

# Panpsychist Infusion

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## 1 Why Panpsychism?

Panpsychism is the view that consciousness is a simple, fundamental and pervasive—perhaps ubiquitous—element of reality. I focus on consciousness because that is the mental aspect of the world that has most persistently resisted assimilation into the scientific picture of the world. To say that consciousness is fundamental is, essentially, to endorse the claim that consciousness cannot be thus assimilated. To say that it is simple is to associate it with the most basic constituents of reality.

Of course, many philosophers, as well as many thinkers from other disciplines who have devoted themselves to the problem of consciousness, would reject panpsychism out of hand. Some of them regard panpsychism as unworthy of a reasoned examination. John Searle regards the view as simply ‘absurd’ (Searle 1997); Colin McGinn as ‘ludicrous’ (McGinn 1999). Obviously, the idea that everything in the world, from quarks to nations, enjoys a conscious mental life similar to our own has little to recommend it. But throughout its long history very few if any versions of panpsychism have entertained such an outrageous extension of mind into nature. Panpsychists have instead postulated that consciousness comes in a vast range of forms which begins with something unimaginably simple, but still phenomenal in nature, and proceeds through more complex forms up to and perhaps exceeding the teeming, dynamic and self-aware consciousness with which we human beings are familiar. And panpsychists have generally denied that all complex physical entities enjoy complex consciousness, or even any consciousness at all.

Those of a physicalist persuasion will find the assignment of even simple forms of consciousness to ‘simple’ parts of nature repugnant to naturalist sen-

timents. Against this, panpsychists can offer two lines of reply, one negative and one positive. Since one of the primary reasons for rejecting panpsychism is its incompatibility with physicalism, the negative reply stems from the now longstanding failure of physicalists to integrate consciousness into the otherwise spectacularly successful, comprehensive and ever expanding scientific picture of the world. While it always remains possible to insist that consciousness will take a standard place in the physicalist view, it is undeniable that consciousness seems uniquely difficult to ‘physicalize’.

It is a testament to the power of the anti-physicalist arguments<sup>1</sup> that many physicalists have conceded the apparent arbitrariness in the link between mind and matter. Their defense involves explaining why the evident ‘explanatory gap’ (see Levine 1983) is a *mere* appearance which does not license ontological implications. According to this strategy, there are two ‘ways of knowing’ consciousness, one as it were from the outside and one from the inside. The inside view’s knowledge is couched in what are called phenomenal concepts. The knowledge available from the outside is expressed in ordinary physical concepts whose referent is whatever physical state is to be identified with consciousness (for attempts along these lines see Loar 1990, Rey (1993), Papineau (2006)). It is some difference between these two classes of concepts which explains why it is so hard to see how they refer to the same physical states.

This strategy faces a deeply problematic dilemma. Either it endorses the claim that phenomenal concepts possess Fregean senses or that they do not. What I mean by the first horn of the dilemma is simply that when we are conscious we are presented with some features by which we distinguish one phenomenal state from another. These features then stand as new properties which have to be integrated into the physicalist account but which face exactly the same problem with which we began. In place of a single explanatory gap, there will be an open ended hierarchy of gaps, the last of which will generate the same anti-physicalist worries as the first. This kind of objection has been called by Stephen White the ‘curse of the qualia’ and he has developed it into an extremely powerful attack on the phenomenal concepts strategy (see White 1986, 2010).

The other horn of the dilemma is no less tractable. It depends on the claim the phenomenal concepts are bare or brute recognitional concepts that

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<sup>1</sup>The core arguments find canonical representations in Nagel (1974), Jackson (1982), Kripke (1980) (lecture 3), Chalmers (1996) (especially chs. 3-4).

lack any substantive sense and which thus do not depend on appreciation of any feature of experience for their application.

Although, in general, the existence of such bare recognitional concepts is not implausible, the problem with this approach is nonetheless pretty clear. It is wildly implausible that when we apply phenomenal concepts we do so in the absence of any ‘source material’ in experience on the basis of which we categorize phenomenal consciousness. Or, to put it another way, if application of phenomenal concepts was via such pure recognitional capacities, then this would be evident to us. Compare how you know how your limbs are currently arranged (without looking!) with how you know what colours your are experiencing. I know both, but the former knowledge does not seem to be mediated by any particular quality of my experience (save when my limbs are in unusual and uncomfortable positions or have been motionless for a long enough time to generate pain), but my awareness of colours is obviously vividly phenomenological. The psychological literature is replete with examples of neurological disorders that feature what might be called knowledge without awareness, as in blindsight but there are many others<sup>2</sup>. It is of course striking that what is missing in these cases is specific sorts of consciousness despite the presence of certain recognitional capacities.

If one takes the recognitional capacities approach to its logical conclusion, consciousness becomes a kind of illusion. On this view, there is no phenomenal experience, but we possess a rich and complex set of concepts which describe a non-existent world in a proprietary manner<sup>3</sup>. Recognitional capacities trigger the application of these concepts and discursive thought over the long span of human cognitive development has elaborated them into a structure which supports a rich but delusive system of beliefs. In terms of what we think consciousness is *within* this system, we are actually no more conscious than rocks.

