

A Physicalistic Account of Emergentism

Nicholas Schroeder

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Abstract Jaegwon Kim’s argument against non-reductive physicalism is well known. Many philosophers take Kim’s argument to also apply to emergentism. But this does not necessarily follow. In this paper, I will first briefly show why Kim’s argument against non-reductive physicalism need not apply to emergentism. Next, I will present a physicalistic account of emergentism offered by Jason Megill in his paper “A Defense of Emergence.” This will be followed by an examination of some of the limitations of Megill’s account, in particular, his failure to adequately account for the causal powers of higher level physical properties independent of realization. Finally, I will offer a suggestion on how Megill might avoid the difficulties raised by appealing to the concept of *wide realization* espoused by Robert Wilson in his paper “Two Views of Realization.” The overarching theme of the paper centers on the idea that the realization requirement is where the action is, in terms of making emergentism compatible with physicalism, and is capable of being tinkered with by the emergentist and physicalist alike.

Keywords Emergentism · Emergence · Physicalism · Non-reductive physicalism · Wide realization · Realization

1 Introduction

Jaegwon Kim’s argument against non-reductive physicalism is well known.¹ Many philosophers take Kim’s argument to also apply to emergentism. But this does not

¹ For an in depth discussion see, in particular, the development of the argument in Kim (1989, 1992, 1999).

N. Schroeder (✉)
Department of Philosophy, University of Kansas, 1445 Jayhawk Boulevard, Wescoe Hall, rm. 3086,
Lawrence, KS 66045, USA
e-mail: n048s514@ku.edu

necessarily follow. In this paper, I will first briefly show why Kim’s argument against non-reductive physicalism need not apply to emergentism. Next, I will present a physicalistic account of emergentism offered by Jason Megill in his paper “A Defense of Emergence.” This will be followed by an examination of some of the limitations of Megill’s account, in particular, his failure to adequately account for the causal powers of higher level physical properties independent of realization. Finally, I will offer a suggestion on how Megill might avoid the difficulties raised by appealing to the concept of *wide realization* espoused by Robert Wilson in his paper “Two Views of Realization.” The overarching theme of the paper centers on the idea that the realization requirement is where the action is, in terms of making emergentism compatible with physicalism, and is capable of being tinkered with by the emergentist and physicalist alike.

2 Emergentism, Non-reductive Physicalism, and Physicalistic Commitments

Before presenting a physicalistic account of emergentism, it will prove useful to first demarcate emergentism from non-reductive physicalism. A very succinct delineation goes as follows. At the basic level non-reductive physicalism is committed to the following: (a) all higher level (e.g. mental) properties are instantiated by lower level physical properties, and (b) (higher level properties) are not directly reducible to lower level properties. But it is also common for non-reductive physicalists to accept two additional claims: (c) higher level properties causally effect lower level properties and (d) higher level (mental) properties are distinct from lower level physical properties.² Usually there is an appeal to the notion of multiple realizability to explain how distinct properties (d) can be instantiated from lower level physical properties. For example, it is claimed that it is conceivable for a higher level mental property like ‘being in pain’ to be realized equally in the brains of mammals, reptiles, mollusk, extraterrestrials, etc.³ But Kim’s *exclusion argument* shows that multiple realizability is unsustainable unless we accept rampant overdetermination.⁴ There is also a desire by non-reductive physicalists to maintain that higher level properties have causal efficacy (c). But as Kim further shows by means of the *causal inheritance principle*,⁵ the claims (a), (b), (c), and (d) taken together are inconsistent. The implications of the argument entail that higher level properties must either be reducible or lack causal powers, collapsing into reductive physicalism or epiphenomenalism, respectively (i.e., we must either reject b or c). Thus, neither of the two options proves desirable for the non-reductive physicalist.

² Claim (d) is taken to entail some version of property dualism.

³ See Putnam (1967).

⁴ See Kim (1999), esp. p. 32. The force of this criticism could be called into question. For a dissenting viewpoint, see Kallestrup (2006) and Corry (2013). For the purposes of this paper, I am taking Kim’s argument to be sound.

⁵ The causal inheritance principle is stated by Kim (1992, p. 18) as: “If mental property *M* is realized in a system at *t* in virtue of physical realization base *P*, the causal powers of *this instance* of *M* are identical with the causal powers of *P*.”

The above line of argumentation works well against emergentism *if* we accept the claims (a), (b), (c), (d). But it need not be the case. For emergentism only needs (b) and (c) to be viable. Essentially, the reason Kim's argument is effective against emergentism depends on the fact that the argument forces us to reject (b) or (c). An important point to make is that the additional claims (a) or (d), while appealing for many emergentists, are not necessary for the theory. *Emergentism is not the same as non-reductive physicalism because it does not necessarily depend on (a) to be viable.* By rejecting the realization requirement, (a), emergentists can escape the arguments raised against non-reductive physicalism, allowing (b) and (c) to consistently be maintained.

