



Rosenberg on Causation¹

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PSYCHE 12 (5), December 2006

KEYWORDS: causation, determination, abstract, possibility, dispositions, passive powers, mental causation, epiphenomenalism

COMMENTARY ON: Gregg Rosenberg (2004) *A Place for Consciousness: Probing the Deep Structure of the Natural World*. Oxford: Oxford University Press. xviii + 325pp. ISBN: 0-19-516814-3.

Abstract: This paper is an explication and critique of a new theory of causation found in part II of Gregg Rosenberg's *A Place for Consciousness*. According to Rosenberg's Theory of Causal significance, causation constrains indeterminate possibilities, and according to his Carrier Theory, physical properties are dispositions which have phenomenal properties as their causal bases. This author finds Rosenberg's metaphysics excessively speculative, with disappointing implications for the place of consciousness in the natural world.

Rosenberg's theory of causation is novel, complex and challenging. I can't say that I have mastered its intricacies, and I admit that much of my puzzlement may be failure of understanding. I also cannot discuss all parts of the view here and will inevitably neglect some important aspects. For example, I will not discuss his arguments against Humean theories, or his theories of space and time. However, I will explain what I take to be the major elements his account of causation as I understand them, highlight some features and raise some questions. Overall, while I appreciate the effort to give consciousness a place in the natural world, I don't think that Rosenberg succeeds in providing a metaphysical foundation for a philosophy of mind that we want to have.

In Part II of *A Place for Consciousness*, Rosenberg considers the following argument for Epiphenomenalism:

1. The physical facts alone do not entail the facts about conscious experience.

2. We can conclude from (1) that 2' Experience is a nonphysical aspect of the world.
3. A completed physical theory is, in principle, a descriptively adequate characterization of the dynamical evolution of the physical world.
4. We can conclude from (3) that 4' Our physical explanations are complete explanations of the causation involved in producing bodily movements.
5. We can conclude from (2') and (4') that 5' Consciousness lies outside the causal structure of the world; it is an irrelevant epiphenomenon (130).

If we don't want to be epiphenomalists, we best dispense with one of these claims.

Rosenberg explores the possibility of denying premise (4). Doing so amounts to saying that the fact that a complete physical theory would explain causation in the physical world does not entail it would completely explain the causes of human action. But that is to say that some of the causes of human action are not part of the physical world, and yet the laws of a complete physical theory are never violated. How could that be? Rosenberg attempts to develop a new theory of causation that will provide a way. It has two major components, the Theory of Causal Significance and the Carrier Theory of Causation. I will consider each of these in turn.

1. The Theory of Causal Significance

1.1. The Determination Problem

Traditional theories of causation focus on causal responsibility: How is it that some entity (event, state, or object) is responsible for the production of some effect? Why do changes occur? These questions presuppose a world of determinate entities and explore the relations between them. Rosenberg's theory of causal significance starts with different questions: Out of the many ways the world could be, why is it *this way*? What constrains the way things are? For Rosenberg, "causation is about constraint on a space of possibilities" (158). Causal *production*, which most accounts have focused on, is but one kind of causal significance.

According to Rosenberg, the world's individuals have many potential states. To be actualized and not merely potential, an individual must take on one and only one potential state. But how does a determinate world emerge from indeterminate potentials? This is the *determination problem*, which can only be solved by a theory of causation, according to Rosenberg (158).

1.2. Effective and receptive properties

Rosenberg begins his attempt to solve the determination problem by distinguishing two types of properties, effective and receptive. Effective properties of an individual give it capacities to constrain the states of other individuals. By experimental investigation, science can reveal the patterns of constraints some individuals place on others and thus discover effective properties. However, a property of an individual may be effective only if some individual is receptive to the property's presence, hence the need for receptive properties (154).

Receptive properties are akin to the passive powers discussed in Aristotle (*Metaphysics* 9.1, 1046a11-13), Locke (1959: 116) and Harre (1970: 87). Rosenberg characterizes them as powers to be effected. However, on Rosenberg's view, a receptive property is a connection between individual properties, enabling them to become members of a causal nexus and to be sensitive to constraints (159). Rosenberg likens receptive properties to the plastic rings on a six-pack, where the cans (effective properties) plug into the available slots. So, even though the rationale for receptive properties was that they must be had by *individuals* in order for other properties to have effects on them, on Rosenberg's view, primitive individuals don't have receptive properties directly. Instead, they are related to other individuals via a receptive connection, whereby they gain the ability to be constrained by other properties. The complex individual constituted by the primitive individuals instantiates the receptive property (165).

Rosenberg's primitive (level zero) individuals are the most primitive effective and receptive properties. He offers mass, charge, and spin as an illustration of possible primitive effective properties. A receptive connection binds together primitive effective properties. Since they are individuals, primitive properties must be something like property instances rather than universals. Furthermore, Rosenberg says "Individuals themselves are pure property complexes (i.e., there are no enduring substances)" (170). So, he seems to hold a bundle theory of particulars. Effective properties have incomplete natures which seek to bind with individuals possessing a complementary kind of property to be complete (165). Effective properties, being indeterminate, are determinables, and their completion, through binding in a receptive connection, makes them (more) determinate: "an incomplete effective property ... is an abstract entity that contains a propensity to become one of its determinates" (167). So, a primitive individual, say charge, is an indeterminate determinable. It could be either of its determinates, positive, negative, or neutral. The matter of which specific charge it will be is settled through being bound to some other receptive property via a receptive connection: "Effective properties are potential unless actually receptively bound" (246).

1.3. Abstractness

When Rosenberg says that incomplete level zero individuals are abstract entities, it's apparent that he does not mean that they are things like classes, numbers, or propositions, but it is not entirely clear what he does mean. He says: "To be abstract is to be removed from context and capable of being placed, under different determinate forms, in multiple other contexts" (211). To be fully abstract is to be maximally context independent. While "determinateness requires full immersion in a context," indeterminateness implies a kind of context independence (211). An indeterminate i.e., abstract individual may exist in multiple, more definite contexts.

