

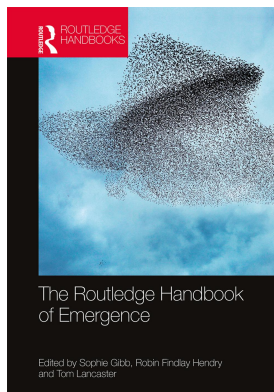
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EMERGENT DUALISM IN
THE PHILOSOPHY OF MIND*Hong Yu Wong***Motivations for emergent dualism**

Emergence has always been seen as a third way between reductive materialism and substance dualism. The concept of emergence is built on three basic commitments: dependence, irreducibility, and novelty. The basic idea of emergence is that novel, irreducible phenomena arise when a system goes beyond some threshold. Often the threshold is some required level of complexity of dynamics or structure. A further characteristic of emergence is that the novel behaviour of the system is not predictable (or at least unexpected) given the behaviour of the system under conditions below the threshold of complexity. The appeal of emergence is clear. On the one hand, because emergent phenomena inhere in and arise from material systems, they do not introduce anything external to material systems. Novel phenomena conceived of as emergent can be explained without alluding to alien, immaterial substances. Thus, substance dualism can be rejected and naturalistic scruples can be upheld. On the other hand, because emergent phenomena are novel and, in some way, unpredictable, they are irreducible to the underlying material phenomena from which they emerged. Thus, reductive materialism can be rejected. Emergence allows for the attractive prospect of a naturalist, materialist, but also anti-reductionist account of the world.

The basic doctrine of emergence has been around since antiquity. Galen is said to have been an emergentist (Caston 1997), and emergentist ideas have also been found in classical Indian philosophy (Ganeri 2011). However, emergence really rose to prominence only in the nineteenth century with the intensifying focus on chemical and biological processes. The golden period of emergentism was between the mid-nineteenth century to the first three decades of the twentieth century (McLaughlin 1992). The doctrine re-emerged in the final decade of the twentieth century with the growing interest in complexity and self-organisation (Bedau 1997; Kauffman 1993), in non-reductive physicalism (Beckermann et al. 1992; Kim 1993), and in the ‘hard’ problem of consciousness (Chalmers 1996).

The examples of choice for what is emergent have often been the phenomena which most stubbornly resisted the pursuits of science – the favoured example being the frontier of science of that epoch. Examples of emergent phenomena over the years have included chemical properties, biological properties – prominently that of life – and mental properties, such as consciousness, intentionality, or agency. In the heyday of British Emergentism, spanning Mill (1843) up to Broad (1925), the critical case was that of chemical properties and chemical bonding. Once that was solved with the advent of quantum mechanics and the development of molecular biology, a mechanistic

account of life could be provided, and the last frontier was that of the mind (McLaughlin 1992; Papineau 2000). This is the explanatory target of most accounts of emergence today (e.g. Beekermann et al. 1992; Corradini and O'Connor 2010; Macdonald and Macdonald 2010).

We can distinguish between two forms of emergence: epistemological and ontological emergence. Epistemological emergence is supposed to be the weaker form of emergence. As the label suggests, it is a form of emergence that relates to what we can know. The key notion here is predictability. Are we able to predict the behaviour of some complex system based on the behaviour of its constituents acting individually? The thought is that knowing what the constituents do when acting individually may not entail that one knows how the complex system they constitute will behave. This unpredictability, however, is not supposed to introduce any new ontology into the world; it is merely epistemic. Ontological emergence goes beyond this. It does not only concern what we are required to posit due to our cognitive and epistemic limitations, but rather marks out new entities that are part of the basic furniture of the world. Elizabeth Barnes (2012) has proposed an elegant way to characterise ontological emergents as entities which are both fundamental (as opposed to derived) and dependent (as opposed to independent). Since the article is on emergent dualism, I shall set aside the epistemological variety of emergence because it is not opposed to physicalism.

Having said this, outside of metaphysics, the distinction between epistemological and ontological emergence isn't as clear as one might want or expect, because a criterion for emergence requires higher-level phenomena that resist reduction to lower-level phenomena. In actual practice, the feasibility of reduction will have to be evaluated through examining specific theories of the higher-level and lower-level phenomena relative to a set of standards for inter-theoretic reduction. In case of a failure of reduction, whether this is to be interpreted as epistemic or ontological emergence is a complex issue. Even taking a set of stringent standards for inter-theoretic reduction, a failure of reduction could be interpreted as indicating autonomous patterns of explanation, but without any corresponding fundamental ontology (Alexander 1920; Fodor 1974).