Daniel Dennett provides a clear expression of this view, which involves

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<sup>2</sup>A particularly fascinating example is discussed in Goodale and Milner (2004). The unfortunate subject, who suffered carbon monoxide induced brain damage, is able to perform a number of complex perceptual tasks without awareness. For a detailed investigation of the relevance of various blindsight thought experiments to the problem of consciousness, see Siewert (1998).

<sup>3</sup>A vaguely analogous situation might be the rich set of concepts developed by Christian thinkers in the late middle ages to describe the occult world of demons, angels and witches. The familiar scientific example of phlogiston can serve as another illustration. A reasonably complex and empirically successful theory was developed around the notion of this non-existent substance.

... a neutral method for investigating and describing phenomenology. It involves extracting and purifying texts from (apparently) speaking subjects, and using those texts to generate a theorist's fiction, the subject's heterophenomenological world. This fictional world is populated with all the images, events, sounds, smells, hunches, presentiments, and feelings that the subject (apparently) sincerely believes to exist in his or her (or its) stream of consciousness (Dennett 1991, p. 98).

I somewhat hesitate to ascribe this view to Dennett since his writing is often ambiguous between a position devoted to debunking certain perhaps dubious philosophical notions, such as that of qualia, and a position which entails the wholesale denial that there is anything even remotely like phenomenal consciousness. The former attacks a straw man. The latter position is surely absurd. The problem of consciousness does not revolve around descriptions of consciousness but around the simple fact that conscious beings are *presented* with the world, and themselves, in a special way quite different from the causal and information laden reactions of more ordinary physical objects.

The idea that this sort of 'presence' is a fictional object seems too wildly implausible to be taken seriously, yet seems to be the natural upshot of the pure recognitional capacities interpretation of phenomenal concepts.

Thus the negative argument for panpsychism seems genuinely powerful. Physicalism is far from established and cannot be deployed in an instantaneous and unassailable refutation of panpsychism.

However, stepping back from physicalism does not entail panpsychism. The most important positive argument for panpsychism was put into its canonical form by Thomas Nagel (1979). Nagel's argument can be summarized thus:

P1. Consciousness is either a fundamental or an emergent feature.

P2. Consciousness is not an emergent feature.

C. Therefore, consciousness is a fundamental feature.

Why does Nagel think that consciousness cannot be an emergent feature? This question is pressing because, as we shall see, consciousness will turn out to be an emergent even if we endorse panpsychism. Despite this, Nagel's argument remains cogent. How can this be?

The key is a distinction between what I will call conservative versus radical emergence. Nagel's claim in P2 is shorthand for the dual claims that

consciousness is not a conservative emergent from a purely physical submergent base and that radical emergence is impossible.

Roughly speaking, a conservatively emergent property of an object *O* is one whose exemplification by an object follows logically from the specification of the properties of *O*'s constituents (plus environment) and the laws governing these submergent properties. Thus, the liquidity of water (at standard temperatures and pressures) is a conservative emergent feature because while neither oxygen nor hydrogen atoms exemplify liquidity it follows logically from the properties of oxygen and hydrogen and the physical laws which govern their interactions, that large samples of H<sub>2</sub>O must form a liquid under ordinary conditions. It is absolutely impossible for oxygen, hydrogen and the environment to be as they are, and the laws of physics to be as they are, and for large samples of H<sub>2</sub>O to fail to be a liquid.

By contrast, radical emergence involves a weaker link between the submergent base and the emergent properties generated by it. Radically emergent properties are still lawfully dependent on the distribution of properties over the submergent entities but some of the laws are special laws of emergence which must be appealed to in addition to the laws of the submergent domain. These laws link the submergent to the emergent features, and can vary across possible worlds. This sort of law was referred to as 'trans-ordinal' by C. D. Broad who explicitly invoked the image of levels of reality. In these terms, there are laws restricted to a single level; the purely physical laws, the laws of chemistry, the laws of biology, etc. Trans-ordinal laws generated radically emergent properties out of the features at the submergent level(s). For example, Broad believed that chemical properties were not strictly necessitated by the purely physical level and sprang into being when the physical level attained the appropriate state via the action of trans-ordinal laws of chemical emergence (see Broad 1925, ch. 2).

But Nagel denies that such laws of emergence are possible because:

... there are no truly emergent properties of complex systems. All properties of complex systems that are not relations between it and something else derive from the properties of its constituents and their effects on each other when so combined (Nagel 1979, p. 182).

Nagel is suppressing the distinction between radical and conservative emergence here. There doesn't seem to be any logical ground for denying the

possibility of trans-ordinal laws<sup>4</sup>.

Let us, however, concede for the moment that radical emergence is off the table. Then the cogency of Nagel’s argument depends on the claim that consciousness cannot be a conservative emergent feature stemming from purely physical submergent features. Of course, the core antiphysicalist arguments alluded to above all tend in exactly this direction. They all tend to show that there is no way to get consciousness out of the physical in anything like the standard way. If that is correct then consciousness cannot be an emergent. If consciousness is not emergent then it is a fundamental feature of the world.