I take it that 'context independent' does not mean having the same characteristics in every context, since, according to the view, a context-independent individual can take different determinate forms in different contexts. Instead, 'context independent' seems to mean outside of any context. But what is a context? Here's one view. A context is comprised of relevant aspects of a thing's environment. When you remove something from its context, in the process of abstraction, you consider it in isolation from those

aspects of its environment. For example, consider the baby block in the toy chest. If you just consider its shape, you've abstracted its property of *being cubicle* from its other properties. Rosenberg sometimes suggests this reading when he speaks of "considering" a property independently of its causal nexus (160). However, 'considering something' is a mental exercise, the metaphysical implications of which are unclear. Neither the block nor its shape is literally taken out of the toy box, but is merely imagined outside of its context.

If being context-independent were merely a matter of being 'considered as' or 'imagined to be' outside of one's environment, then whether or not something is abstract would be a conceptual matter. The pure primitive property would be abstract insofar as it is considered independently from the causal nexus in which it is bound. Incomplete individuals would be abstract to the extent that they are imagined to be isolated from the context which completes them. But Rosenberg's theory is realist, not conventionalist; the theory of causal significance is offered as a viable realist alternative to conventionalism (148). His project is metaphysical and ontological, not conceptual. And Rosenberg says "I do not use the word "abstract" to denote unreality or 'merely intensional' existence" (206). So, placing something in a context or removing it from a context must not be mere mental exercises for Rosenberg. Perhaps being in a context literally means being in a situation or environment, standing in certain relations to other individuals; and being outside of a context means being literally outside of that situation and not standing in those relationships.

1.4. Primitive individuals

These context-independent, primitive individuals are odd entities. In addition to being abstract, they are dispositional and indeterminate. But perhaps the most surprising thing is that they are non-actual:

instances of pure effective or receptive properties do not exist in nature, and so there are no pure level zero individuals realized in the natural world. They are only metaphysical abstracts. Instead, nature contains effective/receptive complexes (168).

So, Rosenberg's most primitive individuals do not exist in nature. As parts of an effective/receptive complex, or causal nexus, they are (at least partially) determinate, but that is only because they are bound together and constrain each other. Putting the pieces together, consider a particle with a certain charge, mass, and spin properties. According to Rosenberg's view, what you are considering is an indeterminate, non-actual some-charge-or-other property, an indeterminate, non-actual some-mass-or-other property, an indeterminate non-actual some-spin-or-other property, and a receptive property which binds them together so that they constrain one another and jointly constitute an actual particle with determinate properties.

The binding of effective properties in a causal nexus sometimes makes them only *partially* determinate. That is because some of the properties may not be constrained by other properties at that level and so they remain somewhat abstract and indeterminate. It's not clear whether this is a matter of a "slot" in a receptive property remaining empty, or a matter of a slot having a property in it, just an indeterminate one. If the property is "in the

slot” why isn’t it bound? I think Rosenberg’s answer would be that it could be part of an asymmetric connection, whereby it constrains other properties, but is not constrained by them. But it stands to reason that it must be determinate to the extent that it has the power to produce effects on other properties.

On Rosenberg’s picture, indeterminate level zero individuals are bound together in a receptive connection, whereby they place constraints on one another and form a partially determinate level-1 individual. This partially determinate level-1 individual binds with other partially determined level-1 individuals to form a complete, determinate level-2 individual (see diagram on Rosenberg, 206). This is not the old micro-reductionist hierarchy of levels, because it is in the formation of the level-2 individual, through the receptive connection, that the properties at the lower levels are fully determined.

Since level zero individuals are the material causes (280) or basis from which higher-level individuals are formed (219) and level zero individuals do not exist in nature, then the base from which higher-level beings such as people are formed does not exist in nature. This talk of not existing in nature, being abstract, and merely potential might lead one to think that level zero individuals don’t exist. Rosenberg says “Determination is an actualization, a coming into the world” (174). This suggests that indeterminate individuals are not actual and have not come into the world, and hence do not exist. Rosenberg strengthens this impression when he remarks: “outside the receptive context of a causal nexus, no effective properties exist” (254). It’s very puzzling to think that we are made up of things that don’t exist.

Perhaps the strangeness of this view can be lessened if we note that Rosenberg most often claims only that level zero individuals don’t exist *in nature*. Is there some way of existing outside of nature? Yes there is, for Rosenberg: existing in the non-natural world of possibility. Primitive individuals reside in this other-worldly, indeterminate realm until they are transformed into a determinate state. According to his subtitle, Rosenberg’s book is “Probing the Deep Structure of the Natural World,” but the deeper he probes, the less natural it gets. One might have thought that actual things exist and non-actual things don’t. But on Rosenberg’s view, the existent individuals include non-actual as well as the actual individuals, as well as the partially actual individuals in-between. On one extreme, there is abstractness, indeterminateness, incompleteness, and potentiality. On the other, there is concreteness, determinateness, completeness, and actualization. These are all “a matter of degree” (174).

1.5. Possibility

But what does Rosenberg mean by ‘actual,’ such that non-actual things can exist? He wants to be a modal realist, but doesn’t want to go Lewis’ route of treating ‘actual’ as an indexical for one of the many possible worlds we happen to be in. Instead of Lewis’ concrete modal realism, Rosenberg advocates “abstract modal realism,” according to which “there are truly different modes of existence, the possible and the actual, and an internal connection and movement of becoming between them” (205). Unlike Lewis, who allows no travel between possible worlds (1986: 69-81).

However, asserting that possibilities are real is not yet to say what they are. What is the possible, other than a different mode of existence than the actual? Rosenberg says a

possibility is a part of a possible world. A possible world is a maximal set of interconnected compatible combinations of potentialities. To have potentiality to be *F* is to be such that there could be a path by which one becomes *F*. An ingression is a path that an individual may take from being indeterminate to being determinate. When the individual is determinate or complete, it is actual (210-211).

