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TWO VIEWS OF REALIZATION

(Received 10 March 2000)

ABSTRACT. This paper examines the standard view of realization operative in contemporary philosophy of mind, and proposes an alternative, general perspective on realization. The standard view can be expressed, in summary form, as the conjunction of two theses, the sufficiency thesis and the constitutivity thesis. Physicalists of both reductionist and anti-reductionist persuasions share a conception of realization whereby realizations are *determinative* of the properties they realize and *physically constitutive* of the individuals with those properties. Central to the alternative view that I explore here is the idea that the requisite, metaphysically robust notion of realization is ineliminably *context-sensitive*. I shall argue that the sufficiency and constitutivity theses are typically not jointly satisfied by any one candidate realizer, and that going context-sensitive in one's metaphysics is preferable to the standard view. The context-sensitive views developed here are implicit in a range of common views in both the philosophy of mind and the philosophy of biology, even if they have not been explicitly articulated, and even though they undermine other views that are commonly endorsed.

1. INTRODUCTION

In describing the relationship between the mental and the physical, Hilary Putnam (1960) introduced a distinction between the logical description of a Turing machine and the physical states that *realize* the states to which that description refers. Accompanying this idea were two others of note: that systems adequately characterized by Turing machine descriptions can be multiply realized by physical states; and that there are no significant barriers to identifying mental states with brain states. Within a few years, the first of these ideas, that of the multiple realizability of mental states, had become a central reason for rejecting the second of them, the mind-brain identity thesis, largely through Putnam's own influence. Thus arose the functionalist view of the mind that, despite its critics (including a later time-slice of Putnam himself), has survived as the dominant "ism" in contemporary philosophy of mind.



Philosophical Studies **104**: 1–31, 2001.

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With the rise of functionalism, the claim that mental states are realized in physical states of the brain became part of the received wisdom on the mind-body relationship. Indeed, the concept of realization, particularly that of multiple realization, is well-entrenched in the articulation, explanation, and defense of *non-reductionist* forms of physicalism (e.g., Fodor, 1974; Boyd, 1980). Yet perhaps the most sustained discussion of realization itself, that of Jaegwon Kim (1989, 1992), advocates *reductionism* about the mind on the basis of what Kim thinks is a proper understanding of the metaphysics of realization.¹

The dissonance here derives in part from the fact that the concept of realization itself has never been the principal subject of detailed philosophical analysis, a point that Horgan (1993, 573 fn.) observed in his “state of the art” review of the concept of supervenience for *Mind*. As a result, the concept of realization originating in Putnam’s early reflections on minds and machines has never received a more general, systematic treatment that does justice to the deployment of that concept across the behavioral, biological, and social sciences. This paper presents a general framework for exploring the concept of realization that accords a central place to the idea that realization is essentially and irreducibly *context-sensitive*, and that represents an alternative to the sort of view that has become, by default, the standard view.

As a way of outlining the chief contrast between these two views of realization, I begin with a first approximation of what I take to be the standard view of realization as used in the philosophy of mind. While there is a recognition both of realization as the (two-place) relation that holds between mental and physical states, and of realizations as the physical states that occupy the *realizer* place in this relation, it is the latter of these that has been the focus of discussion. Intrinsic, physical states of individuals – more particularly, of the central nervous systems of individuals – are the physical realizations of an individual’s mental states, and these realizers are metaphysically sufficient for the presence of the states they realize. This is what makes realization a metaphysically robust relation simultaneously suitable and problematic for underwriting an account of *mental causation*: suitable because metaphysical sufficiency would seem to have the strength to underwrite an account of

mental *causation*; and problematic because, so-construed, physical realizer states, themselves being physical, seem to have no room for distinctly *mental* causation. Thus, while a consideration of our intuitions about psychological explanations and explanations more generally might indicate ways in which taxonomies of the mental are sensitive to beyond-the-head factors, such as the nature of the physical environment or facts about one's social location (Burge, 1979; Putnam, 1975), a proper understanding of the *metaphysics* of realization point one to an individualistic or internalist view of mental states.