A more advanced version of the exclusion argument appears in the later Kim (2003, 2005) that adds physicalistic ontological commitments. This is not necessarily an argument that works against emergentism per se (emergentism need not endorse physicalism), but it is worth visiting if we want to defend an account of emergentism that is compatible with physicalism. The argument contends that the conjunction of five claims are inconsistent. The five claims are:

- (1) Causal Closure: Every physical effect has a sufficient physical cause.⁶
- (2) Non-overdetermination: There is no systematic overdetermination of physical effects.⁷
- (3) Exclusion: no effect has more than one sufficient cause.⁸
- (4) Causal efficacy: higher level properties causally effect lower level properties.
- (5) Property dualism: higher level (mental) properties are distinct from lower level physical properties.

In my understanding, the argument here does not require the defense or endorsement of any one of the claims in particular to make it consistent. Escaping the inconsistency, in principle, seems achievable by discarding any of the claims presented. But let us look at how Kim uses the above argument to refute causal efficacy in light of non-reductive physicalism.

Kim's argument goes as follows.⁹ Because we rejected overdetermination¹⁰ (from 2), no physical effect has more than one sufficient cause. And as physicalists, because we must accept causal closure (from 1), this entails that every physical effect will also have a physical cause. The problem, hence, for the non-reductive physicalist, because he wants to hold that higher level (mental) properties are distinct (from 5) and causally effect lower level physical properties (from 4) concerns the fact that the higher level (e.g. mental) properties in this case can act as a second sufficient cause for some effect. But according to exclusion (from 3) there can only be one sufficient cause for a particular effect. Therefore, we must conclude

⁶ See Kim (2005, p. 15).

⁷ See Kim (2005, p. 17). Kim refers to non-overdetermination as the *principle of determinative/generative exclusion*.

⁸ See Kim (2005, p. 17).

⁹ The argument that follows is roughly adapted from Kim (2005). See Chapters 1 and 2 for Kim's exact formulation(s).

¹⁰ We conceded to this in the previous version of the exclusion argument.

that either the higher level (mental) cause is responsible for the effect *or* the lower level physical cause is responsible for the effect (Kim 2005, p. 19). Though this is this case, Kim argues, we know that if the effect in question is a physical effect it will have at least one sufficient cause (from 1) (2005, p. 21). Because of causal closure, at least one sufficient physical cause will always occur along with a mental cause in producing a physical effect.¹¹ If this is the case, the physical cause alone is able to bring about the physical effect *excluding* the causal efficacy of the higher level mental property. Thus, we must reject (4).

The result from the above argument is that the non-reductive physicalist is again forced to accept epiphenomenalism. Kim takes it that epiphenomenalism is not acceptable for non-reductive physicalism (non-reductive physicalists will not want to reject 4). His target instead is property dualism (5). Kim, in terms of physicalistic commitments, takes this to be the only “negotiable” claim (2005, p 22). But, simply put, without property dualism, higher level causal powers can be explained away in terms of supervenience, and non-reductive physicalism collapses into reductive physicalism (Kim 2005, p. 22). Thus, non-reductive physicalism is incoherent. The important point to remember here is that rejecting (5) escapes the argument. This does so in a way that is compatible with the acceptance of physicalism. While non-reductive physicalism is not viable as a result, the same is not true of emergentism. *Emergentism can escape the argument by rejecting both the realization requirement and property dualism (distinctness)*. The next section will explore the implications of this move.

3 Physicalistic Emergentism

Emergentists can escape Kim’s argument against non-reductive physicalism by rejecting the realization requirement. But what does the rejection of the realization requirement entail? Above I argued that emergentism need only be committed to (b) and (c) to be viable. While these are (I believe) necessary conditions, these conditions *alone* prove to offer an uninteresting or impoverished theory. Emergentists will want more from their theory. We could add distinctness (d) to get a more comprehensive theory, but, in the absence of realization, it will result in ontological dualism. While dualistic emergentism will prove desirable (and sufficient) for some, many others sympathetic to a physicalistic ontology will want to avoid making this move. Thus, there is a need for a formulation of emergence that is consistent with physicalism. Megill makes great headway for this project.

In the absence of realization, Megill proposes that we appeal to law-like regularities between higher and lower level properties: “*First*, if property *E* emerges from physical system *S* in a given world, then *E* emerges from *S* with law-like regularity; that is, whatever else might be said about the emergence relation, it is lawful” (2013, p. 599). This escapes the need for higher level properties to be

¹¹ It should be noted that Kim (2005) enlists the help of mind–body supervenience in his formulation of the argument being discussed. But the argument is effective without adding the additional claim. Kim seems to acknowledge this in a footnote on p. 41. If it is helpful to the reader, mind–body supervenience can be added as a claim in the argument without changing the conclusion.

identical to or realized by lower level properties, while allowing the relation between the properties to be entrenched in the physical world. Megill has the problem of *qualia* in mind here. He is attempting to ground unrealized properties to physical causes: “So, e.g., if a pain quale emerges from a brain state in which C-fibers fire, any time C-fibers fire, a pain quale will emerge” (Megill 2013, p. 599). One way to establish a law-like relation would be to accept strong supervenience. While feasible, strong supervenience opens the physicalistic emergentist to extraneous commitments he may or may not be willing to accept. In keeping the theory simple, we can get by with a lot less. Instead, the physicalistic emergentist need only to accept causal closure: the claim that every physical effect has a sufficient physical cause (Megill 2013, p. 601).

