

Is Consciousness Fundamental?

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What are the fundamental properties of our world, and what is the best metaphysical account of them? Many assume we should look to physics to answer these questions. Physics refers to properties such as mass, spin and charge, and seems to characterise these properties in exclusively dispositional terms. Mass, for example, is characterised in terms of gravitational attraction and resistance to acceleration; charge is characterised in terms of attraction and repulsion. Perhaps, then, we should conclude that the fundamental properties of our world are dispositions: properties essentially defined in terms of how they dispose their bearers to behave. This, at least, is the argument of dispositional essentialists.

However, Jennifer Wang (2019) has recently raised a challenge for dispositional essentialism, rooted in an intuitive principle regarding the relationship between essence and ontological dependence. From this principle, I will argue, after multiple digressions, to the conclusion that at least some experiential properties are fundamental. I will then argue that this finding fits best with a panpsychist theory of reality.

Essence and Dependence

Wang's challenge to dispositional essentialism is rooted in an essentialist account of dependence, expressed by the following principle:

Essentialist Dependence (ED): x depends on y iff y figures in the essence of x .¹

We can roughly think of 'y figuring in the essence of x' as meaning 'y is referred to in specifying what x essentially is'. So, for example, the property of being red figures in the essence of the property of being a red square, as the property of being red is referred to when you specify what the property of being red and square is. In line with ED, this reflects the fact that the property of being a red square depends on the property of being red. Socrates is referred to when specifying the essence of Socrates Singleton – the set containing only Socrates – reflecting the fact that Socrates Singleton depends on Socrates.

A major attraction of an essentialist account of dependence is that it avoids the many counterexamples faced by modal account of dependence. We can define the latter as follows:

Modal Dependence (MD): x depends upon y iff necessarily, x exists only if y exists

¹ Wang calls this principle 'EN' and suggests a couple of ways of analysing it. In fact, all that is needed for Wang's challenge to dispositional essentialism is the right-to-left reading of ED: if y figures in the essence of x , then x depends on y .

To take just one counterexample, MD entails that the Eiffel Tower is dependent on the number 2: the number 2 exists necessarily, and hence the Eiffel Tower exists only if the number 2 exist. ED avoids this absurd implication, as the number 2 does not figure in the essence of the Eiffel Tower. Moreover, ED expresses the intuitive idea that dependent entities are ones that are defined in terms of other entities.

How does ED raise a challenge for dispositional essentialism? Because, for any disposition D, specifying the essence of D involves reference to some property non-identical with D, namely the manifestation of the disposition. For example, to specify what negative charge is we need to talk about repelling positive charged things. By ED, we can infer that negative charge depends on positive charge. Assuming fundamental properties don't depend on anything, we can infer that negative charge is not fundamental. Of course, the same argument could be made for positive charge, and all of the other dispositions described in physics.

The main alternative to dispositional essentialism is *quidditism*, the view that fundamental properties are quiddities. The basic definition of a quiddity is as follows:

Basic Definition of a Quiddity: Property P is a quiddity only if causal roles do not figure in the essence of P.

We pick out mass in terms of what it does. But according to quidditism, these dispositional properties do not define what mass essentially is. Clearly, this thesis distinguishes quidditism from dispositional essentialism.

What then is the essence of mass, if it is not given by the causal roles associated with mass? The most common answer of quidditists is expressed by the following thesis:

Trivial Identity Thesis: Quiddities have trivial essences.

According to the Trivial Identity Thesis, there is nothing more to the essence of mass than its being what it is (from which it follows that it is not another thing). Mass and charge are numerically distinct, but there's nothing to be grasped about what that the difference consists in; mass is one thing, charge is another, and that's all there is to it. As way of clarification, this view conceives of the identity of a property somewhat analogously to how we generally think of the identity of an individual. Suppose Bill and Ben are identical twins. What makes Bill who he is, and Ben who he is? There is plausibly no non-trivial answer to that question: Bill is who he, Ben is who he is, and there's nothing more to be said.²

If physical properties, such as mass and charge, and not defined by their causal roles, where do the causal roles come from? Quidditism is often conjoined with a commitment to the contingency of the laws of nature. This can take a reductive, Humean form, according to which the laws are grounding in patterns realised by quiddities across space and time (Lewis 1986). It can also take the form of a non-reductive, governing laws view, e.g. the view of

² Of course, objects fall into kinds, which come along with essential properties. But kind-membership does not determine the unique individuality of a given individual, as can be seen by the fact that Bill and Ben may fall under all the same kinds whilst being distinct individuals.