By contrast, the view of realization that I shall propose here takes the context-sensitive character of mental states to be inherent to their nature, since *realization itself is a context-sensitive notion*. More poignantly, the claim at the core of the standard view of realization – that realizers are metaphysically sufficient for the properties or states that they realize – drives one to this view, which presents those adopting the standard notion of realization with a dilemma: either give up or soften this claim of sufficiency (but at the expense of a range of further physicalist claims), or admit that realization, and so the metaphysics of the mental, is ineliminably context-sensitive. Either way, some widely-held physicalist views need to be revised or rejected.

Despite the fact that such a view of realization comports with widely accepted views in both the philosophy of mind (e.g., externalism) and the philosophy of biology (e.g., relational views of biological functions and fitness), it remains largely undeveloped and under-explored in those literatures. In the next section I offer a more rounded characterization of the standard view of realization that brings out more explicitly the two theses at the heart of that view. This will make my chief objection to the standard view easy to state and set the scene for an exploration of some context-sensitive alternatives to it.

2. THE SUFFICIENCY AND CONSTITUTIVITY THESES

A view widespread amongst physicalists (e.g., Kim, 1992, 1993a; Poland, 1994, ch. 4; Yablo, 1992), whatever their other differences, is that realizers satisfy what I shall call the *sufficiency thesis*.

sufficiency thesis: realizers are metaphysically sufficient for the properties or states they realize.

I want to say something about why the sufficiency thesis is implicit in standard conceptions of realization, particularly those used in the philosophy of mind.

One reason is historical. As materialists came to be influenced by the way in which the computer metaphor suggested that mental states were *multiply realized* in physical states, rather than strictly identical to those states, the claim that physical states were metaphysically necessary and sufficient for particular mental states, appropriate when considering an identity theory, was weakened to one of sufficiency only.

A second reason is that many statements of what it means for mental states to be realized by physical states presuppose or imply this claim. For example, it is common to think of realization as a relation of *determination* (of mental states *by* physical states), and the sufficiency thesis is at least a necessary condition for such determination. Also, in explaining the one-many relationship between mental and physical states allowed by the notion of multiple realization, it is common to point out not only that this is not to be confused with the claim that there is a many-one relationship between mental and physical states, but that such a possibility would call physicalism itself into question. This possibility, that of *emergent realization*, i.e., of a physical realizer for a given mental property that could realize some other mental property were the world different in various ways, is precisely what is ruled out by the sufficiency thesis, since such realizations would not in themselves determine the properties they realize.

A third reason is that the sufficiency thesis is needed to make sense of many of the positions that physicalists have adopted and the arguments they have offered in support of them. An intuition at the core of physicalism is that all the relevant physical facts fix all the non-physical facts, and the notions of supervenience and realization have both been used to articulate this intuition further. Supervenience, in all its varieties, is itself a relation of determination, and if one thinks of realization as a correlative notion, then it too must be determinative. (Alternatively, if one holds that the physical realization of a given property is typically a *subset* of the subvenient

base properties, realizations are at most *partial* determinants of the properties they realize, a view I shall return to discuss in section 7.) And as already bruited above, the sufficiency thesis not only seems necessary for reductively identifying mental and physical states in views such as Kim's, but it also generates the recent wave of epiphobia² experienced by non-reductionists.

Kim's own reductionism about the mind is also guided by a second thesis, one at least implicitly shared by many others, including Richard Boyd (1980, p. 100), David Lewis (1994, pp. 412–418) and Sydney Shoemaker (1981, p. 265). I shall call this thesis the *constitutivity thesis*:

constitutivity thesis: realizers of states and properties are exhaustively physically constituted by the intrinsic, physical states of the individual whose states or properties they are.

I understand this thesis broadly such that stronger and weaker versions of it could be articulated in terms of the notions of supervenience, type-identity, or token-identity. In the philosophy of psychology, this thesis might be thought to have its methodological counterpart in the popular endorsement of the idea that homuncular functionalism and functional analysis involve the *decomposition* of psychologist capacities into their constituent capacities, a claim we will have reason to consider more carefully later.