The above characterization amounts to saying that to be *possible* is to be part of a set of *com-possible* properties, where a *possible* property is a property that it is *possible* for something to have. The circularity of Rosenberg's characterization leaves the nature of possibility unclear. One thought is that possibility is like superposition discussed in some interpretations of quantum mechanics, e.g., an electron has many merely possible locations until an observation collapses its wave function. However, physics studies only physical properties, and Rosenberg's mere potentialities do not exist in the natural world.

One thing we *do* know about Rosenberg's realm of possibility is that level zero individuals exist in it, and they can move from there to the actual world by being constrained by other properties. However, these other properties which constrain them must not be actual either, because if they were, the determination problem would be solved for them and there would be no need for them to enter into a causal nexus. So, merely possible individuals constrain one another and thereby form something more actual. Notice that 'constrain' is a causal notion; to constrain something that is potentially *A* or *B* so that it becomes *B* is to cause it to become *B*. So apparently, causal production happens in this non-natural realm of mere possibility. In fact, Rosenberg explicitly says "the causal mesh extends beyond the physical aspects of the world" (220).

1.6. Refuting the epiphenomenalist argument

By this point, Rosenberg has marshaled the resources for refuting the argument for epiphenomenalism with which he began his discussion of causation. Recall premise (3):

A completed physical theory is, in principle, a descriptively adequate characterization of the dynamical evolution of the physical world.

That's true on Rosenberg's theory. Physical science can study the way effective properties constrain one another and develop laws that describe their patterns of instantiation. But that is not the whole truth. He claims that "physical causation specifies only the regular and law-like ways the world's basic effective properties instantiate" (298). However, "a causal realist's world contains fundamental causal facts lying beyond the standard concerns of physical science" (228). Reality also includes the non-physical, non-natural world of *possibilia* which the completed physical theory does not include. Therefore, it is false that:

4. We can conclude from (3) that 4' Our physical explanations are complete explanations of the causation involved in producing bodily movements.

The complete explanation of the causation involved in producing bodily movements will also include parts of the causal nexus which are outside of the domain of physical theories.

Rosenberg's primary reason for claiming that parts of the causal nexus are outside the domain of physics is that receptivity is outside the domain of physics. Physical

descriptions of dynamical systems underdetermine their receptive structures (221). Science provides the nomic mosaic – the simplest description of the lawful ways effective properties instantiate through space-time (227). However, their true receptive connections may remain hidden to us, for “nothing in physical theory will give logically conclusive reasons to assert the existence of one structure instead of one of the others” (223). While we can make reasonable guesses about how to interpret physical theory in a way that involves receptivity, the world’s receptive structure is strictly irrelevant to physical explanation (300).

This concludes my exegesis of the Theory of Causal Significance. Before I move on to explore Rosenberg’s Carrier Theory of Causation, I want to pause to critique what has been explained so far.

2. Questions about the Theory of Causal Significance

2.1. Must Receptive Properties be Connections?

It is important to Rosenberg’s theory that receptive properties are relations rather than monadic properties, for they are the glue that binds individuals together at each level, thereby defining the levels. If receptive properties were but another monadic property, they would merely bundle with other properties to form individuals, without any of the structure that Rosenberg envisions in his metaphysical picture. Furthermore, if receptive properties were monadic, like effective properties, they could be the object of scientific investigation like effective properties: We would have evidence that an individual has a passive power to be effected in a certain way in certain circumstances if it displays that effect in those circumstances. But Rosenberg needs receptive properties to be outside the realm of scientific investigation if he is to maintain that “the causal mesh extends beyond the physical aspects of the world” (220). The idea that receptive properties are connections is a cornerstone of Rosenberg’s metaphysics.

However, even if we agree with Rosenberg about need for receptive properties, his connection view is not the only one available. Alternatively, individuals could have receptive properties directly, rather than indirectly via a receptive connection. That would make receptivity a monadic, one-place property, not a relation. For example, the glass’s fragility is a monadic property it has, a liability, a passive power to be affected by striking. Such dispositions would be relationally specified properties, that is, picked out by relations to activating properties and effects, such as striking and breaking respectively, but they would not be relations.

If we think of effective and receptive properties as dispositions, as Rosenberg seems to, there’s reason for thinking that they are *not* relations. An object can have a disposition without ever manifesting it. An electron can have the disposition to be effected by protons even if it never encounters one. You don’t remove an electron’s disposition by removing the proton which activates its passive power. I would argue that you wouldn’t destroy an electron’s disposition to be effected by protons even if you destroyed all of the protons in its world. However, without the existence of protons, the electron would not stand in any relation to a proton. Relations require the existence of relata. Since the disposition can be had in the absence of its relata, it is not a relation.²

Rosenberg claims that the monadic view is inferior to his connection view for the following reasons. First, the monadic view has a problem of “activating an individual’s receptivity relative to the effective states of other individuals” (156). According to Rosenberg, an individual cannot be receptive simpliciter. It must be receptive relative to the effective state of some other individual(s). To give a full monadic account, he claims, one needs to specify some conditions for selectively determining which individuals a given individual will be receptive to. In the dispositions literature, one would put the point as: To give a full account of a particular passive power or liability, one needs to specify the circumstances which trigger the manifestation of that disposition. This complication supposedly doesn’t arise if you think of receptivity as a connection. Having to give the specification of what an individual is receptive to is “an inelegant extra step” in the monadic account (156).