David Armstrong (1983) that laws of nature are contingent relations of natural necessitation that obtain between universals. In either case, whilst mass in itself is not tied to any particular causal role across possible worlds, it nonetheless has a causal role in the actual world, which is determined by the contingent laws of our universe.

Whilst most quidditists – at least in the metaphysics literature – adopt the Trivial Identity Thesis, I think we can imagine a form of quidditism that adopts the basic definition of what a quiddity is whilst denying the Trivial Identity Thesis. In other words, there are two conceptions of a quiddity: one on which quiddities have trivial identities – call these ‘thin quiddities’ – and one on which quiddities have substantive (i.e. non-trivial) essences – call these ‘thick quiddities.’ We can in turn define ‘thick quidditism’ as the view that fundamental properties are thick quiddities, and ‘thin quidditism’ as the view that fundamental properties are thin quiddities.

It might seem hard to make sense of thick quidditism, at least if we accept ED. For, in accepting ED, we accept that, for any fundamental quiddity Q, specifying the essence of Q does not involve reference to any property outside of Q (for otherwise, Q would be dependent on the properties thus referred to, and so non-fundamental). But if nothing other than mass figures in the essence of mass, then surely specifying the essence of mass can amount to nothing other than just saying ‘Mass is mass!’, i.e. mass has a trivial essence. How then could a fundamental quiddity have a non-trivial essence?

Thus, one might think the proponent of thick quidditism faces the following dilemma:

For any property P, either P has a trivial essence, or its essence is specified in terms of properties non-identical with P (in which case P isn’t fundamental).

If this is a true dilemma, then there can be no properties which are both fundamental and have non-trivial essences.

The above dilemma, however, is a false one. For there may be a property P, such that there is an essence-revealing concept of P that is primitive, but which also yields a non-trivial understanding of P. Consider, for example, the concept of *goodness*. It is not implausible that ‘goodness’ is a primitive concept of a primitive property. But, when conceiving of goodness as such, we don’t merely pick it out as *a particular property, distinct from any other*. Our conception of it is richer than that. On the assumption that goodness is a primitive property, we can’t convey the nature of the property in other terms. Still, we seem to have a positive understanding of what it is for something to be good, as opposed to, say, bad.³ On a thin quidditistic view of mass and charge, there is a mere brute identity difference between mass and charge; in the contrasting case of goodness and badness, we seem to have a positive understanding of what the difference consists in.

³ It is plausible that goodness is necessarily connected to reason-giving properties, e.g. the fact that something is good gives rise to a reason to pursue it. But these necessary connections seem to *follow* from the essence of goodness rather than constituting it; it’s *because* X is good that we have grounds for pursuing it. At least it’s not implausible to suppose this.

Another example may be causal relations, on a non-Humean conception of them. Non-Humeans have been known to characterise the causal relation as the ‘oomph!’ relation. Clearly, this is not an attempt at an informative analysis of what it is for things to be causally related. It is rather intended to express a *primitive* but nonetheless *rich* conception of what a causal relation is. One could say it’s the *making stuff happen* relation, although that’s just to say the same thing with different words.

One final example might be modal properties, such as necessity and possibility. There are, of course, entailment relations between necessity and possibility, e.g. if something’s necessary, then it’s possible. But there is plausibly more to what it is for something to be necessary/possible than is captured by the pattern of entailment relations they bear to each other; indeed, these entailment relations seem to follow from the nature of necessity/possibility rather than determining it. The nature of possibility can’t be defined in other terms, but we nonetheless have a positive understanding of what it is for something to be possible.

Of course, not everyone agrees that the above are examples of primitive properties. Some think that for an act to be good is just for it to maximise utility; that the causal relation can be defined in terms of counterfactual dependence; that to be possible is to exist in some Lewisian world. My point is just that there are views with a certain degree of plausibility according to which the phenomenon in question (goodness/the causal relation/possibility) has a non-trivial and yet primitive essence. And if this kind of view is an option in each of these cases, why could not something analogous be true with respect to fundamental physical properties? Perhaps there is an essence-revealing concept of mass which yields a rich understanding of its nature without defining it in other terms. If so, then mass is a thick quiddity.