Since *physical* realizations have been claimed (e.g., Heil, 1992, ch. 3; Poland, 1994, ch. 4; Pereboom and Kornblith, 1991) to provide a metaphysical and explanatory basis for the higher-level properties they realize, it is not surprising that these links between functionalism, realization and constitution structure (or perhaps derive from) a broader physicalist metaphysics, one that accords *microstructure* a central role (cf. Lycan, 1987, p. 40; Cummins, 1983, pp. 15–16). As Kim says, speaking in the first instance of our common sense conception of chemical kinds, but clearly with a more general view in mind:

... many important properties of minerals, we think, are supervenient on, and explainable in terms of, their microstructure, and chemical kinds constitute a microstructural taxonomy that is explanatorily rich and powerful. Microstructure is important, in short, because macrophysical properties of substances are determined by microstructure. These ideas make up our "metaphysics" of micro-determination for properties of minerals and other substances, a background of

partly empirical and partly metaphysical assumptions that regulate our inductive and explanatory practices. (1992, p. 322)

As Kim says a little later, “[t]o have a physical realization is to be physically grounded and explainable in terms of the processes at an *underlying level*” (1992, p. 328, my emphasis).³

It is this particular aspect of physicalist thinking about realization that I think is problematic, but my general challenge is to the *conjunction* of the sufficiency and constitutivity theses for at least a variety of properties and states, including mental properties and states. Context can feature in an account of realization in a number of ways, but feature it must, and I see no way of representing the role of context in such an account that does not undermine either the sufficiency thesis or the constitutivity thesis.

A bald statement of my chief objection to the standard view of realization is that the sufficiency and constitutivity theses are not always true of the same putative realizers. Often the realizations that are metaphysically sufficient for the properties they realize are not exclusively physical constituents of individuals with those properties; conversely, sometimes the physical constitution of an individual with a given property is not metaphysically sufficient for that property to be present. Mental properties are no exception here.

Physicalists who understand realization as a relation of metaphysical determination, as most do, should embrace the idea that at least some states and properties, including mental states and properties, have realizers that extend beyond the individual instantiating them. States and properties that have what I shall call a *wide realization* are prevalent in both common-sense thinking and in the biological, social and behavioral sciences. Perhaps because there has been no general framework for such a view of realization, this view has not been explicitly endorsed in the literature on mental properties, although it is the view of realization that makes most direct metaphysical sense of the widespread recognition that a range of mental properties are not individualistic (see Burge, 1979, 1986; Wilson, 1995) and a view that externalists should readily agree with. This advocacy of wide realizations represents one way of developing a context-sensitive notion of realization.

There are initially less striking ways in which realization is context-sensitive, however, and I shall discuss two of them next

(section 3). After discussing wide realizations (section 4) and what they imply about both reductionist and non-reductionist forms of physicalism (section 5), I will critique attempts to contextualize the sufficiency thesis that operate within the bounds of the standard view of realization (sections 6 and 7). Finally, I shall conclude by considering three ways of radicalizing the context-sensitive view of realization (section 8), arguing that all three can and should be resisted.

3. CONTEXT-SENSITIVE REALIZATION AND THE SUFFICIENCY THESIS

As a way of introducing the idea that realization is context-sensitive, consider the mental state of pain and the Ur-example of its realizer, C-fiber stimulation. As Shoemaker (1981) has pointed out, C-fiber stimulation is at best a *partial* realization of pain; what he calls a *core* realization of that mental state is the specific part of the central nervous system most readily identified as playing a crucial, causal role in producing or sustaining the experience of pain.⁴ But when an individual is in pain other parts of her central nervous system are also activated, and their activity is crucial for C-fiber stimulation to play the causal role that is, according to functionalists, definitive of pain.

In general, the physical states that partial realizations of a property or state will be *metaphysically* context-sensitive in that they will realize that property or state only given their location in some broader physical system. Considered just in themselves, they do *not* satisfy the sufficiency thesis. Additionally, in the special case of the core realization of a property, conceived of as the most salient part of some larger system in which that property is instantiated, we have an *epistemic* dimension to the context-sensitivity of the realization. Not only does what we find of greatest causal salience depend on our conceptual and perceptual abilities; it also depends on the questions we ask, the background information we have, and, more generally, our epistemic orientation.