Today's dialectic sees emergentism pitched against physicalism, a descendent of the previous materialism. The key transformation from materialism to physicalism is the shift from a claim about all individuals being material (McLaughlin 1992) to a stronger modal claim, roughly, that physical facts fix all the other facts (Jackson 1998; Wilson 2005). From a theoretical point of view, the kinds of emergent entities posited could be as diverse as the kinds of metaphysical categories one accepts: emergent events, processes, facts, properties, individuals, substances, what have you. But there have been two major options canvassed in the philosophy of mind: emergent properties and emergent substances. Emergent substances (Hasker 1999; O'Connor and Jacobs 2003) are problematic for similar reasons as substance dualism. It is unclear what evidence could warrant us recognising anything other than material substances (Strawson 1974; Shoemaker 1976; Sosa 1987). Furthermore, the consequences of having such substances in one's ontology are dire (Wong 2007). Having one substance emerge out of another does little to mitigate the objections to substance dualism. That leaves us with emergent properties, which I will focus on. Emergent property dualism is the dominant view amongst emergentists today. Typically, proponents opt for this because of arguments having to do with some special feature of mind that appears to be irreducible and intractable, for example, consciousness (Chalmers 1996, 2006), intentionality (Crane 2001), or agency (O'Connor 2000).

Two forms of emergent dualism

We find two forms of emergent dualism in the literature: supervenience emergentism and causal emergentism. On both views, the emergence relation between basal properties and emergent properties is usually understood to hold as a matter of nomological necessity. On supervenience

emergentism, this is because there are fundamental emergent laws that guarantee supervenience. On causal emergentism, this is because basal properties cause the emergent properties.

Supervenience emergentism

Supervenience emergentism (SE) has been the most influential emergentist view in the last few decades (Kim 1992, 1993, 1999; McLaughlin 1992; Van Cleve 1990; O'Connor 1994; Crane 2010). C. D. Broad first proposed SE in his *The Mind and Its Place in Nature* (1925), where he also provided its canonical formulation and defence (including a version of the knowledge argument). On SE, in certain complex systems, irreducible higher-level properties emerge from lower-level properties due to fundamental emergent laws. SE provides an attractive package of a materialist (but not physicalist) view that combined irreducibility, novelty, and dependence. The dependence between emergent and basal properties is unusually tight because, on SE, emergence holds as a matter of fundamental emergent laws, which govern modal-dependent variation between the basal properties and the emergent properties, ensuring that emergent properties supervene with nomological necessity on basal properties. The emergent laws are fundamental because they are not entailed by any other laws, even together with initial conditions (McLaughlin 1997; Wong 2006: Appendix).

Despite its attractions, SE faces three major objections. First, how does SE differ from non-reductive physicalism (NRP)? Other than the emergent laws being fundamental laws, SE bears a striking resemblance to NRP (Kim 1992). If this is so, in what sense is SE an anti-physicalist view? This is the converse of the question that Kim has posed to NRP. Second, emergent phenomena are explained in terms of fundamental emergent laws that can receive no further elucidation. This is striking because we are dealing with high-level properties of complex systems here. Samuel Alexander (1920) counselled that we should accept the brute connection between emergent and basal properties with 'natural piety'. Can we really swallow this bitter pill? Third, there are worries from causal exclusion. These worries come in two varieties, both originating from Jaegwon Kim. The standard version of the argument relies on the premise of causal closure of the physical. It observes that for any downward causal effect of an emergent property, due to the causal closure of the physical, its basal property will also be sufficient for that effect. Thus, if the effect is not to be overdetermined, the emergent property must be causally impotent (Kim 1993, 1998). Another variant of the argument tries to show that SE is condemned to epiphenomenalism without the causal closure premise by arguing that the downward causal effect of an emergent property will be overdetermined (Kim 1999). (I consider responses to these arguments in the next section.) Whatever one's favoured response to these causal exclusion worries is, Kim's arguments bring out what might be perceived as a tension in SE: How might SE allow for novel, downward causal powers for emergent properties which are supervenient (Wong 2010)? Partly driven by these considerations, some emergentists have proposed another form of ontological emergence, where the emergence relation is understood to be causal.

Causal emergentism

A second form of ontological emergence is causal emergentism (CE). We can trace CE back at least to Mill's (1843) discussion of heteropathic (= emergent) as opposed to homopathic laws and effects. Roughly the distinction was between two classes of causes and the laws governing these causes: those causes whose results could be understood additively ('homopathic') and those which could not ('heteropathic'). Mill's favoured cases were biological and chemical interactions. For example, mixing an acid and an alkali produces salt and water, but the latter is not the additive

sum of the effects of the causes. The basic idea of CE, unlike SE's 'vertical' synchronic relation, is a 'horizontal' diachronic relation. The emergence relation can be seen as a distinctive form of causal relation that generates an emergent property. Depending on the conception of emergence in question, the emergent property can then be bound to co-vary with basal properties in ways that are constrained by law or can lead a causal life of its own, independent from basal properties.