Thick quidditism entails that physical science provides a radically incomplete account of reality, as it tells us nothing about the nature of mass. In physical science we characterise mass in terms of its causal role, but on any kind of quidditist view, this does not capture the nature of mass. For the thin quidditist, there is nothing to be grasped about what mass is, and hence, we’re not really missing out on anything in conceiving of mass in merely dispositional terms. But for the thick quidditist, there is a positive nature we’re missing out on. When God looks down at mass, conceiving of mass using Her divine, essence-revealing MASS concept, God conceives of mass in terms of a rich, positive, primitive nature. Perhaps it’s quite a sight to behold. This is sadly not a conception of mass that physical science affords us.

Thick quidditism is a *possible* view, perhaps not very satisfying as it implies that physical science cannot penetrate into the nature of matter. But do we have any reason to take it seriously? In the next section, I will argue that the properties of conscious experience – phenomenal properties – are thick quiddities, before going on to argue that at least some phenomenal properties are fundamental.

Phenomenal Properties as Thick Quiddities

We can begin with some terminology. Following standard usage, I will use the term 'phenomenal concept' for the kind of concept one deploys when one thinks about the character of an experience as such, i.e. when one thinks about what it's like to have a particular kind of experience. I will refer to the referent of a phenomenal concept as a 'phenomenal property,' and think of an experience as an event of a conscious subject instantiating a phenomenal property.

Kripke famously argues in *Naming and Necessity* that our phenomenal concepts are strikingly different to the natural kind concepts involved in standard scientific identities, and on the basis of this difference he raised some challenges for putative psycho-physical identities. We pick water out in terms of its accidental properties: being the colourless, odourless stuff that falls from the sky and is in oceans and lakes. Science then comes along, on Kripke's view, and reveals the essential nature of this stuff to be H₂O. We pick out heat in terms of its accidental property of causing heat experiences; science then tells us what heat essentially is: molecular motion. Things are quite different, however, when it comes to a phenomenal property such as the feeling of pain. We pick out pain in terms of how it feels. But how pain feels is not an accidental feature of it; pain *just is* a feeling, and as such is essentially defined by how it feels.

Many contemporary physicalists have claimed to agree with Kripke on this issue, whilst giving a purely negative interpretation of what he is saying.⁴ On this negative interpretation, Kripke's claim is merely that we don't pick out pain in terms of some accidental feature of it, which leaves open that our way of fixing reference to pain may involve a grasp of *none* of its properties, neither accidental nor essential. For many physicalists, our concept of pain is somewhat akin to a demonstrative, *pointing* to something without having any positive conception either of its essential nature or of its accidental properties. How on this view is reference fixed? The standard view would be that the reference of phenomenal concepts is fixed by causal connections between concept and referent and/or by the evolved function of the concept.⁵

There is also, however, a positive way of interpreting what Kripke is saying, such that his claim is not merely that we *don't* pick out pain in terms of accidental properties but also that we *do* pick out pain in terms of its essential nature. Pain is a feeling, essentially defined by how it feels; and when we feel pain, and attend to it, we thereby know how it feels, and thereby know what pain essentially is. In knowing how your pain feels, you know what it is for someone to feel that way.

I leave it to the reader to decide whether the positive or the negative interpretation of Kripke is closer to what he intends to say. Regardless of this exegetical question, which view offers a more plausible account of our epistemological relationship to experience?

⁴ The origin of this is Loar 1990/1997: 105, but we can see a similar interpretation of the Kripkean point in Papineau 2002 and McLaughlin 2001.

⁵ See, for example, Carruthers 2000; Tye 2000: ch. 2, Perry 2001; Papineau 2002, Levin 2007a, 2007b.

It would be useful to introduce another bit of terminology at this point. Many phenomenal concepts, such as 'pain' and 'seeing red' are very rough and ready and highly vague. But standardly when one is having a particular experience, one is able to attend to the phenomenal property involved in the experience and think about it directly in terms of what it's like to have it, such that the content of the concept is determined by this act of attention. For example, if I'm in pain, I can attend to the character of the pain, and think about it in terms of how it feels (N.B. 'the character of the pain', 'how it feels', 'what it's like', and 'phenomenal property' all pick out the same thing). David Chalmers (2003) calls this a 'direct phenomenal concept'. In so far as philosophers have wanted to claim that phenomenal concepts are essence revealing (Chalmers 2003; Goff 2015, 2017), it is direct phenomenal concepts that they have had in mind.