The context-sensitivity of partial and core realizations should be uncontroversial, but might be thought of little relevance here because such realizations do not and have never been claimed to

satisfy the sufficiency thesis. Even if core realizations of a property are what we most readily call to mind in thinking of the realization of that property, there are more complete physical states of which core realizations are a part that *do* satisfy the sufficiency thesis, and any interesting context-sensitivity thesis about realization should apply to *them*, not simply to core or other partial realizations. Following Shoemaker (1981), we might define a *total* realization of a property as just such a state of a system.

By talking of a given higher-level property, H, and the system, S, in which H is realized, we can characterize the general distinction between core and total realizations as follows:

- (a) *core* realization of H: a state of the specific part of S that is most readily identifiable as playing a crucial causal role in producing or sustaining H.
- (b) *total* realization of H: a state of S, containing any given core realization as a proper part, that is metaphysically sufficient for H.

In particular cases, “S” is to be replaced by the appropriate system, whether it be psychological, biological, economic, computational, chemical, etc., and their more determinate forms.⁵ While H is a property of some individual entity, such as an organism or a machine, S need not be identical to that entity but, as in the example of pain, may form a part of it. Paradigms of such systems are those in which bodily functions and their associated properties are realized – for example, the respiratory system, the digestive system, the circulatory system – that are a part of each creature with the respective properties. Total realizations of H are exhaustively constituted by a core realization of H plus what I will refer to as the *non-core part* of the total realization.

While total realizations are in some sense complete states *of S*, they are incomplete in two important respects. First, the distinctness of S and the subject or bearer of H entails that total realizations do not include *all* states of those subjects or bearers, for not all states a subject or bearer is in form part of the system specified. For example, a person’s having a toenail of two centimeters, while a property of that person, is not a property of that person’s digestive or respiratory systems; “x has a toenail of two centimeters” expresses a property of persons, not of digestive or respiratory systems. Second,

the total realization of H excludes the *background conditions* that are necessary for there to be the appropriate, functioning system. While these may themselves be necessary for a given entity to have H, since they are not states *of S*, they are no part of the total realization of H. Thus, total realizations should be distinguished from the broader circumstances in which *they* occur.

To illustrate these points, consider the mammalian circulatory system, which is made up of various parts – such as the heart, the arteries, the capillaries, the arterioles, the venules, and the blood. Various states of these parts, considered together, determine what circulatory properties one has at any given time. Related common sense and medical theories about circulation specify what the circulatory system includes and excludes, but it is clearly a (proper) part of an organism. For a given circulatory property – say blood pressure – not all parts are of equal causal importance. From an intuitive point of view, one's blood pressure is most saliently determined by the condition of one's heart and arteries. Thus, the *core* realization of, say, having blood pressure of 120/80 would be identified with a state of these parts of the circulatory system – say, having clogged arteries and a strong heart. But such states do not by themselves and independent of the state of the rest of the circulatory system guarantee blood pressure of 120/80 in a person. Rather, they need to be located in a certain way within the rest of the person's circulatory system. A *total* realization of having blood pressure of 120/80 is a state of the circulatory system, including the states of having clogged arteries and a strong heart, that determines the presence of that property. Excluded from total realizations are both properties instantiated by the individual that are not properties of the circulatory system at all (such as her having brown hair, or being six feet tall), as well as broader features of the individual's environment that are necessary for her to have a functioning circulatory system (such as there being oxygen in the environment and the world's persistence through time). Such background conditions are no part of the total realization of the corresponding property since they are not properties of the circulatory system at all.⁶

Strictly speaking then, it is only the physical states constituting a total realization *together with the appropriate background conditions* that metaphysically suffice for H. Our paradigms for the

relevant systems are functioning, integrated physical systems, and without the appropriate background conditions in each case there would be no such systems. This might be taken as suggesting that even total realizations, considered simply as complex configurations of physical matter and energy, are metaphysically context-sensitive in much the way that partial realizations are.