Megill is committed to causal closure, claiming, “Any version of physicalism must endorse causal closure because if causal closure fails, there is a physical effect that has a non-physical cause, in which case there are non-physical entities and so physicalism is false” (2013, p. 601). Higher level properties must have physical causes to avoid violating the completeness of physics. Non-reductive physicalists were able to avoid a direct confrontation with completeness because the realization requirement entailed that distinct higher level properties, while not identical to physical properties, were still grounded in the physical world by always being realized in or by physical properties (Megill 2013, p. 601). This allowed non-reductive physicalists to escape the threat of ontological dualism. For the physicalistic emergentist this move is not available. The reason this is the case, involves the fact that without realization it is possible to have properties that are completely distinct and detached from physical causes. Detached non-physical properties would provide evidence for a non-monistic world refuting a major tenet of physicalism.¹² The important implication of this commitment is that all non-realized properties, including qualia and consciousness, must be physical. This is an important point that I will return to.

An emergentist theory will also want novelty. In particular, an emergentist will want higher level properties to have novel causal powers not possessed by its base. Megill gets novelty from his theory in an interesting way. First, powers are taken to entail law-like relations between higher and lower level properties. These law-like relations allow higher level properties to causally interact with lower level properties. Next, the irreducibility requirement is taken by Megill to entail novelty and vice versa: “Conversely, if one claims that emergent properties have novel causal powers, one must claim that emergent properties are irreducible” (2013, p. 599). This alone only assumes novelty. But with the rejection of realization, it follows that higher level properties will not be identical to lower level properties. And the interacting higher level properties thus will have powers not possessed by its base: “These novel causal powers will be causal powers not had by the emergent property’s base; they will only appear at the higher level of organization, even though they might be able to causally influence lower levels of organization” (Megill 2013, p. 599). Roughly, we can generate novelty from the combination of

¹² A clear exposition for why non-physical properties cannot independently exist in the ontology endorsed by physicalism can be found in Stoljar (2010).

irreducibility (b) and causal efficacy (c), if we reject realization and add a law-like relation between higher and lower level properties.

The above additions provide emergentists with a comprehensive theory that is compatible with physicalism and avoids the problems previously raised. Physicalistic emergentism might then be represented to entail the claims (b) and (c), in addition to law-like regularity and novelty. Megill captures the formulation when he claims: “So, an ontological emergent property (i) stands in a lawful relation to its emergent base, (ii) has novel powers not had by its base, and (iii) is irreducible to its base” (2013, p. 599). Because Megill’s theory is a physicalistic theory it will also endorse causal closure. Taken with the denial of realization it follows that all higher level properties must be physical properties. Thus, all emergent properties must be physical properties. The implications from the preceding claim also entail that property dualism (implied from d) is false (Megill 2013, p. 601). This for some is a price worth paying; for others it is harder to swallow. The primary candidates for contention are qualia and consciousness, which are normally taken to be distinct or special properties. More will be said on the matter next. But it needs to be stated that physicalistic emergentism *must* hold qualia and consciousness, or any other cherished higher level property to be physical.

We must be careful at this point. There could be an inclination to think that all higher level properties are emergent. This is not the case. Only some higher level properties—in Megill’s case, exclusively consciousness and qualia—are emergent. A property is emergent because it is irreducible, has causal powers, etc., not the other way around. These characteristics are rare and limited to special cases. Megill claims that qualia are unique from other physical properties. But uniqueness does not necessarily entail that qualia are not physical. He claims, “But it is perfectly coherent to hold that qualia are physical properties that happen to be unique from all other physical properties. The property of being a prime number is a unique numerical property insofar as it is not identical to any other numerical property, yet it is a numerical property all the same” (Megill 2013, p. 602). By uniqueness, I take Megill to simply be accounting for qualities that are peculiar to emergent properties. For example, he claims that “qualia emerge from their basal conditions with law-like regularity, they have novel causal powers not had by their basal conditions, and they are irreducible to those basal conditions” (Megill 2013, p. 602). He makes this particular move without much argument. Many philosophers simply grant at least most of these *unique* characteristics to qualia. Instead, Megill is more concerned with showing that qualia can be deemed physical while possessing the characteristics in question. He goes on to point out that there is nothing inconsistent or incoherent about unique properties being physical (Megill 2013, p. 602). In fact, Megill is committed to holding unique properties to be physical if his theory is to remain viable.