Making use of the notion of direct phenomenal concepts, we can define the two possible interpretations of Kripke as follows:

Revelation: Direct phenomenal concepts reveal the essence of their referents, i.e. when conceiving of a phenomenal property under a direct phenomenal concept, one conceives of that phenomenal property in terms of its essential nature.

Opacity: Direct phenomenal concepts reveal neither essential nor accidental properties of their referents.

Someone who disagreed with Kripke could take a middle way option, arguing that direct phenomenal concepts reveal accidental but not essential properties of their referents (Lewis 1980). There is also a 'partial Revelation' option, according to which direct phenomenal concepts reveal some but not all essential properties of their referents (Schroer 2010).

I think something like Revelation is self-evident. Suppose I am currently having a specific pain experience, and I attend to the character of the experience and think about it as such. In doing so, I am not blindly pointing at *something I know not what*. Rather, I am directly aware of *a way of feeling*. And, in attending to that way of feeling, I know how the experience feels, and thereby know what it is for someone to feel that way. By definition, there is nothing more to the essence of a feeling than one is aware of when one attends to how it feels.

Well, not quite. I used to defend Revelation (Goff 2015; 2017: Ch. 5), but I now think the simple principle given above needs to be qualified. One difficulty for the above principle is that it's not clear whether a given direct phenomenal concept of specific phenomenal property affords a grasp of *all aspects* of that property. Suppose one forms a direct phenomenal concept of what it's like to drink a certain claret at the beginning of a wine tasting course, and one forms a distinct direct phenomenal concept of what it's like to drink the same claret at the end of a wine tasting course. It is plausible that, in attending to the character of the experience at the end of the course, you will be able to discern all sorts of subtle flavours that were invisible to you at the start. Were these subtle flavours present in your experience at the start of the course despite your lack of awareness of them? Or has the course changed your wine experience, enriching it with new flavours that were simply not part of your experience before? Hard to say, but the former possibility has a certain plausibility, and in so far as we take it seriously, we must reject Revelation. For, on this view,

the direct phenomenal concept I formed at the start of the wine tasting course left me ignorant of some of the features of the phenomenal property it was referring to.

I also think mindfulness meditation can give us reason to doubt Phenomenal Revelation. In mindfulness meditation, one attempts simply to attend to a given experience, often the experience of the breath. In other words, one attempts simply to sustain a continuous direct phenomenal concept of what it's like to experience the breath. For almost everyone, this is very difficult, and they find themselves continuously distracted by thoughts that make them temporarily cease from employing the phenomenal concept. Noticing the distraction, they return to deploying a direct phenomenal concept of what it's like to breath, and this repeats many times.

A more subtle problem that arises after one has succeeded in sustaining continuous attention to the breath, is that one notices that the content of the phenomenal concept one is sustaining is not wholly based on attending to the character of the experience. To a certain extent one is projecting on to the breath experience one's memory-based idea of what it's like to experience breathing, rather than simply attending to the character of experience one is currently having. It's hard to put into words precisely what one is projecting, but it's something like a slightly simplified caricature of the character of a breathing experience.

Why does this undermine Revelation? The first problem is that it leads to problems with Chalmers' definition of a direct phenomenal concept. Chalmers defines a direct phenomenal concept as one for which the content of the concept is *wholly* based on attending to the character of the experience. Given this definition, I'm inclined to think that mindfulness meditation reveals that we never really have direct phenomenal concepts, because we always, to a very subtle extent, project onto our *current* experiences experiential character based on our memories of *past* experiences. I have an idea of what pain feels like based on my prior experiences of pain, and, to a subtle extent, I project that idea onto my current experiences of pain.

We could respond to this problem by giving up talk of direct phenomenal concepts. Alternately, we can simply modify the definition such that the content of a direct phenomenal concept is *to a large extent* based on attending to the experience. When I attend to a pain I am currently having and think about it in terms of how it feels, to a subtle extent I am projecting the character of past pain experiences onto it, but this does not negate the fact that to a large extent I am taking in the character of the pain I am currently having, and forming a concept based on that direct awareness. Indeed, one central aim of mindfulness meditation is to increase the extent to which the content of one's thought about experience is based on attending to the character of the experience, and correspondingly to decrease the extent to which the content is based on memories of other experiences one has had previously.⁶

⁶ For those used to the standard discourse used to describe mindfulness meditation, it may seem strange to describe it as the activity of sustaining *thought* about experience, as mindfulness meditation is generally described as passively observing thoughts that arise but not instigating them. However, the 'thought' implied by deployment of phenomenal concepts is simply the result of attending to experience; when those involved in mindfulness meditation talk of 'thought', I don't think they refer to 'thought' in this sense.