But suppose an individual has a disposition to react to certain individuals in a certain way, such as an electron with a disposition to move toward positively charged particles. What’s the problem with simply saying it simply has this receptive power? In order to complete an account of this power, we need to specify that *positive charges* activate it. But it’s not clear why this is a problem, why it is inelegant, or even an extra step, as compared to Rosenberg’s view, which posits a relation, and hence another relation, as a way of specifying the receptive property’s activating conditions. Furthermore, Rosenberg notes that there is good reason for that thinking his receptive properties are not located in space-time (221), which makes them somewhat mysterious. On the monadic view, the receptive property instances are located at the individual that instantiates them. Even if the monadic view were a marginally more complex account, it still might be a preferable or more accurate metaphysical picture than the connection view.

Rosenberg’s second reason for rejecting the monadic view is that it limits the account in unnecessary ways. When trying to determine which individuals activate the receptive property, one tempting part of an answer is that the individuals must be spatially and temporally contiguous. That rules out non-local causation and the possibility of analyzing space and time in terms of causation. However, this is not the only way for the monadic view to constrain which individuals an individual is receptive to and not integral to the view that individuals have monadic liabilities.

Rosenberg’s third reason for rejecting the monadic view is that it privileges microphysical connections, where the connection view allows connections between higher-level individuals. This is indeed an attractive feature of Rosenberg’s account, the full import of which does not emerge until one delves deeper into it. However, it is not clear to me why a monadic view must privilege microphysical connections, or why believing in monadic dispositions makes one a reductionist. It seems that it should be possible to develop an account of monadic receptive properties which are causally relevant at the higher levels. At least Rosenberg hasn’t shown why it isn’t.

Rosenberg claims some other advantages for the connection view, such as providing the resources for theories of space and time. However, despite its appeal, it’s not clear to me that the connection view is preferable to the monadic view. This is important, since Rosenberg uses the need for receptive properties as a reason for the reader to get on board with the rest of his theory (208, 269). However, the truth of his theory is not a consequence of this need, if it is one.

2.2. Are receptive properties needed to bind effective properties?

Further problems for receptive properties arise when we consider the role that receptive properties are meant to play. Rosenberg seems to think that if two properties are bound together, there must be a third property that binds them, since he posits the receptive properties to do this job. But if a binding property is needed, what binds the receptive property to the effective property? Rosenberg seems to face a version of the “third man” problem here. Suppose effective properties P and Q are bound together. According to Rosenberg, there must be some receptive property R that does the binding. By the same reasoning, something is needed to bind R to P and to Q , and the regress commences. “The problem is that at each stage further relations are required, but they are *never* able to link their would-be relata. The difficulty is that nothing *ever* gets connected to anything else” (Swoyer 2000). If receptive relations don’t need additional properties to bind them to their relata, it’s not clear why additional properties are needed to bind effective properties together.

2.3. What do receptive connections bind?

The fact that primitive, unbound effective properties are non-actual deepens the mystery of the binding relation. The level zero effective properties that a level zero receptive connection binds are said to be abstract and non-actual. So, it seems that there’s no actual property in the world for the receptive connection to bind. Perhaps the mystery could be somewhat lessened by appealing to the nature of abstract entities, as those outside of any context. But if, as I surmised, being in a context means, for Rosenberg, being in some environment or other, what does it mean to be outside of any context? It is not just being removed from a certain context and put in a different one, but being independent of any context. But how an individual can be in no context at all? Even if you put it in empty space, it is still in the context of empty space. If you put it outside the natural world, it would be in that context. Things can be in different contexts, but if a context is some environment or other, it is not clear how one individual could be more contextualized than another. Perhaps being in a context is just a matter of being in the natural world. If so, then Rosenberg’s statement that “to be part of nature is to have some degree of context” (212) is analytic in his terminology. In that case, saying something is abstract is to say little more than that it is non-actual, which brings us back to our original mystery of how any relation could grab hold of a non-actual thing and bind it.

2.4. How are properties individuated?

Rosenberg’s receptive connections are supposed to get an indeterminate individual to settle into one of its possible determinate states. This view seems to support the following counterfactual: “If this instance of positive charge were not bound to other properties, it would have been an indeterminate charge.” As it stands, perhaps, there are no actual instances of pure, unbound charge, so the antecedent is never true in the natural world. Yet it seems that the counterfactual would be true on Rosenberg’s view. This counterfactual sounds counterintuitive, but what’s more, it problematizes the identity conditions for properties.

It's not obvious that an instance of having some charge or other can be the same property as an instance of positive charge. That possibility violates Leibniz's Law of Indiscernability of Identicals: If property instance $P =$ property instance Q , then if P is F , then Q is F . It seems essential to the instance of indeterminate charge that it is indeterminate and essential to the instance of positive charge that it is positive. But perhaps not. Perhaps an instance of positive charge could have been a negative charge or no charge at all. But what makes it the same property instance? Is there some essential core to properties, some *haecceitas*? It seems odd for someone wants to deny enduring substances to posit an enduring essential "this-ness" to property instances.

2.5. Does actuality come in degrees?

Perhaps the most surprising thing about Rosenberg's metaphysics is that he posits non-actual individuals as the fundamental building blocks in his ontology. The idea that individuals can be more or less determinate is reminiscent of the view that reality consists of various "levels of being." At the lowest (zero) level are pure properties, mere indeterminate potentialities. Above that would be partially determined individuals, combinations of determinate property and indeterminate properties. The more determinate properties, the more determinate the individual. These partially determined individuals reside somewhere between potentiality and actuality: "the individual is still abstract in some respects and, as such, is still a complex of potential rather than a fully concrete determinate" (172). At the top is a fully actual determinate individual, with all of its indeterminacies resolved.

Rosenberg notes his philosophical debt to philosophers such as Russell and Whitehead, but he also has affinity with less recent historical figures. Consider the following passage from Leibniz:

To explain a little more distinctly ... how temporal, contingent, or physical truths arise out of truths that are eternal and essential, or if you like, metaphysical, we should first acknowledge that from the very fact that something exists rather than nothing, there is a certain urgency [*exigentia*] toward existence in possible things or in possibility or essence itself – a pre-tension to exist, so to speak – and in a world, that essence in itself tends to exist. From this it follows further that all possible things, or things expressing an essence or possible reality, tend toward existence with equal right in proportion to the quantity of essence or reality, or to the degree of perfection which they involve; for perfection is nothing but quantity of essence (Leibniz 1697: 487).