It is but a small step from the idea that consciousness is fundamental to the core tenet of panpsychism: consciousness is a characteristic of the most simple elements of nature. At least, this follows if we accept the general scientific account of the long term development of the world, which begins with a rather undifferentiated ‘sea’ of very simple things gradually developing into more and more complex entities interacting according to the dictates of physical law. Otherwise, we have the inexplicable appearance of a fundamental feature of the world—consciousness—at some late date in the universe as a property of certain highly complex entities. Such a scenario is just radical emergence which we are assuming does not occur. Thus consciousness in its simplest or most basic form should be associated with the simplest and most basic physical features which constitute the universe<sup>5</sup>. To this extent, Nagel’s argument for panpsychism is vindicated.

However, once we relax the stricture against radical emergence we face a disjunctive conclusion: either panpsychism is true or else there is radical emergence. I don’t see any strong proof that the idea of radical emergence is incoherent, but that does not mean it is attractive. In fact, there are a number of basic considerations that disfavour it.

For one thing, it is metaphysically uneconomical. If we can do without positing *both* new fundamental features and peculiar cross-domain laws governing their creation *ex nihilo* then we should avoid it.

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<sup>4</sup>Others have also disputed the coherence of radical emergence, notably Galen Strawson (see Strawson 2006). I think however that is very hard to show that radical emergence is self contradictory. A defence of at least the coherence of radical emergence can be found in McLaughlin 1992; I discuss Strawson’s argument in Seager 2012a.

<sup>5</sup>A full panpsychism requires that the mental be ubiquitous as well as fundamental. One might argue, as did Nagel, from the claim that conscious beings can be constituted out of any sort of physical constituents (e.g. anti-matter vs. matter) to the claim of ubiquity.

For another, there seems to be only one place in the world where radical emergence looks to be even potentially necessary, and that is the case of consciousness. This is at best a strange intrusion into an otherwise well behaved world. In the absence of any other clear case of radical emergence this also makes its postulation in the unique case of consciousness seem ad hoc.

For yet another, radical emergents standardly herald the arrival of new causal powers into the world. Yet the structure of the physical world seems to be complete and causally closed.

Panpsychism holds out the promise of a different picture. One in which consciousness is a fundamental feature of the world, irreducible to the purely physical but one that otherwise fits quite smoothly into the extant, extremely attractive and successful, scientific picture of the world.

## 2 Deferential Emergentist Panpsychism

The version of panpsychism which best exemplifies these advantages I will call deferential emergentist panpsychism (DEP). The view is deferential in the sense that it accepts that modern science provides an accurate picture of the world, which is entirely physical and exhibits an hierarchical structure of increasingly complex emergent properties and systems. The kind of emergence required to fund the scientific picture is restricted to conservative emergence. DEP is emergentist in this minimal sense. But more than the standard conservative emergence which typifies the physical world, DEP also postulates that consciousness forms its own system of emergence, which is similarly conservative, and reflects in some way the growth of mentality in correlation with the increasing complexity of physical systems.

DEP presents the world as exemplifying consciousness from its inception, as non-physical properties of the fundamental physical entities which constitute the world. As these entities interact to form more complex physical entities, so too does consciousness become more complex. Presumably, the sort of consciousness which the physical fundamentals enjoy is of a simplicity which we can scarcely imagine. Furthermore, we have little grasp of the laws, or the ‘mental chemistry’ (Nagel 1979, p. 182), by which more complex states of consciousness emerge.

This phrase was not invented by Nagel but can be traced back to John Stuart Mill (see Mill 1869/1989, pp. 108-9). Mill was no panpsychist; he

was, in our terms, a radical emergentist<sup>6</sup>. His mental chemistry expanded the range of associationism in psychology to include combinations of sensations into new forms (Mill uses the analogies of the spectral composition of white light and the way a moving light forms a visible ‘trail’). For Mill, mental chemistry, as indeed physical chemistry, involved a kind of radical emergence. But it is interesting that the explicit idea of combining mental states into new forms can be found in Mill’s writing. Despite his emergentism, he makes a number of pronouncements about mental chemistry that will figure in the articulation of DEP. For example, Mill continues the discussion of the way mental composition occurs, extending the analogy with the spectrum:

If anything similar to this obtains in our consciousness generally...it will follow that whenever the organic modifications of our nervous fibres succeed one another at an interval shorter than the duration of the sensations... those sensations or feelings will, so to speak, overlap one another, and becoming simultaneous instead of successive, will blend into a state of feeling, probably as unlike the elements out of which it is engendered, as the colour white is unlike the prismatic colours. (Mill 1869/1989, p. 108).

Mill also considers how mental phenomenal might join to create new forms of consciousness in his *Logic*:

The generation of one class of mental phenomena from another... is a highly interesting fact in psychological chemistry; but it no more supersedes the necessity of an experimental study of the generated phenomenon than a knowledge of the properties of oxygen and sulphur enables us to deduce those of sulphuric acid without specific observation and experiment (Mill 1843/1963, p. 534).

And further:

... it appears to me that the Complex Idea, formed by the blending together of several simpler ones, should, when it really appears simple... be said to result from, or be generated by, the simple ideas, not to consist of them (p. 533).