Given this watering down of the definition of a direct phenomenal concept, however, problems arise for Revelation. Consider a case in which I'm subtly projecting features of previous pain experiences (or a slightly simplified caricature of what pain feels like) onto my current pain experience. To the extent that I am doing this, my direct phenomenal concept *mischaracterises* the character of the experience I'm currently having, and hence mischaracterises the essential nature of that phenomenal property (N.B. phenomenal property=character of experience=what it's like to have the experience).

I think the way around both of the problems described above (arising from the wine-tasting and the meditation examples) is to frame the principle not in terms of direct phenomenal concepts, but in terms of phenomenal concepts in general *in so far as they are accurate*:

Revelation*: For any phenomenal concepts C referring to phenomenal property P, in so far as C accurately represents P, C reveals the essence of P.

As a bad wine taster, perhaps my attention-based concept of what it's like to drink claret misses out subtle aspects of the character of the experience. Perhaps my attention-based concept of how my current pain feels projects some features of my past pain experiences onto my current pain experience. Still, such careful attention-based experiential concepts, to a very significant extent, get the character of the experience right. Given that phenomenal properties just are the characters of possible experiences, in so far as our experiential concepts accurately represent those characters, to that extent they accurately represent the essences of the phenomenal properties.⁷ So much seems to me to be self-evident.⁸

Once we have accepted Revelation*, it seems to me hard to deny that phenomenal properties are thick quiddities. Consider a case of my attention-based concept C of phenomenal property P, e.g. the character of a red experience I'm currently having. To a large extent, C accurately represents P, and, to that extent, C reveals the essence of P (Revelation*). Upon phenomenological reflection, two things seem to me to be evident about how P is conceived of under C:

- Anti-Dispositionalism: P is not conceived of in terms of its causal role but in terms of what it's like to have an experience involving it.⁹

⁷ It may seem strange to talk about 'representation' in this context, as this word might seem to imply some epistemic distance between the representer and what is represented, whereas the content of a direct phenomenal thought is based on a direct awareness of the referent. However, I don't think 'representation' need imply epistemic distance; phenomenal thought is *about* experience, and it is *aboutness* that is the essential notion in representation. Furthermore, as we have been discussing, phenomenal thought can fail to be perfectly accurate, and the notion of accuracy/inaccuracy is also a crucial element of representation.

⁸ Knowing a self-evident truth doesn't entail rational certainty (where one has rational certainty of P iff it's rationally permissible to believe P with a credence of 1).

⁹ One might think that the phenomenal character of a pain (phenomenally conceived) is conceived of in terms of its causal role. This naturally leads to the analytic functionalist position that to be in a pain is to have an inner state that plays a certain causal role. However, the analytic functionalist position is ruled out by the conceivability of zombies. Furthermore, epiphenomenalism seems to be conceivable, which suggests that phenomenal concepts don't present phenomenal properties in terms of their causal roles. When we attend to

- Non-Triviality: C doesn't pick out P merely as *a particular property, distinct from any other*: in grasping a phenomenal property (e.g. the qualitative character of a red experience) one is afforded a positive understanding of what its reality consists in.

It follows from the above, by definition, that R is a thick quiddity.

Reductive representationalist views of consciousness might seem to give us grounds for doubting Anti-Dispositionalism.¹⁰ According to reductive representationalism:

- A conscious state is essentially defined in terms of its representational content, e.g. the phenomenal character of a red experience is essentially defined in terms of its representing redness in the external world.
- The representational content of a conscious state is essentially defined in terms of the evolved function of tracking, i.e. the capacity to recognise, and behave with respect to information about, specific features of the external world, e.g. experientially representing redness is essentially defined in terms of its evolved function of tracking redness.

Reductive representationalism is indeed inconsistent with Anti-Dispositionalism, as according to the former a phenomenal property is ultimately essentially defined in terms of its causal relationship with a certain feature of the external environment. However, I don't think that Reductive Representationalism is sustainable once we accept Revelation*. Reductive representationalism is plausible, if plausible at all, as an *a posteriori* claim about the essential nature of consciousness. There is nothing about evolved functions and/or tracking apparent to me when I attend to the qualitative character of my red experience; it is entirely conceivable that my conscious experience was miraculously created five minutes ago rather than resulting from millions of years of natural selection and/or that my conscious mind is the only thing in existence.