Note the remarkable similarities to these passages from Rosenberg:

The actual world is connected to its metaphysical background by a process of becoming. The metaphysical contraction of a well of potential into a determinate and complete individual is a coming into being, a move from possibility to actuality, for a real entity (210).

The principle of maximal completion. Individuals seek completeness (173).

Leibniz's ideas about degrees of being have a long historical tradition (Lovejoy 1936), but few contemporary adherents. Perhaps the payoff in terms of resources for resisting

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both reductionism and epiphenomenalism are worth the price of these ontological commitments. I evaluate that possibility below.

2.6. Why should we think non-actual individuals exist?

In support of his view of possibility, Rosenberg gives two arguments for abstract modal realism. First, if there were no real possibilities, or alternatives to actuality, there would be nothing to constrain and nothing for causal significance to do. There is constraint and causal significance, so real possibilities exist. However, this argument presupposes Rosenberg's theory and is not an independent argument for it.

Second, Rosenberg argues that if possibilities were mere fictional constructs, there would be no real power of causal production. I think his argument can be set out as follows:

- a) If c is a productive cause of e , c raises the probability that e occurs.
- b) If c raises the probability that e occurs, in addition to the actual probability of e 's occurrence, there are non-actual probabilities of e 's occurrence (lower probabilities that e 's occurrence could have had, if not for c .)
- c) Therefore, if c is a productive cause of e , non-actual probabilities exist (206).

Rosenberg assumes this probability-raising account of causal production and makes no mention of literature on such accounts and their difficulties (Hitchcock 2002). Alternative accounts of causation and probability-raising are available (Schaffer 2003; Hayek 2003) and hence denials of (a) and (b) are not implausible.

Rosenberg claims that "any realist theory of causation will be committed to abstract modal realism about possibility" (207). Granted, if you think that things have causal powers, you think that it's possible that they might have certain effects. But does that entail being committed to a non-natural realm where mere possibilities *exist*, striving to become actual? I think not. I believe that a match is flammable – it is possible that it will burn. But that is not to say that there is some merely possible burning existing somewhere outside of the natural world, which may, upon striking, travel the path to the natural world. Future possibilities may deserve different treatment than indeterminate individuals. If one is a presentist, future possibilities don't exist yet. Indeterminate individuals on Rosenberg's view exist, but with some aspect of their natures undetermined. A causal realist may need different, possible not-yet-existing futures, but that doesn't go to show that she needs presently existing merely possible individuals. The causal realist need not be saddled with such possibilities.

2.7 Is there any evidence that the Theory of Causal Significance is true?

As I understand Rosenberg's answer to the argument for epiphenomenalism, much hinges on the claim that part of the full metaphysics of causation, particularly receptive connections, are beyond the purview of science. I'm not sure whether Rosenberg is saying that scientists do not investigate receptive connections merely because they are not interested, or because it is impossible. Since receptive connections, if they exist, are part of the deep fundamental structure of reality, they seem like the kinds of things the scientists might very well be interested in investigating, if possible. If Rosenberg is saying that receptivity is beyond the reach of scientific investigation, his view can be challenged from two different angles.

On the one hand, it seems that he is setting the bar too high for science. Empirical evidence is, I dare say, never logically conclusive for any nontrivial scientific claim. If a domain were beyond scientific investigation every time claims about that domain did not follow logically from the empirical evidence, the domain of scientific investigation would be slim indeed. However, if all facts about causal nexii are open to investigation by physical science, then a complete physical description of the causal structure of reality would be a complete description period, and Rosenberg has no reason for denying premise (4) of the epiphenomenalist argument.

On the other hand, if parts of the causal nexus are indeed unavailable to scientific investigation, Rosenberg's theory has no empirical support. One might wonder, then, do we have any reason to believe that any of it is true? Rosenberg's primitive individuals, the building blocks of his ontology, only exist outside of the natural world, and our only empirical evidence for them is our observations of actual causal nexii which they constitute. But it's not clear that we have any reason to think actual individuals are constituted by non-actual, indeterminate individuals. One perhaps less mysterious way to look at the idea is as suggesting, for example, that a positive charge could have been a negative charge had it been bound differently. But still, there can no empirical evidence of the charge's indeterminate potentiality outside its nexus since, on Rosenberg's view, no unbound indeterminate charge exists in the world. We never get to see level zero individuals in their undetermined state since they don't exist in nature. What's more, receptive connections don't exist in the world either and Rosenberg explicitly argues that no possible empirical evidence can reveal the nature of receptive connections (219).

Even supposing we have one of Rosenberg's unified causal nexii, it's not clear that Rosenberg has any support for his views about the direction of determination of its constituents on different levels. On Rosenberg's view, the formation of a higher-level individual determines the nature of the level zero individuals. But how do we know the direction of determination isn't the other way around? The direction of determination cannot be chronological because (a) level zero individuals do not exist in nature "before" complexes and (b) the theory of causal significance does not presuppose time but supposedly provides resources for developing a theory of time. While he claims that his conclusions are consonant with the character of modern quantum mechanics (207), Rosenberg is explicit about the fact that he is not putting forward an empirical theory. Lacking empirical support for his theory, Rosenberg needs to show that it has the support of the preponderance of the philosophical evidence.

3. The Carrier Theory of Causation

The Theory of Causal Significance is but one part of Rosenberg's theory of causation. The other part is the Carrier Theory of Causation. The Carrier Theory presupposes and builds on the Theory of Causal Significance. However, it is the Carrier Theory which most directly connects causation with the mind and supports Rosenberg's panexperientialism.