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<sup>6</sup>In Mill (1843/1963), ch. 4, one finds a seminal discussion of radical emergence expressed in terms of the distinction between ‘homopathic’ and ‘heteropathic’ laws. These are closely analogous to Broad’s intra- versus trans-ordinal laws of nature.

These remarks reveal Mill's commitment to what we're calling radical emergence, and also Mill's sense that it is impossible to 'compose' mental entities together in a purely constitutive manner. Rather, when the right mental entities occur together or in the appropriate relation, then they will 'generate' a novel form of consciousness.

It is thus a crucial question for panpsychism how to understand 'mental chemistry'. DEP must appeal to something like mental chemistry, but the issue remains whether this can be understood as requiring nothing more than conservative emergence. If radical emergence must be invoked to make the leap from the foundational elements of micro-consciousness to more complex forms then DEP becomes otiose. For, if radical emergence is accepted it is obviously simpler and more elegant to let complex consciousness radically emerge from purely physical fundamentals and forego the intuitively implausible assignment of mental properties to basic physical entities.

But radical emergence seems implausible in general and unmotivated in the purely physical domain. So there is hope that finding the right sort of mental chemistry which demands no more than conservative emergence, will make DEP the more attractive position. However, one monster problem immediately raises its threatening and ugly head, a problem which may destroy any hope of finding anything like the mental chemistry we need.

### 3 The Combination Problem

As is now widely recognized, the combination problem presents perhaps the most difficult implementational problem for panpsychists (see Chalmers - this volume). The classic statement of the problem is by William James (James 1890, ch. 6). James's basic complaint is that there is simply no way to make sense of the notion of mental combination. It is important to note that James is essentially taking over Mill's understanding of combination and constituency here. On this understanding combination operates by the straightforward summation of the combining elements which retain their identity and causal powers before, during and after composition. This is what Mill called the mechanical mode of the composition of causes against which he opposed the chemical mode (see Mill 1843/1963, bk. 3, ch. 6). The distinction between the mechanical and chemical modes of causal composition correspond to the distinction between conservative and radical emergence.

James's sense that mental combination in the mechanical mode is hopeless

is clearly expressed in this passage:

Where the elemental units are supposed to be feelings, the case is in no wise altered. Take a hundred of them, shuffle them and pack them as close together as you can (whatever that may mean); still each remains the same feeling it always was, shut in its own skin, windowless, ignorant of what the other feelings are and mean. There would be a hundred-and-first feeling there, if, when a group or series of such feelings were set up, a consciousness belonging to the group as such should emerge. And this 101st feeling would be a totally new fact; the 100 original feelings might, by a curious physical law, be a signal for its creation, when they came together; but they would have no substantial identity with it, nor it with them, and one could never deduce the one from the others, or (in any intelligible sense) say that they evolved it. (James 1890, p. 160).

This problem has long bedeviled panpsychist thought. Almost two decades after James wrote the *Principles*, he was still banging his head against the combination problem:

I struggled with the problem for years, covering hundreds of sheets of paper with notes and memoranda and discussions with myself over the difficulty. How can many consciousnesses be at the same time one consciousness? ... The theory of combination, I was forced to conclude, is thus untenable, being both logically nonsensical and practically unnecessary (James 1909, p. 207).

James solution, if it is a solution, is a radical rejection of the terms of the problem. He regards the problem as a symptom of 'intellectualism' by which he means something like the forced deployment of concepts in domains where they are desperately and irredeemably inadequate. Perhaps despairingly, perhaps in liberation, he writes that:

I have finally found myself compelled to give up the logic, fairly, squarely, and irrevocably. ... I prefer bluntly to call reality if not irrational then at least non-rational in its constitution (James 1909, p. 213).

The combination problem also confounded the most famous panpsychist of the twentieth century, Alfred North Whitehead. He castigates Leibniz for

failing to solve the problem which Whitehead claims is ‘a perplexity which is inherent in all monadic cosmologies’ (Whitehead 1929/1969, p. 32). Recall Leibniz’s example of our perception of the sound of a wave crashing onto a beach, which perception is literally composed of untold numbers of unconscious auditory perceptions of the individual droplets hitting the beach. The resultant consciousness, in which the multitude has been lost, Leibniz calls ‘confused’. Thus, we might say, confusion solves the combination problem for Leibniz. But without an analysis of how confusion arises this is a merely verbal solution. As Whitehead says, ‘he [Leibniz] fails to make clear how “confusion” originates’ (Whitehead 1929/1969, p. 32). Whitehead describes the problem as follows:

... the integration of simple physical feelings into a complex physical feeling only provides for the various actual entities of the nexus being felt as separate entities requiring each other. We have to account for the substitution of the one nexus in place of its components... (Whitehead 1929/1969, p. 293).

This process Whitehead calls ‘transmutation’. It is very complex, involves a great deal of Whiteheadian machinery, and I will not pretend to understand it. Notice that it is a multi-step process, for the initial transmutation takes a set of ‘physical feelings’ being taken up into a initial unity by which each is felt to ‘require’ the others. This is analogous to James’s 100 feelings being partially integrated. A second stage of transmutation goes further and somehow or in some way ‘absorbs’ the feelings into a single unitary state.