In order for Megill’s theory to be viable, every property must be a physical property. So far, we have simply stipulated that higher level properties like qualia or consciousness are unique and physical. More is required to solidify the theory. The next section will offer empirical evidence in support of two claims: first, qualia and consciousness are physical, and second, qualia and consciousness are unique and actually are unrealized, irreducible, causally efficacious, etc. If these two conditions

are met, there is reason to believe that qualia and consciousness are emergent properties and physicalistic emergentism is true.¹³

4 Unique Higher Level Properties

Let us start with consciousness, which is normally taken to be awareness of the external and internal content characteristic to mental states. Consciousness is usually thought to be a likely candidate for being a higher level property. But, a higher level property like consciousness poses a direct threat to Megill's theory if it proves to be distinct.¹⁴ Remember, this was the case because without realization the existence of distinct higher level properties entails ontological dualism. We have strong reasons to think that consciousness exists and is a higher level property. Thus, there is good cause for Megill to show that consciousness is physical. He looks to recent empirical research regarding the Electromagnetic Field Theory of Consciousness to support his case (Megill 2013, p. 609).¹⁵

The Electromagnetic Field Theory of Consciousness is taken to make three core claims: "First, the brain produces an electromagnetic field. Second, this electromagnetic field can in turn influence the firing of neurons. Third, this electromagnetic field is consciousness" (Megill 2013, p. 610). By consciousness, Megill has in mind a self-referring loop resulting from the exchange of information between the magnetic field and its neuronal base. The electromagnetic field in this case, I take Megill to be treating as higher level, and the neural states to be lower level. Megill goes on to provide empirical support for each of the claims. The first claim proves to have the most empirical backing. For example, electroencephalography only works because of the fact that the brain produces an electromagnetic field (Megill 2013, p. 610). Furthermore, fluctuations in this field are directly measurable. As Megill points out, "so not only does the field fluctuate, but it fluctuates when a brain receives sensory information or generates bodily movement" (2013, p. 610). The second claim, that the electromagnetic field of the brain can influence the firing of neurons (its neural base), is also empirically supported. The strongest support comes from transcranial magnetic stimulation, where a magnetic field is generated through the use of a coil placed on the subject's scalp (Megill 2013, p. 610). Megill points to research backing the field's ability to influence cognition, concluding that "there are mechanisms in place through which the field could influence the behavior of neurons, and there is empirical evidence that suggests that the field does exert such

¹³ There could, of course, be other problematic (unique) higher level properties that need to be accounted for. But Megill takes qualia and consciousness to be the biggest hurdles for his theory.

¹⁴ An important clarification is in order. It is not the case that mental properties like consciousness are non-physical by definition. Rather, Megill's theory simply holds that mental properties cannot be distinct from lower level physical properties. I am grateful to an anonymous reviewer at *Axiomathes* for pointing out the importance of this clarification.

¹⁵ It should be noted that the Electromagnetic Field Theory of Consciousness is not widely accepted in the scientific community.

an influence” (Megill 2013, p. 610). If this is the case, it will give Megill support for the causal interaction he needs to occur between higher (the magnetic field) and lower level (neural base) properties. I will return to this point.

The third claim, that the electromagnetic field in the brain is consciousness, is the most controversial of the three claims. But Megill goes on to argue that empirical evidence points in its favor (2013, p. 610). Megill is largely relying on the research of Johnjoe McFadden presented in his paper, “Synchronous Firing and Its influence on the Brain’s Electromagnetic Field: Evidence for an Electromagnetic Field Theory of Consciousness.” An important passage in the paper is worth quoting:

That complex information can be encoded in electromagnetic fields is of course familiar: electromagnetic waves are routinely used to transmit information that is decoded by television or radio receivers. I propose here that our thoughts are similarly electromagnetic representations of neuronal information in the brain, and that information is in turn decoded by neurones to generate what we experience as purposeful actions or freewill. This circular exchange of information between the neurones and the surrounding em field provides the ‘self-referring loop’ that many cognitive scientists have argued to be an essential feature of consciousness. (McFadden 2002, p. 38)

The above conclusion follows from a series of testable predictions performed by McFadden.¹⁶ Essentially, the results indicate a feedback loop between characteristic features of thought (i.e. awareness, perception, volition, etc.) indicative of consciousness and fluctuations in the electromagnetic field produced in the brain. While the results remain unclear on whether consciousness is the whole of or merely part of the electromagnetic field produced in the brain, it in many ways proves to be beside the point. The research if cogent, provides some concrete support for the physicality of consciousness. Electromagnetic fields, according to contemporary physics, are physical. If we accept this ontology, consciousness will also be physical if it is an electromagnetic field. Megill takes this to be sufficient empirical evidence for his theory (2013, p. 610).

¹⁶ See McFadden (2002, pp. 31–32). The eight predictions tested (and passed) are: (1) Stimuli that reach conscious awareness will be associated with em field modulations that are strong enough to directly influence the firing of motor neurones. (2) Stimuli that do not reach conscious awareness will not be associated with em field modulations that affect motor neurone firing. (3) The cemi field theory claims that consciousness represents a stream of information passing through the brain’s em field. Increased complexity of conscious thinking should therefore correlate with increased complexity of the brain’s em field. (4) Agents that disrupt the interaction between the brain’s em field and neurones will induce unconsciousness. (5) Arousal and alertness will correlate with conditions in which em fluctuations are most likely to influence neurone firing; conversely, low arousal and unconsciousness will correlate with conditions when em fields are least likely to influence neurone firing. (6) The brain’s em field should be relatively insulated to perturbation from exogenous em fields encountered in normal environments. (7) The evolution of consciousness in animals should correlate with an increasing level of electrical coupling between the brain’s endogenous em field and (receiver) neurone firing. (8) Consciousness should demonstrate field-level dynamics. Again, it should be noted that the Electromagnetic Field Theory of Consciousness is not widely accepted in the scientific community, nor have McFadden’s experimental results been replicated.