We can put the above argument as follows, starting from Revelation rather than Revelation* for the sake of simplicity:

The Revelation Argument Against Reductive Representationalism

1. Revelation: When I attend to a red phenomenal property R, I conceive of R in terms of its essential nature.
2. If reductive representationalism is true, then to conceive of a R in terms of its essential nature is to conceive of it in terms of its evolved function of tracking redness in the external world.
3. It's not the case that when I attend to R, I conceive of it in terms of its evolved function of tracking redness in the external world.
4. Reductive representationalism is false.

pain, we immediately want to avoid it, but it doesn't follow that the disposition to give rise to avoidance behaviour is part of the essence of pain.

¹⁰ Dretske 1995; Tye 1995.

Admittedly, the above argument is framed in terms of Revelation, which I have suggested is false, rather than Revelation*, which I think is true. But it doesn't seem that moving to the more nuanced principle would make a difference, apart from making the argument a bit more cumbersome to state. When I attend to R, my attention-based concept *largely* accurately represents R, and hence I *largely* correctly grasp R's essential nature. And yet evolved tracking functions feature not at all in my conception of R. The move from Revelation to Revelation* does not open up a window in which some significant features of R's essential nature are entirely hidden. The claim of Revelation* is that to know what it's like to have an experience is to grasp the nature of the relevant phenomenal property; it's just that we always *slightly* mischaracterise what our experiences are like.

This is not to say that phenomenal properties do not represent. It's pretty plausible that my visual experience of a tomato in front of me necessarily represents a red, round object at a certain distance. But once we accept Revelation*, this fact points to the Phenomenal Intentionality Theory, according to which intentional properties are grounded in phenomenal properties rather than vice versa (Kriegel 2013; Montague 2016; Mendelovici 2018).

Phenomenal Properties as Fundamental Properties

I argued in the last section that phenomenal properties are thick quiddities. However, this is not the same as the claim that phenomenal properties are *fundamental* thick quiddities. It is simply the claim that:

- The casual roles of a phenomenal property do not figure in its essence.
- A phenomenal property has a non-trivial essence.

Many of the phenomenal properties of human experience are highly complex, which, assuming ED, would make them dependent on their elements. Any given colour phenomenal property, for example, involves phenomenal analogues of hue, saturation and brightness. Assuming ED, any given colour phenomenal property will depend on phenomenal saturation and phenomenal brightness and on a certain phenomenal hue. Furthermore, to the extent that the colour phenomenal property involves specific magnitudes of, for example, phenomenal brightness, it would seem that certain mathematical properties figure in its essence.

Phenomenological reflection doesn't seem to reveal any other properties that figure in the essence of our phenomenal properties beyond phenomenal and mathematical elements. Assuming Revelation, we can infer that there are no other properties that figure in the essence of phenomenal properties beyond phenomenal and mathematical properties. Assuming ED, we can in turn infer that there are no properties, other than phenomenal and mathematical properties, upon which our phenomenal properties depend:

The Revelation Argument for the Mathematio-Phenomenal Nature of Phenomenal Properties

1. Revelation: To conceive of a phenomenal property under a direct phenomenal concept is to conceive of it in terms of its essential nature.
2. When a phenomenal property is conceived of under a direct phenomenal concept, no properties other than mathematical and phenomenal elements figure in its essence.
3. Therefore, for any phenomenal property x , and for any non-phenomenal and non-mathematical y , y does not figure in the essence of x (1,2).
4. Essentialist Dependence (ED): x depends on y iff y figures in the essence of x .
5. Therefore, for any phenomenal property x , and any non-phenomenal and non-mathematical property y , x does not depend on y (3,4).

As in the case of the Revelation argument against reductive representationalism, I have assumed Revelation, rather than Revelation*, for the sake of simplicity. But I don't think the move to the more nuanced principle would make a difference, for the reasons discussed in the context of the Revelation argument against reductive representationalism.