Nonetheless, we can take these pronouncements of our great forebears Leibniz (‘unity by confusion’), James (‘unity by generation’) and Whitehead (‘unity by transmutation’) as clues to the outline of a solution to the combination problem.

## 4 Infusion not Combination

The solution I will advance here I call ‘combinatorial infusion’. It follows James’s suggestion (which he found inadequate) that the transmutation from the hypothetical micro-psychic features assigned to the fundamental entities of the physical world to the macro states of consciousness with which we are introspectively familiar requires the generation of a new state which infuses

its precursors, or, to use Whitehead's term, substitutes a new state for the set of precursor states.

The two core constraints on combinatorial infusion are, first, that infusion be a form of conservative emergence and, second, that it provide some kind of intelligible link between the micro-psychic features assigned to fundamental physical entities and resultant complex states of consciousness. Given our concession to James's denial that mental combination is possible and that only radical emergence of consciousness is possible, it looks very difficult to meet these constraints.

The difficulty arises, however, from the rather limited view of combination which James endorses. James implicitly identifies combination with what Mill called the mechanical mode of causal composition. Perhaps he agreed with Mill that any alternative would have to involve a kind of radical emergence. But James (and Mill) must be wrong, because we have examples from modern science which transcend the mechanical mode of causal composition but which do not invoke radical emergence. Let me briefly note two examples.

The first stems from quantum mechanics. Entanglement can create states which, at least in some cases, result in essentially new systems which have properties distinct from those of their precursors and causal powers which are not purely mechanical or additive results of the causal powers of their components. A specific example can be drawn from Paul Humphreys who regards quantum entanglement as involving a kind of fusing of entities into new systems<sup>7</sup>. In the standard example of entanglement, the so-called 'singlet state', two particles interact so as to form a new state whose mathematical representation cannot be decomposed into a product of the representations of the constituents. The system acts as a unified state insofar as measurements on one part instantaneously puts constraints on measurement results on other parts of the system and there is no way to determine whether the particles are entangled by any local measurement performed on the parts.

The second example is from classical physics. The famous 'no hair' conjecture about black holes states that they can be exhaustively characterized by three physical properties: mass, electric charge and angular momentum. That is, no matter how a black hole is formed it will be indistinguishable from any other which shares the same mass, charge and spin. In a certain sense, a

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<sup>7</sup>See Humphreys 1997 for a general account of 'fusion emergence'; for a critique of Humphreys's approach see Wong 2006.

black hole forms something like a fundamental particle. The physical entities which form a black hole can be said to fuse into a new entity which cannot be understood as a relational structure of its precursor entities. They have gone out of existence. The new system retains certain physical properties even as it throws away the particular characteristics of the precursor entities.

It must be emphasized that this example is simply used as a model for combinatorial infusion. The classical black hole is a product of general relativity and classical electromagnetism and we have every reason to doubt that the complete physical story will leave its description unchanged. Be that as it may, the classical black hole stands as a viable model for the kind of fusion I am trying to articulate and apply to the combination problem.

These examples, within their own domains, meet analogues of the constraints laid down above. The kind of emergence they exemplify is *not* radical. This is evident from the fact that entanglement and black hole formation are predictions of the applicable physical theories and from the fact that the features of the emergents are drawn from the set of fundamental properties of the theories which predict them.

Panpsychist combinatorial infusion would thus postulate a set of fundamental properties of consciousness which are assigned to the fundamental physical entities which constitute our world. It holds that, under certain conditions of which we remain quite ignorant, mental fusion will occur, generating a new state of consciousness which is a function of the precursor states. This fusion would be a psychological process; it would not be the fusion of physical entities into a state of consciousness (a process of doubtful coherence and certainly a kind of radical emergence). It would be a fusion of mental entities into a new fused mental state.

I do not think that fusion would be an hierarchical process. Although more complex physical states of the right sort would be the physical signature of mental fusion, the to-be-fused entities would be the fundamental mental states of the basic physical constituents of these complex physical states. For example, we know something about the neural correlates of consciousness. These highly complex states of the brain are aspects of a biological organ which has a multi-faceted interactive and hierarchical functional architecture. But the mental fusion which such brain states occasion is the fusion of the fundamental micro-psyhic features<sup>8</sup>.

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<sup>8</sup>Does this claim violate Chalmers's principle of organizational invariance (Chalmers 1996, ch. 7)? It might or it might not, depending on how the fundamental mental features

A natural question to ask at this point is: what, exactly, are the fundamental micro-psyche features? No very informative answer can be given at this point. DEP based upon combinatorial infusion is committed to some ‘primitive’ mental features but their specification is hostage to future theories of consciousness. For example, suppose for the sake of argument that the recent AIR theory of consciousness (Prinz 2012) is correct, modulo the need to embrace DEP in order to introduce consciousness into the world<sup>9</sup>. Prinz holds that mechanisms of attention directed upon intermediate level sensory representations engender consciousness. He maintains that all consciousness is sensory consciousness, construed broadly enough that the somatic and proprioceptive states of bodily awareness count as sensory. Prinz also puts tremendous effort into specifying likely neural correlates of sensory states and attention. In terms of a combinatorial infusion based DEP, these neural correlates point to the physical configurations which occasion mental fusion. Further, Prinz’s claim that all consciousness is sensory suggests that the micro-psyche features we need to postulate are elementary forms of such consciousness. Fused states will then arise that conjoin and blend these into more complex sensory states (such as phenomenal color, auditory, olfactory experiences, and the various bodily experiences of pain, pleasure, heat, cold, etc.).