3.1. Carriers

As I understand it, Rosenberg's explanation of the Carrier Theory proceeds as follows. Systems, such as the game of Life, have functional, multiply realizable properties, such as

being ‘on’ or ‘off’. These properties are ‘intrinsic’ to the system in that their identity conditions are grounded in the relations between the elements of the system. The properties of the realizers, or ‘carriers’ of the functional properties are ‘extrinsic’ to the system, in that their natures are not defined by their relations to the other elements in the system. For example, being ‘on’ is a functional property of the Life game that is intrinsic to the system, defined merely in terms of being opposite the ‘off’ property and the rules of development of the system. This property of being ‘on’ can be realized, or carried, by a red checker. The physical properties of the checker, such as being red, are extrinsic to the system of the Life game (233). The fact that the properties that are intrinsic to the system are defined in terms of each other creates a certain circularity to the system. Many systems are circular: chess, computers, economics, biology, and psychology, for example. Physics is also said to be circular, because the theoretical concepts like charge, mass, spin, and gravitational attraction are all defined in terms of one another (236).

Multiply realizable properties, which are intrinsic to some system, must have carriers that realize them. For example, the Life game must have two differing properties to serve as the ‘on’ and ‘off’ properties if the game is to be played. So, what realizes physical properties? In other words: “What is extrinsic to physics? What carries the contrasts and relations needed to satisfy our systems of physical concepts?” (236). Rosenberg contemplates three possible answers:

1. Nothing carries physical properties. But then the system would contain pure contrasts that don’t seem to be between anything, which is implausible.
2. A physical property is carried by some other multiply realizable property, which is in turn realized by some other multiply realizable property, ad infinitum. But Plank’s constant seems to put a limit on how finely space, time, and matter can be divided.
3. Physical properties are carried by ultimate carriers, extrinsic to every system, but intrinsic *tout court*, rather than intrinsic to a system. That’s the proper solution, according to Rosenberg.

Intrinsic *tout court* simply means not intrinsic to any system, i.e., extrinsic to every system. Rosenberg elaborates the idea of a pure intrinsic property as “one whose being is intrinsic at least partly to itself rather than to its contextual relationships” and “it is a property we cannot understand in purely systematic terms without leaving something out” (237).

3.2. Phenomenal Carriers

What properties can play the role of ultimate carriers? Rosenberg answers “The phenomenal qualities of phenomenal consciousness are the perfect candidates”: They are purely intrinsic, not fully characterizable by their relations; they do not ontologically supervene on physical properties; they have the right kinds of internal contrasts; and they fall into natural determinable families (238).

Rosenberg goes on to elaborate the Carrier Theory by saying that effective properties are carried by phenomenal properties and receptive properties are carried by experiential properties. A causal nexus is the fundamental kind that has a phenomenal

side, consisting of the intrinsic properties that carry the physical properties, and an experiential side, through which the phenomenal natures are bound (241). A phenomenal quality is an object of experience, not to be identified with the experiencing of it had by the individual which experiences it (243). These considerations lead Rosenberg to his Central Thesis: Things in the world are natural individuals if, and only if, they are capable of experiencing phenomenal individuals (241).

Rosenberg's Central Thesis provokes the following puzzle. A natural individual is defined as "A primitive effective or receptive property, or a completed (i.e., fully saturated) receptive connection" (219). Furthermore, a primitive effective property is a non-actual, indeterminate metaphysical abstract. So, it seems to follow that, on Rosenberg's view, an indeterminate, non-actual property instance is capable of experiencing phenomena. However Rosenberg explicitly denies this consequence: "At level zero, the individuals do not have receptivities of their own, so they could not have receptive fields and so could not experience" (244). How are we to interpret Rosenberg here?

One thing to note is that when he reminds us what a natural individual is in the context of the Carrier Theory, Rosenberg says "To be a natural individual is to be a completed receptive connection," (269) leaving out the 'primitive property' part. Rosenberg's initial definition of 'natural individual' (p. 219) creates the difficulty, so perhaps he abandons it. Another possibility is that he avoids a contradiction by making the Central Thesis about "things in the world." Primitive individuals aren't in the world, so they can be natural individuals without being capable of experiencing phenomena.

At any rate, level zero effective properties are not phenomenal properties, but they are carried by phenomenal properties. There are no free-floating phenomena without an entity to experience them since "no carriers of effective properties would exist outside of a receptive context" (254). Phenomenal properties are brought whole into existence, and leave existence, with a causal nexus (254).

Perhaps Rosenberg is speaking loosely here. It's not that unconnected phenomenal properties don't exist, but just that they are indeterminate, which Rosenberg equates with non-actual and outside of the natural world. Since the determinable/determinate structure of groups of phenomenal properties such as colors was a desiderata for the Carrier Theory, I take it that phenomenal properties are supposed to exist in some indeterminate, determinable state of potentiality until they are bound in a receptive context. So, perhaps the picture looks like this. Various phenomenal properties and experiences are possible. These possibilities place certain constraints on one another, but at lower levels of organization, their states are still indeterminate, so there are no actual experiences. However, when a certain relatively high level of organization places enough constraints on the whole system such that all of its properties become determinate, it is complete, and all of the possible phenomenal properties become actual. Since "receptive properties are carried by inherently experiential properties," (241) the receptivity that is responsible for placing the final constraints is the experience of those phenomenal properties. The individual so constituted is the entity that has the experiences.

Higher-level individuals emerge only when there is indeterminacy in the lower level, otherwise, there is no need for causation since the determination problem is solved for that individual (181). Experiencers (of which people are one type, I suppose) are complete individuals which emerge from the combination of lower-level individuals. This entails that the highest, sub-personal constituents of persons, such as brain structures, are incomplete, partially indeterminate, and not fully actual. They are less concrete, less part of the natural world, than people are. Rosenberg notes: indeterminacy in the joint state of neurons is a precondition for the existence of a higher-level individual partially constituted by neurons (288). This consequence is perhaps not as odd as it may seem at first. Since all of the indeterminacies are resolved and actualized, each part of the experiencing individual is equally actual, because they are parts of a complete, natural individual. The sub-personal parts of a person are only indeterminate and incomplete only insofar as they are considered independently from the causal nexus in which they figure (279).