The conclusion of the above argument is consistent with the possibility that phenomenal properties can be reduced to mathematical properties, that is to say, that the essence of a phenomenal property is wholly constituted of mathematical properties. However, I think there are good reasons to doubt that this is the case. A colourblind scientist might have detailed understanding of the structure of colour experiences, of how various colour experiences fit in to the similarity space framed by phenomenal hue/saturation/lightness, but this will not yield a full understanding of the character of colour experiences. This is the moral of the story of black and white Mary (Jackson 1982). For a less far-fetched example, we can consider the real-world case of the scientist Knut Nordby, an expert in colour vision who suffers from *achromatopsia*: a rare condition in which, due to the absence of retinal cones, one is unable to perceive colours, apart from black and white and shades of grey. In reflecting on colour experience, Nordby says:

...one way for me to attempt to visualise the special quality of experiencing colour is to liken colour to the musical quality of tones, or *chroma*. Whereas colours have brightness and hue...tones have loudness, pitch, timbre, and chroma. ... Although the 'chroma' metaphor may convey the idea of a special sensory property, it can never depict the actual experience of colours (Nordby 2007: 79-82).

Without a commitment to Revelation*, these epistemological considerations don't tell us very much. But assuming Revelation*, to attend to a phenomenal property in phenomenal terms (in so far as the resulting conception is accurate) just is to grasp the essential nature of that phenomenal property. No purely mathematical description can provide that kind of understanding. On this basis, we can argue that our experiences involve both phenomenal and mathematical *elements*, where a property P is an element just in case there is no property Q non-identical with P , such that P depends on Q .

The Argument for Phenomenal Elements

1. When a phenomenal property is conceived of in terms of its essence, no properties other than mathematical and phenomenal elements figure in its essence.

2. Therefore, either (A) the essence of a phenomenal property is wholly constituted of mathematical elements, or (B) the essence of a phenomenal property is wholly constituted of phenomenal elements, or (C) the essence of a phenomenal property is wholly constituted of both phenomenal and mathematical elements.
3. (A) is false, as this would mean that understanding of the essential nature of a phenomenal property could be gleaned from a purely mathematical description.
4. (B) is false: a mathematical property, e.g. a certain magnitude, is neither identical with nor depends on any phenomenal property.
5. Therefore, the essence of a phenomenal property is constituted of both phenomenal and mathematical elements.

Does it follow that (some) phenomenal properties are fundamental? Not necessarily, as some philosophers distinguish between dependence and grounding.¹¹ Indeed, if we don't make such a distinction, then ED is not very plausible, as it does not allow for cases of multiple realisation. Consider the property of *being a heart*. In human beings, the instantiation of this property is grounded in the instantiation of certain specific neurophysiological properties. But those specific neurophysiological properties don't figure in the essence of the property of being a heart; the former constitute just one possible grounding base for the latter. Similarly, non-reductive physicalists hold that physical properties do not figure in the essence of phenomenal properties, as the former constitute just one possible grounding base for the latter (non-reductive physicalists allow that, in other possible worlds, consciousness facts are grounded in non-physical facts). On this view, we could say that phenomenal properties are *elemental* – there are no non-phenomenal properties upon which phenomenal properties depend – but not *fundamental*.

However, it is quite plausible that there is also a necessary connection between essence and grounding.¹² Consider the grounding relation between the fact that <there is a party> and the fact <Rod, Jane and Freddy and partying>. Clearly, Rod, Jane and Freddy do not figure in the essential nature of a party. It is pretty plausible, however, that the essential nature of a party specifies a general condition which (A) is satisfied by the fact that Rod, Jane and Freddy are partying, and (B) the satisfaction of which is sufficient for there being a party; that general condition is: it is in the nature of a party that if there are people partying, then there is a party. Fine (2012: 75-6) renders this as follows:

Suppose that the truth C is grounded in B₁, B₂, Then the grounds B₁, B₂,... will concern certain existing items a₁, a₂, ...and so may be stated in the form B₁(a₁, a₂, ...), B(a₁, a₂, ...), A generalization of this particular connection of ground will therefore take the form:

B₁(x₁, x₂, ...), B(x₁, x₂, ...), ... is a ground for C whenever A(x₁, x₂, ...),

where A(x₁, x₂,...) is a condition that in fact holds of a₁, a₂, Thus given that A(x₁, x₂, ...) in fact holds of the existing items a₁, a₂,..., the particular connection of ground will logically follow from the general connection.... What we may now claim is that

¹¹ Fine 1995 distinguishes two notions of dependence, one of which figures in ED, the other of which – grounding – does not.