There are two major contemporary versions of such a view. One is Humphreys's (1996, 1997a, 1997b, 2016) notion of fusion emergence – which he sees as a subset of cases of what he now calls transformational emergence (Humphreys 2016). Not all instances of transformational emergence are causal – for example, the case of quantum entanglement is not one where the entangled molecule is caused by the constituent atoms – but the key idea is that the emergence relation here involves a non-supervenient relation of 'interaction'. On Humphreys's distinctive view, when basal properties fuse to become the emergent property, the basal properties are destroyed in the fusion operation. Because there are no basal properties when there are emergent properties, they do not supervene on the basal properties. (But see Wong 2006.) Thus, the exclusion problem does not arise.

Another is O'Connor's dynamic view of emergence (O'Connor 2000; O'Connor and Wong 2005). In this picture, emergent properties are caused and sustained by basal properties, but have novel causal powers that can influence the dynamics of both emergent and basal properties. Emergent properties do not supervene on basal properties even though they are caused and sustained by basal properties, because there can be differences in emergent properties without a change in basal properties due to the novel causal powers of the emergent properties. In this picture, because emergent properties have effects which basal properties could not themselves cause, emergent properties supplement the causal dynamics of systems. Once again, the exclusion problem does not arise.

Emergence and non-reductive physicalism

Non-reductive physicalism (NRP) is the dominant form of physicalism (Fodor 1974; Loewer 2001). It combines adherence to supervenience physicalism (SP) – the claim that any minimal physical duplicate of the world is a duplicate simpliciter (Jackson 1998) – with a rejection that higher-level properties reduce to physical ones. This anti-reductionism usually derives from considerations about multiple realizability – the observation that higher-level kinds can be realised by different physical kinds and hence cannot be identical with them – and externalism about content.

NRP seemingly allows one to have one's cake (anti-reductionism) and eat it too (physicalism). Despite its apparent attractions, Kim has argued that NRP is an unstable view. NRP and SE seem to share the same basic commitments: SP and anti-reductionism. Yet SE is explicitly an anti-physicalist view. If NRP has the same basic commitments as an anti-physicalist view, it cannot be an acceptable form of physicalism. Kim argues that NRP's anti-reductionism undermines its physicalist credentials. Hence, emergence has come to play an important role as a foil in the debates surrounding how physicalism ought to be formulated (Horgan 1993; Wilson 2005).

Horgan has argued that what is required for NRP beyond adherence to SP is 'superdupervenience' – that the supervenience of higher-level properties must be explained in a 'physicalistically acceptable way' (Wilson 2005). It is an open question what counts as 'physicalistically acceptable'; possible ways include, *a priori* deducibility from physical truths or *a posteriori* functional reduction. Ultimately the idea is that the high-level properties must be made sense of in a broadly physical way. I concur that any form of physicalism needs to meet this requirement and that this has powerful ramifications for how one must respond to the explanatory gap (Crane 2010). However, I disagree that there is no difference between SE and NRP. Partly this comes

down to whether SE holds SP. And this depends on what a minimal physical duplicate comes down to. If emergent laws are not part of the physical base, fixing the physical facts will not be enough to fix the emergent facts. These will require fixing the physical facts and the emergent laws. However, I agree that there is a major issue about the epistemic status of higher-level facts. Even if one rejects *a priori* deducibility of higher-level truths from physical truths, NRP cannot rest content with taking the explanatory gap as a brute necessity, unlike SE, but must discharge the supervenience of high-level facts in a 'physicalistically acceptable way'.

Prospects for emergent dualism

What are the prospects for emergent dualism? In closing, I discuss three major challenges for it.

Causal closure of the physical

The first challenge comes from the apparent causal closure of the physical (CCP) (Kim 1998; Papineau 2000), which is a key premise both in causal exclusion arguments against emergence and in arguments for physicalism. Roughly, this principle states that if a physical effect has a sufficient cause, then it has a physical cause. Though there is some controversy about how best to state the principle (Montero 2003; Gibb 2015), it is widely accepted that some such principle is correct. How can the emergentist respond?

Any specific response would require settling on a formulation of the principle and then assessing the situation for emergent properties, but let me consider four responses. First, the emergentist can reject causal closure. Are there principled grounds for rejecting CCP other than the emergent dualist's conviction that emergent properties make a causal difference? The most straightforward way to reject CCP is because the emergent dualist believes in new, configurational forces. But is there evidence for such causes? The status of this rejection will be considered in the next two subsections. Second, the emergent dualist can attempt to show that any formulation of CCP would be question begging against the emergentist. The status of this move depends on whether there are independent grounds to think that causal closure is correct. Third, the emergent dualist can accept CCP but see emergent properties as overdetermining causes (e.g. Sturgeon 1998). However, he will claim that this kind of overdetermination is unlike the vicious cases of causal overdetermination involving more than one independent, sufficient cause. Fourth, the emergent dualist can accept CCP and resign himself to emergent properties being epiphenomenal (Chalmers 1996).