3.3. Mental Causation

Beyond refuting epiphenomenalism, Rosenberg's theory of causation promises to provide further resources for developing an account of mental causation. Recall that on the Theory of Causal Significance, causation solves the determination problem. Importantly, indeterminacy is not consigned to the lower levels. Any complex individual with any indeterminate part is partially indeterminate. Indeterminate higher-level individuals may enter into a higher-level causal nexii and become determinate. There is no privileged level at which full determination occurs. Therefore, there can be irreducible higher level causal laws governing the formation of these causal nexii—strongly emergent laws consistent with the laws governing the effective properties at the lower levels, but not entailed by them (199). And so, there can be higher-level individuals whose causal efficacy is not reducible to the causal efficacy of its constituents. High-level individuals may be combined to form a very high-level individual, such as a person, where that binding resolves some lower-level indeterminacy. This suggests a picture of how people and their mental properties, can be causally relevant to physical events, over and above their micro-physical properties.

The Carrier Theory promises to provide further resources for avoiding epiphenomenalism. Consciousness avoids being epiphenomenal by being a carrier for effective properties (152). Effective properties are dispositions which have carriers as their causal bases, in the same way that fragility is a disposition with a certain kind of molecular structure as its causal basis. Just as the molecular basis of fragility has the primary causal significance for breaking, so the carrier has the primary causal significance for the manifestations of the effective properties. Since the carriers of effective properties are phenomenal properties, phenomenal properties have primary causal significance (276).

Rosenberg is careful to differentiate his view of the causal significance of consciousness from that of the substance dualist. He says:

In downward causation or Cartesian interaction scenarios, conscious events are clearly efficient causes of microevents. They typically are supposed to present some new force or influence on the concrete dynamics of microphysical entities, leading

them to change the concrete behavior they otherwise would exhibit. This is not an adequate description of the mechanism by which high level individuals have causal significance (278).

To explain what he thinks is an adequate alternative picture of the causal significance of consciousness, Rosenberg draws on Aristotle's distinctions between four different kinds of causes: efficient cause – the primary source of change through time (what Rosenberg calls causal responsibility or causal production); material cause—constitutive substance, what a thing is made of; final cause—purpose or end-nature of a thing; formal cause—what a thing must be by definition (277). An effective property is an effective cause of other properties at its level by excluding some their possible states. Higher-level individuals, on the other hand, operate on independently allowed possibilities. They constrain open possibilities, but they cannot produce lower-level activity not explainable by lower-level interactions plus randomness (279).

Lower-level individuals constitute, and are thus material causes of higher-level individuals. The determinate state of a higher-level individual acts as a final cause or *telos* for the otherwise indeterminate lower-level individuals. This follows from Rosenberg's major claims, as the following argument shows:

1. Individuals seek to be complete (the principle of maximal completeness).
2. To be complete is to be a natural individual (definition of natural individual).
3. Natural individuals are capable of experiencing phenomena (the central thesis).
4. Therefore, individuals seek to constitute experiencing individuals.
5. A final cause of an individual is the end which it seeks.
6. Therefore, experiencing individuals are the final cause of low-level individuals.

So, there is a causal role for phenomenal properties as efficient causes at their own level and as final causes of lower-level individuals (281).

4. Questions about the Carrier Theory

4.1. Do physical properties need phenomenal carriers?

Rosenberg claims that phenomenal properties are the perfect candidates for carriers of physical properties. But they are not the only candidates. Rosenberg admits that he has no idea what “world-making ingredients God might have had available in the jars of his kitchen cabinet” (252). In other words, for all we know, the ultimate carriers could be some kind of physical property. That might be more plausible than supposing that the causal basis of electric charge is something like phenomenal redness.

Furthermore, it is not clear why effective properties need carriers at all. Rosenberg assumes that since effective properties are dispositions, like dormitivity or flammability, they must have causal bases. However, many philosophers such as myself (2003), Mumford (2005) and Molnar (2003: 131-132) have recently questioned that assumption. If fundamental carriers are supposed to have primary causal significance, then they either are or have some causal powers. Since the carriers are fundamental, these powers have no further grounding. But if these powers require no further grounding, then

there's no reason to think that the fact that effective properties are dispositional means they must have further grounding. So, even if the ultimate carriers are not the inter-defined properties of physics, they could still be effective properties.

4.2. Why do receptive properties need carriers?

Rosenberg's justification for positing ultimate carriers is that the theoretical properties of physics need carriers. But then he goes on to conjecture that receptive properties have carriers. But elsewhere, Rosenberg argues that receptive properties are not physical properties. The argument that physics is circular and physical properties need carriers lends no support to the idea that receptive properties have carriers. I'm not sure that Rosenberg gives us any reason to think that they do. This matters for Rosenberg, because he claims that the carriers of receptive properties are experiences, so if receptive properties don't need carriers, there's no role for experience in his system.

Perhaps Rosenberg could say the following. The reason physical properties need carriers is that they are characterized by relations to each other. Receptive properties are also understood in relation to the effective properties they bind together. Therefore, they also need carriers, whether or not they are physical.

This move seems to be drawing on the idea that receptive properties are relations. It's not clear that every relation must be characterized in relation to what it relates. But if they do, we seem to fall into a more vicious version of a third man regress. If we can't understand a relation except in terms of its relation to its relata, then we cannot understand a relation's relation to its relata unless we understand a further relation, and so on. Since we can never complete this process, we can never understand any relations.