4. THE CONSTITUTIVITY THESIS AND WIDE REALIZATIONS

So far I have concentrated on the sufficiency thesis and the challenges to it posed by two ways in which realization is context-sensitive: core realizations are both metaphysically and epistemically context-sensitive, and total realizations presuppose background conditions necessary for the existence and functioning of the corresponding system. But I want to turn now to the constitutivity thesis and how *it* is undermined by a more far-reaching type of context-sensitivity. Here the sufficiency thesis will be my ally, and I shall return to focus initially on mental properties in particular.

I begin by elaborating on my claim, made in section 2, that homuncular functionalism is often construed as a methodological counterpart to the constitutivity thesis. The idea of the prevalent strategy of homuncular decomposition in cognitive science is to explain complex, intelligent, representational capacities by functionally analyzing them into simpler (but typically more numerous) capacities, and then re-applying this first step recursively until we have simple abilities that require neither representation nor intelligence (see Cummins, 1983, chs. 2–3; Dennett, 1978; Lycan, 1987, ch. 4). If each homuncular level of analysis provides a realization of the level above it, and realizations satisfy the constitutivity thesis, then any view of homuncular functionalism that purports to be a *physicalist* view should proceed via *physical* decomposition.

The constitutivity thesis itself implies that realizations of mental properties are *individualistic*, in that two molecularly identical individuals must also share the same realizations of mental properties. And if realizations are determinative of the properties they realize, mental properties must be individualistic, too (Wilson, 2000).⁷ Indeed, reflection on the relationship between the above bodily systems and the individuals to whom they belong supports this as a

general view of realizations, since bodily systems are parts of individuals, and so there is no way for molecularly identical individuals to differ in the bodily system that each has.

This general view overlooks, however, that there are *two* species of total realizations, only one of which can be understood in terms of the notion of constitution above. While it is often the case that *S* is a part of the individual that has *H*, there are a variety of examples in which the converse is true, examples in which *the individual that has H is a part of S*. These are cases in which *S* extends beyond the boundary of the individual, and I shall call the type of total realization that exists in such cases a *wide realization*.

Let *B* be the subject or bearer of *H*. In *constitutive decomposition*, of which homuncular functionalism is often construed as a paradigm, *S* is a part of *B*. But in cases of *integrative synthesis*, *B* is a part of *S*; in these cases, *H* has total realizations that are wide. We can summarize the distinction between wide and *entity-bounded* realizations in terms of the location of the non-core part of a total realization as follows:

- (c) *entity-bounded* realization: a total realization of *H* whose non-core part is located entirely within *B*, the individual who has *H*.
- (d) *wide* realization: a total realization of *H* whose non-core part is *not* located entirely within *B*, the individual who has *H*.

Figure 1 provides a simplified depiction of the metaphysical parallels between these two forms of realization, as well as the crucial differences between the corresponding strategies of constitutive decomposition and integrative synthesis.

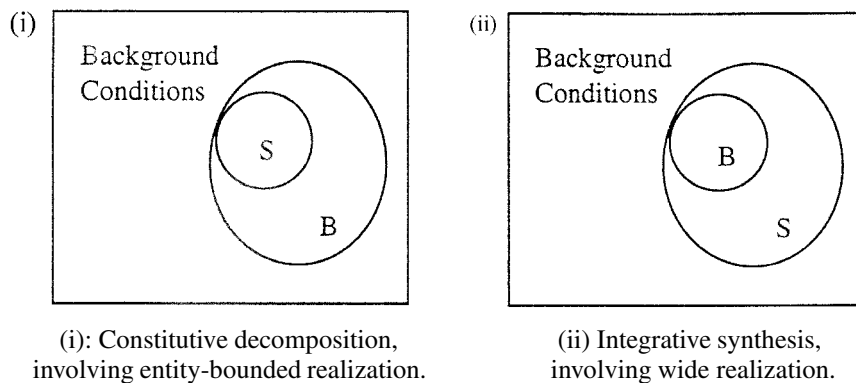


Figure 1.