Empirical evidence for emergent dualism?

The second challenge comes from the paucity of positive empirical evidence for emergent dualism. Even proponents of the view admit that positive empirical evidence for emergent dualism has been scant. It is wedged between empirical facts that cannot be explained in physical terms and an acknowledgement that such brute facts are to be taken with 'natural piety'. The flirtation of philosophers attracted to emergence with epiphenomenalism is evidence of the attempt to insulate themselves from empirical commitments and consequent counterexamples.

In this vein we find physicalists going on the offensive. McLaughlin (1992) boldly asserted that there is 'not a scintilla of evidence' in favour of ontological emergence. Papineau (2000) mounts an inductive argument where there is increasing evidence from the sciences, including physiology, that all accelerations can be accounted for by a small stock of basic forces and that there is no need for the configurational forces that the emergentists posited.

If there is little by way of positive empirical evidence for emergent dualism, then it seems that, epistemically, the view is always a ‘last resort’ kind of view. One has to show that no materialist treatment is in principle possible, and thus one has to accept emergent dualism with ‘natural piety’. If that is indeed the case, then two issues arise. First, how can we ever be sure that no materialist treatment is in principle possible? If the argument is based a priori, then this might work, but not if it’s based on induction and inference to the best explanation. Here our credence that physical theory will never show it to be the case must be so much weaker than our credence that current physical theory does not succeed. So it leaves us in the agnostic state of wait and see. Second, if other ontological pictures which can accommodate the same range of observations are possible without taking on the heavy epistemic and ontological commitments of emergent dualism, then it would seem that these are preferable. It is to such pluralist ontologies that we finally turn.

Other pluralist pictures

The evidential situation for new forces or causes from emergent properties would suggest that another response is to develop a more ecumenical vision of physicalism. Are there such alternative pluralist pictures that would undercut the motivation for emergentist dualism? If a pluralist picture could be developed that would combine the following elements, it might satisfy some of the demands which engendered emergentism in the first place: supervenience physicalism, anti-reductionism, an interventionist account of causation, and, consequent on this, a rejection of CCP. Adherence to supervenience physicalism is a necessary condition of physicalism, whilst the rejection of reductionism is key to the autonomy of higher-level phenomena.

Very roughly, an interventionist account of causation claims that X causes Y if and only if intervening on the values of variable X is a way of intervening on the values of variable Y (Woodward 2008). In this case, we can say that X is a control variable for Y. Note that since the notion of an intervention used to explicate causation is itself a causal notion, this is a non-reductive account of causation. Armed with an interventionist account of causation, we can consider causation in the special sciences (Woodward 2008). Two things follow from the interventionist account. First, it is not the case that whenever we have an emergent or higher-level property with downward causal effects, then the basal property that the emergent property supervenes on will also be a cause of the basal effect (*pace* Kim). This is because it does not follow from the emergent property being a control variable for a basal effect that its supervenience base must also be a control variable for that effect. There are independent conditions that a control variable must satisfy that the basal property may not meet (Woodward 2008). Second, in this picture, causation is a macroscopic phenomenon rather than a microscopic phenomenon and is not found at the level of fundamental physics. If causation is seen as a macroscopic phenomenon and not a ground-level physical phenomenon, then it will not be true that there is always a sufficient physical cause, whenever there is a cause of a physical effect. So the thesis that physics is causally closed is not true – but not because there is evidence of any alien configurational forces. Interventionism allows us to capture the sense in which higher-level properties may be genuine causes, because they provide for genuine control variables.

Through an interventionist lens, emergence is more commonplace and less exotic than one might expect. Whenever we can identify control variables which are higher level, we have a case of emergence. The interventionist framework allows us to make sense of these higher-level causal claims and to see how their status as causes is not undermined from below. Thus, this way of characterising emergence gives us much of what we want from emergence – novelty, anti-reduction, and causal relevance. Seen in this light, emergence is less metaphysically dubious and more consistent with scientific practice. An interventionist account makes it clear why the

question of reduction does not arise, tying the issue nicely to the existence and explanatory power of higher-level control variables. This allows for high-level causal claims to be vindicated, without any need for undue metaphysics. In this picture, we can have novel control variables without having either to introduce alien forces or reject physicalism.

An interventionist account of emergence thus allows theorists to recognise both that we have new entities which are causally relevant, and, hence, explanatorily useful, and that there is nothing mysterious about this. It allows us to navigate between the Scylla and Charybdis of theories of emergence: typical accounts of ontological emergence build in unacceptably strong assumptions, whilst epistemological accounts are unsatisfactorily weak.

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