On the other hand, many find the restriction of consciousness to sensory states implausible. If so, the range of elementary micro-psyche features would have to be expanded to generate the states which the correct theory of the phenomenological nature of consciousness decrees. The main point is that while it seems hopelessly mysterious to posit that phenomenal experience is generated by a system of entities possessed only of physical properties such

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are distributed over the fundamental physical entities whose interactions and relational structures realize functionally definable systems. It might, for example, be the case that any system functionally equivalent to the human brain would occasion mental fusion. This mental fusion might or might not be phenomenally indistinguishable from brain based fusion, or it might be in various ways and to greater or lesser extent phenomenally different (inverted spectrum cases fall under this possibility). Or it could even be that some systems functionally isomorphic to the conscious brain do not occasion fusion at all, leading to the possibility of zombies.

<sup>9</sup>Prinz is a physicalist who endorses the strategy, discussed above, of defusing the problem of consciousness by showing how the explanatory gap is a cognitive illusion. However, his AIR theory is a perfectly intelligible account of the physical ground of consciousness and the phenomenal character of consciousness in its human form even if the physicalism is rejected.

as mass, spin, charge, energy and a few more abstruse quantum mechanical properties, it does not seem similarly paradoxical that a system of entities possessed of elementary phenomenal features could generate complex states of consciousness, given an operation like combinatorial infusion whose intelligibility is clear and established in other domains.

Prinz's discussion of the neural correlates raises another important issue. This is the question of whether the physical states which occasion mental fusion must themselves exhibit their own form of combinatorial infusion. I think it would be fair to say that, broadly speaking, the various quantum theories of consciousness (e.g. Hameroff and Penrose 1996, Hameroff and Powell 2009, Stapp 1993, Lockwood 1989 etc.) suggest an affirmative answer insofar as they expect to find in the brain some quantum 'signature' of consciousness which lines up quite well with the fusion like features of quantum mechanics. While this is a real possibility and is ultimately an empirical question, I don't think that combinatorial infusion based DEP needs to take a stand on this issue. It seems perfectly possible that 'ordinary' brain states, such as the ones Prinz selects as the correlates of consciousness, could be the physical state which underpins mental fusion. This is a good thing because there is little evidence that *distinctively* quantum effects play a role in the brain's functioning or that the brain cannot be understood, under the broad umbrella of the neuron doctrine, in standard neural network terms. In any case, the discovery of distinctive quantum effects in the brain would not undercut the need for combinatorial *mental* infusion. Quantum properties, even if undergoing something like fusion themselves, do not make the emergence of consciousness intelligible. If we posited, to take a ridiculous example that makes the general point, that when two electrons become entangled an experience of red appeared this would be just as mysterious as any other physical basis for the appearance of consciousness.

The best way to understand the place of consciousness in the world from the point of view of a combinatorial infusion based DEP is something like a dual aspect theory. That is, it would be a misunderstanding to think that the elementary micro-psyche features are simply 'extra' properties of things which stand in the same relation to, say, electric charge as does, say, mass. It is better to think of consciousness as the expression, in the realm of the mental, of the kind of physical complexity which occasions mental fusion. On this view, the physical arrangements that matter to consciousness are necessary preconditions for mental fusion because they as it were 'line up' the micro-psyche features in the right way. The best way to investigate

these conditions is standard research into how consciousness is realized in the brain. This is another aspect of the differentiability built into the account which minimizes disruption of the scientific picture in general and our developing physical understanding of the relation between mind and brain in particular.

## 5 Objections

David Chalmers (this volume) develops a characteristically clear and comprehensive overview which presents a set of core challenges for panpsychism raised by the combination problem. He also makes some criticisms specifically directed at a combinatorial infusion based DEP. It is tremendously helpful to have such a focused set of issues at hand and I want to conclude with some responses.

**The Aggregation Argument.** Stemming from some remarks of William James this objection depends on the claim that aggregates are not objectively real. If we add the claim that all conservative emergents are aggregates then we can conclude that consciousness (or a conscious subject) is a mere aggregate and hence unreal. Chalmers notes that this puts consciousness on a par with ordinary objects like rocks, tables, trees, etc. and thus does not think the argument in this form is particularly worrying. I take the argument more seriously and think there is a real problem here (see Seager 2012b, ch. 9). But combinatorial infusion undercuts the worry. Infusions are not what James meant by an aggregate. They would instead fall under his remark quoted above that the constituent micro-psyche features would ‘by a curious physical law, be a signal for its [the infusion’s] creation’. What is distinctive about DEP is that it can embrace this remark *without* embracing radical emergence.

**Subject Summing.** A related argument sees DEP as requiring that subjects have to somehow combine to solve the combination problem and subjects simply do not sum. Following some work of Philip Goff, Chalmers spells out this argument in modal terms, with the crucial premise being

It is never the case that the existence of a number of subjects with certain experiences necessitates the existence of a distinct subject.