As a species of total realization, wide realizations satisfy the sufficiency thesis. But since they extend beyond the physical boundary of the individual, they are not exhaustively constituted by the intrinsic, physical properties of the individual subject, and so do not satisfy the constitutivity thesis.

The concept of a wide realization allows us to make *metaphysical* sense of the widely share view, spurred initially by the Putnam-Burge arguments from the Twin Earth thought experiments, that the propositional attitudes are not individualistic (or that they at least have a non-individualistic aspect). The propositional attitudes *have* a physical total realization, albeit one that is not entity-bounded. The realization of particular folk psychological states is wide, and given the framework I am proposing that entails that those states should be understood by using integrative synthesis to locate their bearers in some broader system, presumably one that involves *social* relations between individuals. I shall call this our *folk psychological system*.

The width of our folk psychological system is not anomalous in psychology; in fact, the strategy of integrative synthesis also applies readily to computational psychology. Many computational systems that govern cognition are themselves *wide*, where the computational system S extends beyond the boundary of B, the individual who instantiates the psychological properties, and the appropriate type of total realization is a wide realization. I have previously argued (Wilson 1995, ch. 4, 2000) that we should expect wide computational systems of cognitive states just when there has been sustained mind-world constancy over evolutionary time of the type that one finds in the case of many perceptual and behavioral systems.⁸ Such systems include our mechanisms for form perception and the navigational systems that ants and bees deploy (see Wilson, 1994, 1995, ch. 3). Furthermore, Marr's (1982) theory of vision, much discussed in the literature on individualism in terms of the notion of content that Marr relies on (narrow vs wide), can be seen as specifying wide computational systems for low-level vision.

Since a variety of evolutionary and ecological properties themselves have wide realizations and are profitably understood through the strategy of integrative synthesis, i.e., by locating their bearers in the corresponding wide systems, such a view of the realization of psychological properties is in no way *sui generis* or *ad*

hoc. Such properties include fitness, being highly specialized, and being a predator, properties of individual organisms or even species; and properties of phenotypic traits or behaviors, such as being an adaptation, a homology, or a spandrel.

To consider just one of these examples in more detail, an organism's *fitness* is its propensity to survive and reproduce in its environment;⁹ we can represent the former as a probability between 0 and 1 (the organism's *viability*), and the latter as a number greater than or equal to 0 (the organism's *fertility*) where this number represents the organism's expected number of offspring (see Sober, 1993, ch. 3). In either case, although fitness is a dispositional property of individual organisms (or even whole species), this disposition is not individualistic, since physically identical organisms may differ in fitness because they have been or are located in different environments: the numbers that represent viability and fertility may vary *solely* because of an organism's environmental location. This relational aspect to the property of fitness is often masked by the fact that an organism's environment usually plays (in effect) the role of a constant in many of the contexts in which the concept of fitness is put to work. Yet the properties "has a probability of surviving of 0.7" and "has an expected number of offspring of 2.2" are incompletely specified in a way that makes them meaningless without an implicit reference to an environment. What metaphysically suffices for a given organism to have a specific level of fitness is not instantiated entirely in that organism: the total realization of fitness (and its determinate forms) is wide, not entity-bounded. Here the relevant wide system is the organism plus something like its niche.

To this point I have been discussing wide realizations whose core part is located within an individual. But one might well wonder whether a realization of H could be wide in that not only does its non-core part extend beyond the individual *but so too does its core part*. I shall call this type of wide realization a *radically wide* realization:

- (e) *radically wide* realization: a wide realization whose *core* part is not located entirely within B, the individual who has H.

The clearest examples of radically wide realizations are those of social *actions* that both themselves involve engaging with the world and have further social and institutional background conditions. For

example, consider actions such as making a withdrawal from a bank, committing a felony, or voting, each of which we might do by signing a piece of paper in certain circumstances. Here not only the non-core part of the total realization extends beyond the individual agent, but so too does the most natural candidate for the core realization of these actions, signing a piece of paper. The relevant system explored via integrative synthesis, whether it be the banking system, the criminal justice system, or the electoral system, extends beyond the boundary of the individual agent, and has its own background conditions.

