.

<sup>24</sup> Or consciousness, in the case where the terms are conflated in the literature.

least somewhat like ours, and therefore most likely embodies the properties of spatial and temporal phenomenal cohesion. This makes a bat a phenomenal entity. Though we do not know exactly what it is like to be a bat, the fact that a bat is an example of a phenomenal entity leads us to the intuition that it most likely has some sort of subjective experience and allows us to cognize a rough idea of what it might be like.

Example of a rock's phenomena (not a phenomenal entity):

Though our theory of universal phenomena allows us to consistently infer that rocks do have phenomena (though not necessarily at the level of a rock), it does not mean that we can understand these phenomena in terms of what it is like to be a rock. As a rock has neither the property of phenomenal spatial cohesion nor the property of phenomenal temporal cohesion, it is not a phenomenal object. Because our understanding of what it is like to be comes from our experience as phenomenal entities, we cannot expect to have the ability to understand what it is like to be a rock. For all empathetic purposes, there is nothing that it is like to be a rock, nor is there anything that it is like to be a component of a rock. Because a rock is not a phenomenal entity, its phenomena, though extant, cannot be understood directly in terms of experience.

The fact that we attribute experience only to phenomenal entities may form the basis of epistemic theories of consciousness attribution. Such theories can help us to understand how we partake in empathy and why we associate experience only with phenomenal entities. Though some components of this distinction are undoubtedly due to our inability to simulate the experience of non-phenomenal entities within the terms of our own embodied phenomenal experience, there may be other neurally engrained reasons for the attribution of lesser degrees of experience to other animals and to things that may be phenomenal entities, but in a very different way from us (Jack, in-press). The phenomenal entity, however, is an essential structure for consciousness and for experience as we know it. Though phenomena are universal, the problem of what gives rise to our consciousness may be investigated in terms of what specific physical properties are necessary to instantiate spatial and temporal phenomenal cohesion.

### Alternative physical bases for phenomena

However elegant and essential a theory of universal phenomena might be, it is still not a precise specification for how the world works, but a broad concept of a theory, sort-of a theory outline. A complete theory, as Chalmers rightly argues, would specify exactly how differences in physical form map to differences in phenomenal experience (Chalmers, 1996). So far we have found no such results.

Though we will not discuss it in the detail required, there is an issue that we have glossed over related to exactly what properties of the physical give rise to phenomenal correlates.

The exact physical bases of phenomena are not important to the general theory of universal phenomena, but such an understanding might be essential for discovering the solutions to the problems of spatial and temporal cohesion. These bases might be many things, and there is a vast literature that argues for one or the other. There are quantum theories that suggest that phenomena arise from some sort of quantum entanglement property, theories that posit an electrical basis for phenomena, theories that posit oscillation frequency bases, informational theories, and others. The exact arguments in each of these theories are interesting and may be of interest to those investigating the problems of phenomenal cohesion, though the one I do specifically wish to discuss briefly is Chalmers' own double aspect theory of information.

David Chalmers proposes that the physical basis for phenomena is information itself. One issue with this claim is that information is a subjective quantity. On the lowest quantum levels, information may be a physically instantiated and quantifiable property, but the information on these levels tells us nothing about phenomena, nor does it tell us anything about the macroscopic information that Chalmers uses in his examples.

Chalmers invites us to imagine that a thermostat may be the simplest physical basis for phenomena in that it contains simple binary information of on or off (Chalmers, 1996). But this macroscopic information of on and off is not a metaphysically privileged property. We can imagine that this might mean nothing, or that other things that do not seem to convey information relevant to phenomena might contain more actual information. Imagine for instance the position of a pawn on a chess board. This certainly conveys information, yet does not seem in the least bit phenomenally relevant. The writing on the Rosetta stone also conveys information—much more so in fact—yet the physical basis of this information is an unchanging stone that seems to be no more phenomenally complex than a similar stone without writing. Information of this type is what I call subjective information in that it exists only relative to an observer. The information that might have a chance of having a metaphysical basis is quantum information, but there seems to be no way that this information might relate to the spatiotemporally coherent phenomena that we observe in our own consciousness<sup>25</sup>.

As we have seen, a better way to understand whether a consciousness-like phenomenon exists is whether the entity in question satisfies the requirements for being a phenomenal entity. Though spatial and temporal phenomenal integration<sup>26</sup> may not be sufficient for human consciousness, they seem to be what is required for phenomena to arise that in any way resembles what we might call experience. Though the idea that phenomena are universally present in the physical seems to me to be essential for a unified metaphysical theory of the physical and the phenomenal, the information medium that Chalmers proposes as the physical basis for phenomena will most likely need to be replaced by something else.

## Conclusion

We have seen that the metaphysical issues that arise from contemporary theories of the physical relation to the phenomenal can be obviated by instead appealing to a theory of universal phenomena. By positing that phenomena are a universal property and that the consciousness we observe is contingent, we can begin to ask the question of what properties of the physical world give rise to human-type consciousness. Moreover, we were able to show that two properties—spatial and temporal phenomenal cohesion—are essential for consciousness to arise. We began a discussion of how these properties contribute to consciousness and raised questions about how they might be instantiated in the physical world. In the case of the temporal property, we proposed a possible solution that involves the integration of experience of a moment over all of the adjacent moments to yield a temporally cohesive experience similar to that described by William James in his concept of the specious present. We found the case of spatial cohesion more difficult and suggested (among

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<sup>25</sup> Though there cannot be a metaphysical information basis for phenomena due to the reasons discussed, it is possible to view phenomena from an informational perspective with Chalmers' phenomenal coherence property (discussed in Chalmers, 1996) enforcing a bijection between the physical and the phenomenal or at least a supervenience of the phenomenal on the physical.

<sup>26</sup> This is another term for spatiotemporal phenomenal cohesion, although it emphasizes the fact that the components are not separate, but integrated into a single unit entity.

other possibilities) that it might be solved by some sort of continuous manifold upon which physical and phenomenal components lie. Using these properties of spatial and temporal cohesion, we were able to posit the existence of a general class of phenomena that has similar experiential properties to human consciousness. This class—known as phenomenal entities—consists of all things that we might intuitively attribute experience to, and helps us to explain why we can begin to imagine the experience of other people and other higher-order animals, but not of trees and rocks.

## Future Work

I am working on developing a consistent metaphysical ontology that helps to solve some of our current metaphysical paradoxes in addition to the some problems associated with universal phenomena and spatial and temporal phenomenal cohesion. As this is a massive and quite ambitious undertaking, I am not sure whether it will come to fruition. The purpose of this note is simply to suggest that there are some issues in the above theory that I have avoided exploring because the associated roads lead to further untangling of adjacent philosophy and is therefore of a larger scope than I wish to consider in this short paper. I hope to explore these in the future and I imagine that the clearing of these paths will not only make way for future discoveries, but will help us to better understand and explain this theory of universal phenomena.

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