Having now established consciousness as physical,¹⁷ Megill proceeds to the next phase of his argument: establishing that consciousness possesses the unique qualities characteristic of emergent properties. Remember, Megill claimed that emergent properties (i) stand in a lawful relation to its emergent base, (ii) have novel causal powers not had by its base, and (iii) are irreducible to its base. Consciousness, according to the Electromagnetic Field Theory, meets each of these three criteria. As a field produced in the brain, consciousness is a property that stands in a law-like relation to its neural base. Evidence for this is the corresponding fluctuations in neural activity (i.e. firing of motor neurons) with fluctuations in the electromagnetic field (Megill 2013, p. 611). The electromagnetic field can also influence the emergent base. One example of this previously discussed came from transcranial magnetic stimulation. Thus, because the electromagnetic field can causally influence its neural base and has causal powers not possessed by its neural base “these fields would have novel causal powers not had by their emergence base” (Megill 2013, p. 611), satisfying the second condition for being an emergent property. Lastly, Megill points out that magnetic fields are not reducible to their base: “one cannot reduce a magnetic field created by neurons to the neurons themselves” (2013, p. 611). If this is indeed the case, the third condition for being an emergent property is satisfied.

With the following pieces in place Megill can make a case for his theory. Consciousness is a unique property meeting all the conditions necessary to be an emergent property. There is also empirical evidence for holding that consciousness is a physical property, being consistent with Megill’s theoretical commitments to physicalism. Therefore, consciousness is a physical emergent property. If we accept this conclusion, physicalistic emergentism is true. This, of course, is not a knock-down argument for physicalistic emergentism, but it does provide strong *prima facie* evidence for it. But we still need to address qualia. Qualia are the content of phenomenal judgments; the raw feels of subjective experience. Like consciousness, qualia are held to be higher level and to possess the unique qualities characteristic of emergent properties. If this is the case then they cannot be distinct. This is important, remember, because Megill’s theory requires all higher level properties to be physical. Megill spends much less time on qualia than he does on consciousness. I take it that he considers consciousness to be the harder case. Let us look at the argument regarding qualia.

Megill takes a different route in providing support for the claim that qualia are physical emergent properties. He first claims qualia to be covered by the same mechanisms responsible for consciousness according to the Electromagnetic Field Theory of Consciousness (Megill 2013, p. 612). This assumes qualia to be physical if identical to the magnetic field from which they emerge. Next, Megill argues backwards to support his theory. He claims that there is strong empirical evidence showing that the neural system associated with visual qualia (the ventral stream) is disconnected from the neural system associated with behavior (the dorsal stream)

¹⁷ There are of course grounds to deny Megill this move. In particular, we might try to show that the Electromagnetic Field Theory of Consciousness is false, flawed, or non-conclusive. But, *prima facie*, Megill has enough empirical evidence to justify moving forward with his argument.

(Megill 2013, p. 613). Megill then argues that there are strong reasons to believe that qualia cause behavior: “The problem, of course, is that our intuition that qualia cause behavior is extremely powerful” (2013, p. 614). The above claims for Megill are both taken to have strong support. According to Megill, reductive and non-reductive physicalists (on account of realization) cannot account for the causal powers of qualia by the empirical evidence presented, forcing both to retreat into epiphenomenalism (2013, p. 614). He then proceeds to claim that physicalistic emergentism can consistently account for both the empirical evidence regarding the disconnected neural systems and the causal powers present: “There is another possibility however, one that, so far as I know, has been overlooked. If ontological emergentism is true, then it would still be possible for visual qualia to causally affect behavior even though the relevant neural systems are not directly connected to one another” (Megill 2013, p. 614). The move essentially relies on the fact that qualia *can* affect behavior from a disconnected neural system because they are a non-realized property.

Though Megill’s argument above moves fast, and relies on some questionable assumptions, his theory, if the empirical criticism stands, seems to be the most able (of the physicalist theories presented) to account for qualia; *if* we are committed to the claim that qualia cause behavior. From what was discussed, in an interesting twist, the existence of qualia now provides positive support for physicalistic emergentism. Megill’s final argument (from the discussions of consciousness and qualia) then entails that, not only is physicalistic emergentism true, but it is also needed to account for the fact that qualia cause behavior.