¹² Fine 2012; Dasgupta 2014, Goff 2017: Ch. 2.

whenever a given truth C is grounded in other truths, then there is a generalization of the particular connection of ground that will hold in virtue of the nature of C (or of the items it involves). Thus, the particular explanatory connection between the fact C and its grounds may itself be explained in terms of the nature of C.

This connection between grounding and essence seems to support the fundamentality of phenomenal elements in much the same way that ED supports the existence of phenomenal elements. For a fact of the form <X instantiates phenomenal element P> to be grounded in some more fundamental, non-experiential fact, it would need to be the case that the essential nature of that phenomenal element specifies some general condition the satisfaction of which would be sufficient for there to be something that instantiates P. But, as already discussed, no non-phenomenal properties figure in the essence of the phenomenal elements. Therefore, if there is some such condition specified by the essence of pain, sufficient for its instantiation, it can only be the condition that some phenomenal property is instantiated. There is nothing that figures in the essence of a phenomenal element that could open it up to reduction in non-phenomenal properties.

The Case for Panpsychism

Empirical science tells us only about the dispositional features of micro-physical properties, and hence, on the assumption that these properties are quiddities, there seems to be no way of directly ascertaining whether or not they are thick quiddities or thin quiddities. But if the above arguments are sound, we have grounds for thinking that some properties, i.e. phenomenal properties, are thick quiddities. The hypothesis that our universe contains only thick quiddities is simpler and more unified than the hypothesis that our universe contains thick quiddities and thin quiddities. Therefore, in the absence of any reason to think that micro-physical properties are thin quiddities, we should go with the more theoretically virtuous supposition that they are thick quiddities.

As already noted, the view that micro-physical properties are thick quiddities might seem rather unsatisfying, as (on this view) physics does not provide us with essence-revealing concepts of these properties. We may have something to go on, though, in speculating about the essential nature of micro-physical properties. For, if the above arguments are sound, we do know the essential nature of some of the thick quiddities in our universe, namely, the phenomenal properties of humans and some other animals.¹³ The hypothesis that all fundamental quiddities in our universe are determinates of the same determinable is a simpler and more unified hypothesis than the hypothesis that some fundamental quiddities are determinates of one determinable and other fundamental quiddities are determinates of another determinable. Therefore, in the absence of any reason to think that micro-physical properties are determinates of a non-experiential determinable, we should go with the more theoretically virtuous supposition that they are determinates of the determinable *phenomenal property*.

A hundred years ago, Arthur Eddington reached this conclusion for something like these reasons:

¹³ I take it that we have some grip on the phenomenal properties of non-human animals, e.g. they feel pleasure and pain, and have sensory experiences which represent the environment around them.

We are acquainted with an external world because its fibres run into our consciousness; it is only our own fibres that we actually know; from these ends we more or less successfully reconstruct the rest, as a paleontologist reconstructs an extinct monster from its footprint (Eddington 1928: Ch. 13).

In reaching these conclusions, Eddington was building on certain theses Russell defended in *The Analysis of Matter*. There has been a recent revival of interest in these ideas of Russell and Eddington, which has led to the emergence of a view that has become known as ‘Russellian panpsychism’ (Alter & Nagasawa 2015; Goff 2017). Indeed, Russellian panpsychism is essentially the position we have already reached, from a different direction. To put it in the terms employed in this paper, Russellian panpsychists claim that micro-physical properties are thick quiddities. Physical science characterizes them in terms of their causal roles, but in their essential nature they are phenomenal properties. Physics tells us what negative charge does – attracting positively charged things and repelling other negatively charged things – but in its essential nature negative charge is a phenomenal property.

What kind of phenomenal property is negative charge, or mass or spin? Are the phenomenal properties of humans and animals grounded in phenomenal properties at the micro-level – the *weak emergentist* version of Russellian panpsychism (Roelofs 2019) – or are both macro and micro-level phenomenal properties fundamental features of reality in their own right – the *strong emergentist* version (Mørch 2019). We may or may not be able to fill in some/all of these details of the panpsychist position. Physical science has made great progress in identifying the dispositional properties of matter. However, if we are working with the assumption that physical properties have rich essential natures independent of the causal role they play, it is much less clear that we human beings will be able to uncover those essential natures. At the very least, making progress on this will require a radical rethink of the methods of natural science.

In the meantime, even in the absence of further detail, the above considerations give us grounds for thinking the general panpsychist position is more probable than its rivals.

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