Perhaps Rosenberg can claim that not all relations are such that they must be characterized in relation to their relata, but there's something special about the receptive connections—they are merely characterized by their relata. Suppose a certain receptive connection binds a certain mass and charge. It is merely characterized as 'that which binds mass and charge,' its intrinsic character unspecified. Therefore, a carrier for receptivity is needed.

The suggestion is that, while not all relations need carriers, those that are characterized by relations to their relata, such as receptivity, do. But is this plausible? For one thing, it's not clear why the nature of metaphysical relations is held hostage to the way minds like ours characterize them. Nevertheless, consider another relation that is characterized by its relation to its relata: marriage is characterized as that relation which binds a husband and wife. The terms 'husband,' 'wife,' and 'marriage' are inter-defined in this conceptual system. It's plausible that some individual carries the husband property, and likewise for the wife, but I don't see any reason to suppose that we need to a third thing, extrinsic to the matrimonial system, to carry the marriage relation.

Furthermore, recall that these ultimate carriers are not themselves relations, but purely intrinsic properties. It's not clear how these intrinsic properties can carry a relation, in other words, how they related to the relata of the relation they realize. If, as Rosenberg supposes, an experiential property carries the receptive connection, then the carrier itself seems like a relation between the experiencing individual and the phenomenal properties. But then the carrier for receptive properties is not a pure intrinsic

property. In short, even if Rosenberg's Carrier Theory works for effective properties, its application to receptive properties is less clear.

4.3. Are there any actual non-mental properties?

The Carrier Theory suggests that the ultimate carriers of physical properties come into existence only when they constitute an entity to experience them. Again, it seems that we are made up of things that don't exist; that is, made up of nothing. Perhaps the ultimate carriers of our physical properties exist because we can experience them, but what about the rocks on Mars? Their properties do not constitute an entity to experience them, so their physical properties would have no carriers. But, according to Rosenberg, physical properties must have carriers. It seems that many ordinary dry goods are incomplete and not fully actual on Rosenberg's view. Recall the Central Thesis: Things in the world are natural individuals if, and only if, they are capable of experiencing phenomenal individuals. Brains, neurons, and perhaps certain kinds of machines, are said to be good candidates for natural individuals (286). However, thermostats and rocks are not thought to have experiences and are not considered natural individuals. But that is to say they are not complete. If an individual is incomplete, it is indeterminate, and not fully actualized. This implies that thermostats and rocks, and by implication most of the parts of what we think of as the physical world, are less than fully actual, and have one foot outside of the natural world.

4.4. Do mental properties have an adequate causal role?

The idea that phenomenal properties are the causal bases and experiences are final causes may give one the impression that consciousness is playing a significant causal role. However, aspects of Rosenberg's account of mental causation are less than satisfactory. On his view, there is no efficient causation between levels (281) and our physical states do not causally interact with our conscious states (265). So, mental states are not productive, efficient causes responsible for bodily movements. The mind does not make the body move. One might hope that a theory of mental causation would explain, for example, a causal chain between my feeling thirsty and reaching for a glass of water. Since on Rosenberg's view, the only sense in which mental states are causes of physical states is as final causes, the only sense in which my thirst could cause my reaching would be if the purpose of reaching was to feel thirsty.

Rosenberg has a story about how mental properties can be causally efficient on their own level, that is, to other mental states. Suppose two mental states, M1 and M2, are part of a causal nexus. Like all individuals in causal nexii, M1 and M2 are indeterminate when considered independently. In their causal nexus, M1 constrains the possible states M2 can have, and that is what it means for M1 to have causal significance with respect to M2. Since M1 is the source of change through time, M1 is the efficient cause of M2. The lower-level physical properties, also part of the causal nexus, constitute and thus are the material causes of the mental states (267).

This gives us some idea of how a mental property, like feeling thirsty, could be related to another mental property, like *having the experience of* reaching for a glass of water. However, it does not tell us how feeling thirsty causes anything physical. Perhaps feeling thirsty has a material cause which is an efficient cause of the bodily movement.

But then the connection between the thirst and the reaching would merely be that of having a common cause—some physical state that is both the material cause of the thirst and the efficient cause of the reaching. This picture has an unattractive similarity to epiphenomenalism, whereby a physical event is a common cause of both a mental and a physical effect. Perhaps Rosenberg's picture is more complicated, since different kinds of causation are involved, and the reaching may be at a higher level than the material cause of the thirst. Then the material cause of the thirst would be the efficient cause of some other physical state that is the material cause of the reaching. But such complications do nothing to give the mental property a greater causal role.

5. Conclusion

Rosenberg's theory of causation has many fascinating and attractive features, especially as they relate to his philosophy of mind. He aims to provide an alternative to views such as that of Kim 1984, in which all real causal action happens at the lowest micro-level and all macro-level causation is epiphenomenal. He tells a story according to which higher-level entities and properties make a difference to the way the world is. Furthermore, he gives consciousness and experience a central role in this causal story. For anyone with scientific yet anti-reductionist leanings, his efforts are a welcome contribution to the discussion.

However, as Rosenberg anticipated, some people will find his metaphysics excessively speculative (208). The idea that the ultimate constituents of reality are non-actual, indeterminate phenomenal properties bound by connections with no location in space-time is not likely to be accepted without good reasons, and I don't think Rosenberg has provided them. The consequences of his theory of causation for philosophy of mind are somewhat disappointing. His rejection of the epiphenomenalist argument comes down to a restricted conception of the limitations of scientific investigation. His efforts to avoid Cartesian interactionist dualism leave us with a theory of mental causation which lacks an account of how mental states produce bodily movements. While Rosenberg's ideas are provocative and interesting, I don't think that the place consciousness is given is worth the ontological commitments. Of course, this opinion may be a result of some misinterpretation on my part. If so, I look forward to further clarification.

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Notes

1. Thanks to Torin Alter for inviting me to contribute to this collection and to him, Joe Mendola and Adam Kovach for comments on earlier drafts.
2. This argument is due to Adam Kovach in his comments on an earlier draft of this paper.