5 Problems with Physicalistic Emergentism

Megill’s physicalistic emergentism, while a promising theory, faces some difficulties. The biggest concern involves how non-realized higher level physical properties are to be accounted for. If they are not instantiated by lower level physical properties, where do they come from? Do non-realized higher level properties “magically” appear from nowhere, or have they always been?¹⁸ I believe we should avoid going down this road. One move we might make would be to hold that the emergence of non-realized properties takes place at the same level as its base. This is a view held by Paul Humphreys.¹⁹ The emergence of the emergent property would then result in the destruction of its base—at the *horizontal* level (Humphreys 1997, pp. 13–14). In this sense, the emergent property would not be instantiated by a lower level property, hence being non-realized. This could work in some cases, but it would be strange to hold that an emergent property like consciousness is the result of fusion. While not in direct conflict with physicalism, the mechanism by which the properties we care about are generated and sustained remain in many senses unexplained by Megill’s theory.

¹⁸ The latter view is endorsed by Shoemaker (2002).

¹⁹ See Humphreys (1997).

Another concern involves Megill's account of law-like regularity (i). What does this regularity amount to and how are causal powers granted? In the case of reductive and non-reductive physicalism, the realization requirement at minimum, is able to ground a supervenience relation between higher and lower level properties. But for Megill, there is no direct way to entrench higher level properties to lower physical bases without stipulating that the interaction or relation simply holds. He does claim that a lawful relation between entities entails that "if one entity is present, the other will invariably appear" (Megill 2013, p. 599, in a footnote). But there is little support given by Megill for why this needs to be the case. We could appeal to causal closure to ground some law-like relation. But this only tells us that causal interactions and entities must be physical. It does very little to differentiate higher level physical powers from lower level physical powers.

Even if we grant Megill causal powers derived from the law-like regularity between higher and lower level properties, it can only provide a very weak sense of causal powers to higher level properties. This seems to amount to a basic physical interaction between higher level properties and its base. It is unclear how complex interactions, or powers normally associated with special properties like consciousness are to be derived from the limited notion of law-like regularity espoused. In other words, Megill fails to provide novelty in an acceptable sense. At best, his conception can grant that higher level properties will causally interact with lower level properties. This does not tell us how higher level properties interact with lower level properties, or the content of the powers involved. If this is the case, we are (at least from law-like regularity) unable to get Megill's second requirement for emergence: (ii) that an emergent property have novel causal powers not had by its base.

Of the three requirements for emergence defended by Megill, only irreducibility (iii) seems to stand on solid ground. This, of course, has to follow in some sense if emergent properties are non-realized. But, taken alone, it falls into a similar dilemma faced by traditional mental properties. It is possible, I believe, that we could have something that amounts to *physical epiphenomena*. To see this, think back to the account of consciousness given in the previous section. The electromagnetic field in the brain was stated to be higher level and the neuronal base was stated to be lower level. From this, it follows that the electromagnetic field in the brain is non-neural and the base is neural. In a similar vein to Kim's argument against the mental,²⁰ we might say that the lower neuronal level is able to do all the causal work; and the non-neural level is simply a case of overdetermination. Therefore, higher level (non-neural) properties will be epiphenomenal if they are irreducible to the lower (neural) level.

It was argued that a crucial requirement for Megill's theory is that all higher level properties be physical. This blocks non-physical entities and causes. But another problem surfaces in the absence of the realization requirement. It seems possible to have *unrealized realizers*. This is not disallowed by Megill's theory. It is worth pointing out that *rejecting* the realization requirement does not prevent realizers, all it does is allow for the possibility of non-realized higher level properties. As long as

²⁰ See Kim (1999, p. 32).

the properties in question are physical, it seems reasonable that non-realized properties could act as realizers for other properties. Rejecting the realization requirement allows for this possibility. The realized properties need not even be emergent themselves. In fact, they would have to be non-emergent (since they are realized). Remember, emergent properties are (according to our understanding) rare. Many non-emergent properties could conceivably work under a traditional understanding of realization. The problem though is that such a mix of realizers and non-realizers can easily get off track.²¹ There is nothing in McGill's theory to prevent unrealized properties from realizing realizable properties which (as realizers) in turn realize other realizable properties and so on in a regressive chain. Nor is there anything to prevent an emergent property (because it is unrealized) from appearing at any point in the chain disrupting the link. These intermediate properties, though non-emergent, lack an appropriate grounding. We want to say, at least for (common) realizable properties, that the physical underlying causes go all the way down. But an irreducible link in the chain seems to prevent this move.

What we have here is a grounding problem.²² Let us look again at visual qualia, which McGill takes to offer positive support for his theory. If there is a lower level physical realizer in this case, it would be in the ventral system. But as McGill defends, qualia are not realized in the ventral system. Of course, they are not realized in the dorsal system either. This is allowed under the stipulation that visual qualia are a non-realized property. The problem is that this interpretation (undoubtedly) posits that we do not need lower level physical properties at all. There seems to be no reason to even talk about the ventral or dorsal systems in this case. Independent from either system, the higher level property just occurs somehow; possibly from somewhere else. In the case of non-reductive physicalism, the realization of higher level properties (while distinct) could (or must) be attributed to *some* lower level physical realizer, even if not a specific realizer. For physicalistic emergentism, this is not the case. It is at least possible that visual qualia could emerge from outside the brain or from nowhere. Because it is non-realized, locating it in some region of the brain is speculative, or correlative at best. Even if it does seem to always occur in the presence of a particular physical realizer, it need not be the case. This possibility should cause concern for any physicalist.