It is crucial to note that this assumes something about the nature of a panpsychism which, like DEP, wants more complex states of consciousness to arise

from more elementary forms. The assumption is that it must be absolutely necessary that, in this case, the new subject arise from the old. One must be very careful about how to interpret such claims. To avoid radical emergence, they must indeed be necessary. But the absolute necessity at issue is one that is relative to the fixing of relevant laws of nature. Compare the case of the liquidity of water. This arises from the properties of hydrogen and oxygen and the laws of physics. Relative to these laws, it is absolutely necessary that water be a liquid (under standard conditions). To put it another way, there are simply no possible worlds where the laws of physics hold, where oxygen and hydrogen chemically combine under standard conditions, and where this combination is not a liquid.

In the case of a combinatorial fusion based DEP, the laws which are relevant have to include the laws which underlie mental fusion. Given these laws and the physical laws, there are simply no possible worlds where a physical system gets into a state like those in our brains which occasion consciousness, where the micro-psychic features are arranged as they are in the actual world, and where a new subject does not arise via combinatorial mental infusion. So the premise above can be legitimately denied.

One note about subjects here might be in order. By subject I mean something very thin. A subject of a mental state is simply an entity which exemplifies the mental property which constitutes that mental state. When mental fusion occurs, subjects at issue are not the myriad elementary physical entities which bear the micro-psychic features but rather the system which occasions the fusion (note that this might provide a new way to distinguish objectively real things from mere aggregates and solve the 'problem of the many').

**The Conceivability Argument Against Panpsychism.** Chalmers generalizes the subject summing argument into one that mirrors the modal argument against physicalism. That argument works by endorsing the claim that the totality of physical truths and physical laws does not entail any fact about consciousness. The extended argument holds that the totality of physical truths, physical laws and the micro-psychic facts does not entail any macro-psychic facts. So there is a possible world that is a physical and micro-psychic duplicate of our world that is not a total duplicate of our world (in particular, this duplicate lacks complex states of consciousness). But, of course, the duplicate world should also duplicate any laws governing the micro-psychic features. Combinatorial infusion based DEP holds that there are such laws and that they (in concert with the arrangement of purely

physical features) generate fused mental states. Naturally, if one does not include the micro-psychoic laws one can conceive of worlds that lack macro-psychoic features despite being otherwise identical to the actual world. By the same token, if one refused to include (some of) the physical laws one could conceive of worlds with oxygen and hydrogen but without water.

The laws which describe combinatorial mental infusion are presumably contingent. So there are indeed worlds which resemble our world with respect to the micro-psychoic features and the physical entities and laws but differ in their mental laws. That does not by itself seem to threaten combinatorial infusion based DEP.

**The Knowledge Argument Against Panpsychism.** As above, this argument extends Frank Jackson's knowledge argument to the case of panpsychism. If we add to Mary's knowledge base all the micro-psychoic facts, she will still not be able to deduce the macro-psychoic facts. But again, of course not. She needs to know the laws of combinatorial infusion. It is no surprise that ignorance prevents deduction. Should we hold that the laws governing combinatorial infusion should be a priori knowable just from knowledge of what consciousness is like? I see no reason to think so. This means that combinatorial infusion based DEP admits the possibility of zombies. True, but that is no problem. The *relevant* kind of zombies are absolutely impossible. The relevant zombies would be ones that occur in worlds that share our physical arrangements and laws, the micro-psychoic features' arrangements and the laws governing combinatorial infusion. There are no zombies in those worlds.

**The Palette Argument.** Read as an attack on combinatorial infusion based DEP, this argument presents the worry that there will be too few micro-psychoic features to plausibly generate by infusion the myriad complex states of consciousness that can exist. Chalmers's own version of Russellian monistic panpsychism assigns micro-psychoic features in one-to-one correspondence with fundamental physical properties. There seem to be relatively few of the latter, hence a paucity of the former.

One might reply by claiming that physically indistinguishable fundamental entities are nonetheless differentiated by their micro-psychoic features. However, this option faces the difficulty that since physical complexity is engendered strictly by physical law, the micro-psychoic character of entities is then irrelevant to the growth of physical complexity. In fact, this point was the basis of Nagel's argument for the ubiquity of fundamental micro-psychoic features.

Perhaps the best reply (as Chalmers implicitly notes) is to permit each

kind of fundamental physical entity to host a constellation of fundamental micro-psyhic features which then combine according to combinatorial infusion as dictated by the laws of infusion and the variegated associated physical systems. This could perhaps be incorporated into a Russellian panpsychism by the claim that it is the *constellation* of micro-psyhic features associated with physically fundamental entities which provides the categorical basis for the dispositional properties revealed by scientific investigation. If we let our imagination take further flight, we could envision that since different constellations of micro-psyhic features makes a difference in the kind of physical relations and causal interactions into which physical entities can enter, this in turn might affect the systems available to occasion mental fusion.

This reply entails, or at least strongly suggests, that each fundamental physical entity has a highly disunified consciousness in the sense that a number of incompatible basic micro-psyhic features belong to it. But disunified consciousness is not impossible, especially given the thin conception of subject which DEP endorses. In fact, combinatorial infusion suggests a way to think about the emergence of the unity of consciousness in which fusion inaugurates a kind of co-constituting totality in which each discernible feature is partly modified by and partly modifies its other components.