Without the realization requirement, emergent properties have no accountability to the causal structure of the physical world. We could stipulate that every emergent property is physical, but this seems to apply in name only. Emergent properties have unique, special, novel, different (dare we say distinct) features that other physical properties lack. Non-realized higher level physical properties of this kind, if physical, possess a special kind of physicality that for all intents and purposes

²¹ The problem here concerns the structural relation between properties rather than a diachronic relation. For an interesting discussion on the role of structural relations in ascribing emergent properties see Symons (2002).

²² I am taking *grounding* to entail at least some *in virtue relation* extending all the way down to the fundamental level. The issue of fundamentality, of course, is subject to its own difficulties, which I will not treat here. For a thorough treatment of fundamentality see Schaffer (2003) and Brown and Ladyman (2009).

border on the non-physical. The problem is that physicalistic emergentism finds itself vulnerable to the charge of ontological dualism under this view. While it is true that the realization requirement, as it stands, is not a viable option for the physicalistic emergentist, there are, I believe, other routes we could take to ground the theory. One such option is explored in the next section.

6 Wide Realization

In grounding emergent properties, I suggest we look to Wilson's concept of *wide realization*. Wilson, admittedly, seems not to have emergence in mind when presenting his argument, but instead is concerned with fixing the traditional formulation of the realization requirement. He is especially concerned with what he takes to be an inconsistency regarding two aspects implicit in the realization requirement referred to as the *sufficiency thesis* and *constitutivity thesis*. The two theses are formulated as:

- (1) *sufficiency thesis*: realizers are metaphysically sufficient for the properties or states they realize. (Wilson 2001, p. 4)
- (2) *constitutivity thesis*: realizers of states and properties are exhaustively physically constituted by the intrinsic, physical states of the individual whose states or properties they are. (Wilson 2001, p. 5)

The sufficiency thesis, for Wilson, is taken to entail metaphysical determination (2001, p. 4). Realization in this case, entails a necessary relation between physical states and the higher level (e.g. mental) properties they realize. The constitutivity thesis holds that realization is individualistic in the sense that realized properties are nothing over and above their physical constituents, or the microstructure of the individual instantiating them (Wilson 2001, p. 6). The conjunction of the two theses entail that higher level properties must also be individualistic (Wilson 2001, p. 10). This for Wilson is problematic. While both conditions can typically be met, there are instances where one or the other condition fails to apply to the same realizer. The intrinsic physical states of individual entities are not always metaphysically sufficient to account for the properties they realize, nor are metaphysically sufficient realizers always “exclusively physical constituents of individuals with those properties” they realize (Wilson 2001, p. 6).

The above criticism points to the fact that the (1) sufficiency and (2) constitutivity theses cannot jointly be maintained in certain cases. Wilson has context-sensitive cases in mind here. For example, Wilson argues that a property like an organism's Darwinian *fitness* is dependent on relational aspects that are at least partially instantiated outside of the organism (2001, p. 13). For Wilson, the conjunction of (1) and (2) then is unsustainable as a general principle of realization:

The view of realization that I shall propose here takes the context-sensitive character of mental states to be inherent to their nature, since *realization itself is a context sensitive notion*. More poignantly, the claim at the core of the

standard view of realization – that realizers are metaphysically sufficient for the properties or states that they realize – drives one to this view, which presents those adopting a standard notion of realization with a dilemma: either give up or soften this claim of sufficiency (but at the expense of a range of further physicalist claims), or admit that realization, and so the metaphysics of the mental, is ineliminably context-sensitive. (2001, p. 3)

In resolving the dilemma, Wilson opts for the second option, effectively dropping the constitutivity thesis, or the general commitment to entity bound realization.

This new context-sensitive view of realization “embrace[s] the idea that at least some states and properties, including mental states and properties, have realizers that extend beyond the individual instantiating them” (Wilson 2001, p. 6). Wilson claims properties of this kind to have wide realization. In support of the context-sensitive understanding of instantiation, Wilson gives two new formulations of the realization requirement, one deemed *wide realization* and the other deemed *radically wide realization*. The formulations are as follows:

- (a) *wide realization*: a total realization of H whose non-core part is *not* located entirely within B, the individual who has H. (Wilson 2001, p. 11)
- (b) *radically wide realization*: a wide realization whose *core* part is not located entirely within B, the individual who has H. (Wilson 2001, p. 13)

In the above formulations, the *core* part is the part of a *total* broader physical system that is most readily identifiable as playing a crucial causal role in producing or sustaining H; where H is a given higher level property (Wilson 2001, p. 8). And B is the subject or bearer of the higher level property. The *total realization* of a system would include both core and *non-core* (non-crucial) parts of the system. Wide realization occurs when some non-core part is realized outside of the realizer (individual) of the non-core part, and radically wide realization occurs when some core part also is realized outside of the realizer of the total system.²³ In both formulations, neither the core or non-core parts alone are sufficient to instantiate a higher level property in the broader system. Thus, in order for a particular higher level property to be *sufficiently* instantiated, the total realization of that property must be taken together with the appropriate background conditions. In such cases, lower level physical realizers are only *partial* realizers.