Finally, it is not completely obvious that a large number of micro-psyhic features is necessary to account for the range of macro-psyhic states of consciousness. After all, it takes but three fundamental hues to generate all possible colours which humans can experience. Of course, this is simply an analogy but if, as noted in our discussion of Prinz's theory above, all consciousness is sensory consciousness it might turn out that only a relatively small number of fundamental micro-psyhic features need to be postulated.

**The Revelation Argument.** This argument begins with the highly plausible claim that '[t]he nature of consciousness is revealed to us in introspection'. Coupled with the further claim that '[i]f constitutive panpsychism is correct, consciousness is constituted by a vast array of microexperiences' we infer that this array of microexperiences should show up in introspection. Since it obviously does not, constitutive panpsychism finds itself in trouble. But it should be clear that combinatorial infusion based DEP is in a different boat. Infusion generates a new entity which fuses the micro-psyhic in a way that erases its multiplicity. Think of the black hole example. Although formed by the gravitational collapse of a vast array of highly differentiated physical things, the resulting black hole keeps no record, so to speak, of its precursor 'constituents' and ends up exemplifying just a few new properties

which are fusions of those of its initiating precursors. In introspection, we should expect to only find the fused macro-psychic feature with no hint of the complex micro-psychic features (and physical structure) needed to generate it. On the other hand, we might expect introspection to tell us something about the basic features themselves to the extent we can abstract away from complexity. We have, for example, found via introspection and investigation that colour experience depends on only three basic experiential hues.

**The Structural Mismatch Argument.** I find this argument somewhat obscure but the main point seems to be that if macro-psychic states are constituted by micro-psychic states which correspond to fundamental physical features we should expect to see a match between macro-psychic and macro-physical structure. Certainly, no such match is evident to introspection. Certain versions of what might be called purely constitutive or structural panpsychism could fall victim to this objection. But combinatorial infusion based DEP will not because (1) the post fusion state will not reveal pre-fusion constituents and (2) the physical state which occasions mental fusion need not have its structure duplicated in the fused mental state. The example of quantum entanglement might be useful here. There is no way to tell by looking at the entangled constituents of such a state whether they are entangled or not. Only by looking at the system as a whole will this be revealed. We can interpret this as a denial that the constituting structure must be duplicated or reflected in the resulting states.

**Mental Causation.** Perhaps the most serious problem for DEP, one that goes beyond the combination problem and bedevils wide swathes of the philosophy of mind, is how to ensure that mental features have causal efficacy. Constitutive panpsychism attempts to solve this by postulating the micro-psychic features as the categorical basis for the powers of fundamental physical entities. Then, ‘microphenomenal properties are causally efficacious in virtue of their playing fundamental microphysical roles, and macrophe- nomenal properties are causally efficacious in virtue of being grounded in microphenomenal properties’ (Chalmers, this volume, p. ??). This issue raises many difficulties but one response would be to appeal to the existence of fusion like operations in the physical world. Entangled systems have powers distinct from those of their constituents taken by themselves. Perhaps fused mental states can stand as the categorical ground for fused physical states. This might suggest that we should look for such distinctive physical states as the correlates of states of consciousness.

On the other hand, a venerable view has it that we should regard the

mental and physical as co-expressions of one underlying reality. In that case, we should not expect to find anything like psycho-physical causation. Combinatorial infusion based DEP could then be deployed to explicate the nature of the co-expression relation, which would not be a thoroughgoing parallelism (which is highly implausible) but a selective one.

It also seems to me that panpsychism actually mitigates some of the problems associated with epiphenomenalism. The classic statements of this view make consciousness a radical emergent. By contrast, panpsychism holds that consciousness is a universal expression of its associated physical state. One might say that its role is just to testify to the pattern of physical events which occasion its fusions and its elementary manifestations. On this view, we should not expect consciousness to have a causal role in the world but simply to reflect patterns of that world.

**Constitutive, not Causal.** The foregoing are general arguments. Chalmers also makes some remarks specifically directed at accounts similar to combinatorial infusion based DEP, of which I will only consider here what I take to be the most significant. Chalmers complains that since combinatorial infusion is a diachronic relation it is hard to see how it could be constitutive. As he notes, such diachronic relations are generally regarded as contingent and causal. Here, the defender of infusion must plead guilty, with an explanation. The explanation is that the world just is causally structured so as to support combinatorial mental infusion. We already know that the physical world is set up to enable combinatorial physical infusion<sup>10</sup>. But this is a feature, not a bug. It is what you get when you take seriously Mill's and Nagel's idea of 'mental chemistry'.

Although none of these replies is remotely definitive, it seems to me that they show that if panpsychism is to be taken seriously at all, then the abundant advantages of a combinatorial infusion based deferential emergentist panpsychism make it rather attractive and eminently worth further investigation.

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<sup>10</sup>Chalmers claims that classical physics does not support combinatorial infusion whereas quantum physics does. I think the example of the black hole, which is a classical phenomenon, shows that this is not quite right.

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