I believe that accepting the above revision of the realization requirement could give us the grounding we need for physicalistic emergentism, without falling prey to the problems previously raised. To see this, let us (albeit briefly) return to emergent properties. According to wide realization, it would follow that a lower level physical property is not ultimately sufficient in itself to bring about a higher level property in all cases. Other relational conditions must be satisfied. But it still follows that lower level physical properties are necessary conditions for a higher level property to instantiate. For example, the activation of the neural constituents

²³ Wilson (2001) gives the examples of making a withdrawal from a bank, committing a felony, and voting to represent what he means by radically wide realization. See p. 14.

of the ventral system, in the case previously described, would not be sufficient in itself for qualia to cause behavior. But we can now say that the ventral system as a lower level realizer acts as a necessary condition for the instantiation of qualia in the case. Before we could not make this claim because the non-realized properties were causally independent from the realizers at the lower level. If the appropriate conditions are satisfied by lower level properties, an emergent property will instantiate, though it will not necessarily be realized in or completely restricted to the lower level base that instantiates it. This explains how qualia can cause behavior while not being instantiated in a specific region in the brain—though it could (or will) be partially realized there. Thus, while not realized by any particular realizer, emergent properties can under the new formulation at least be traced to *some* lower level physical cause as a partial realizer. This grounds emergent properties in the physical world by making them dependent on some lower level base—emergent properties cannot emerge out of nowhere—while also allowing a subset of novel causal powers not possessed by the emergent base(s). Unfortunately, a thorough defense for the viability of wide realization cannot be performed here. But we can still, *if* we subscribe to the revised formulation of realization (wide realization), in principle, evade Kim's standard charge against non-reductive physicalism.

7 Conclusion

In this paper, I have presented a physicalistic account of emergentism that avoids the problems normally raised against other theories of emergentism and non-reductive physicalism. This account followed Megill in dropping both the realization requirement and distinctness. As a result, we were able to maintain that unique higher level properties like consciousness and qualia are emergent—though they must be physical properties. The move allowed us to escape Kim's arguments, while also maintaining a theory that is consistent with physicalistic ontological commitments. But such an account was shown to be insufficiently grounded without the realization requirement, and was in many ways bordering on ontological dualism. Looking to Wilson, I argued that wide realization gives us what we need to ground emergent properties to the causal structure of the physical world, while still evading the problems present in the traditional formulation of the realization requirement. For many (I believe) this will prove adequate. For those with a more emergentist bent, the concept of radically wide realization might instead prove more desirable. The important point is that a framework for a physicalistic emergentist theory is in place. While some amount of tinkering and refinement is inevitable, if not required, the direction physicalistic emergentism can go is in many ways up to intuitive appeal and preference. Strengthening the new realization requirement endorsed, whatever that may entail, pushes towards a more traditionally physicalist theory, whereas weakening the requirement will push towards a more emergentist theory. Whatever the preference, the project is one worth pursuing for the physicalist and emergentist alike.

References

- Brown R, Ladyman J (2009) Physicalism, supervenience and the fundamental level. *Philos Q* 59:20–38
- Corry R (2013) Emerging from the causal drain. *Philos Stud* 165:29–47
- Humphreys P (1997) How properties emerge. *Philos Sci* 64:1–17
- Kallestrup J (2006) The causal exclusion argument. *Philos Stud* 131:459–485
- Kim J (1989) The myth of nonreductive materialism. *Proc Addresses Am Philos Assoc* 63:31–47
- Kim J (1992) Multiple realization and the metaphysics of reduction. *Philos Phenomenol Res* 52:1–26
- Kim J (1999) Making sense of emergence. *Philos Stud* 95:3–36
- Kim J (2003) Blocking causal drainage and other maintenance chores with mental causation. *Philos Phenomenol Res* 67:151–176
- Kim J (2005) *Physicalism, or something near enough*. Princeton University Press, Princeton
- McFadden J (2002) Synchronous firing and its influence on the brain's electromagnetic field: evidence for an electromagnetic field theory of consciousness. *J Conscious Stud* 9:23–50
- Megill J (2013) A defense of emergence. *Axiomathes* 23:597–615
- Putnam H (1967) The nature of mental states. In: Putnam H (ed) *Mind, language and reality: philosophical papers, vol 2*. Cambridge University Press, Cambridge, pp 429–440
- Schaffer J (2003) Is there a fundamental level? *Nous* 37:498–517
- Shoemaker S (2002) Kim on emergence. *Philos Stud* 58:53–63
- Stoljar D (2010) *Physicalism*. Routledge, New York
- Symons J (2002) Emergence and reflexive downward causation. *Principia* 6:183–202
- Wilson R (2001) Two views of realization. *Philos Stud* 104:1–31