To recap, in this section and the previous one I have proposed four ways in which physical realizations are context-sensitive, the first and second of which challenge the sufficiency thesis, and the third and fourth of which challenge the constitutivity thesis. First, core realizations in themselves are not metaphysically sufficient for the properties they realize, but must be part of some larger functional system. This point is of some significance in itself because it is core realizations that are typically invoked in discussions of reductionism, realization, and functionalism, especially in the philosophy of mind, even if no one *really* believes the sufficiency thesis to be true of them. Second, since total realizations are physical states of such larger functional systems, and there are background conditions necessary for their functioning, strictly speaking even total realizations themselves do not satisfy the sufficiency thesis. To pose these challenges to the sufficiency thesis, we have assumed the constitutivity thesis, and thus individualistic realizations. But our third and fourth types of context-sensitivity assume the sufficiency thesis, and by recognizing that some functioning systems are wide, rather than individualistic, challenge the constitutivity thesis. In the type of wide realizations that are exemplified by mental properties, the non-core part of total realizations extends beyond the boundary of the individual who has those properties. And in the type exemplified by social actions, the core part of the total realization does so, thus giving us what I called radically wide realizations.

Those who would like to salvage the standard view of realization can shuffle where they locate the particular examples I have introduced in this four-fold schema. But since the sufficiency and constitutivity theses are jointly satisfied in *none* of the four forms

of context-sensitive realization, there will remain a problem for the standard view.

5. RETHINKING NON-REDUCTIVE PHYSICALISM

The conflict between the sufficiency and constitutivity theses provides a novel way of expressing a long-acknowledged tension between externalism and reductionism in the philosophy of mind. But it also points to largely unrecognized inadequacies in a number of ways of expressing *non-reductive* materialism, since those expressions have also, I believe, relied on the standard view of realization.

For example, non-reductive materialism has sometimes been formulated in terms of the acceptance of a “token-token” identity thesis (Davidson, 1970, 1974) or via a compositional view of realization (Boyd, 1980). The token identity theory claims that tokens of mental and physical states may be identical even if types of mental and physical states are not identical, where the relevant physical states are intrinsic states *of the brain*. But our exploration of the varieties of realization suggest that this view is false for at least a range of mental states, since the total realization of such mental states are wide and thus *not* intrinsic states of the brain. At most, it is the *core* realizations of mental and physical states that are identical, but this takes us little way to *identifying* mental and physical states. Compositional views of realization and thus physicalism likewise take the relevant composed entity to be the individual or her central nervous system, and in so doing rely on the constitutivity thesis. In short, both of these common expressions of non-reductive materialism have relied on the standard view of realization. If either view allows the relevant tokens or composed entity to be larger than the individual who instantiates the corresponding mental properties, and so in effect gives up the constitutivity thesis, it must be revised in fairly significant ways: we are no longer talking of token physical states of the brain, or compositional states of individuals.

Non-reductionist forms of physicalism are also often expressed in terms of there being “higher” and “lower” levels of explanation, the latter of which provide a metaphysical (but not a reductive) basis for the former. Whether we can adequately conceptualize

mental states as being realized by “lower level” states seems to me doubtful. Those articulating this idea further using a constitution-based conception of realization either will be hard-pressed to maintain the view that realization is determinative, or will, in effect, concede that lower levels *do* provide a reductive base for higher levels. Neither option should be attractive to a non-reductionist. To tackle the first horn of this dilemma would require a fairly radical re-thinking of the concept of realization, one that gives up on the sufficiency thesis altogether. Tackling the second horn threatens to locate the site of one’s non-reductionism solely within the realm of explanation, a threat exploited by Kim in his attacks on non-reductive physicalism (see esp. his 1989, 1992).

We can make this point in another way and more positively. I said in section 2 that a constitution-based conception of realization appears to provide the metaphysical grounding for the explanatory strategy of homuncular functionalism. In the language of higher and lower levels, this is the idea that things and properties specified by lower-level homuncular descriptions physically constitute those specified by higher-level homuncular descriptions. If we grant that at least these latter things and properties are often relationally individuated, this relation of constitution can be determinative only if the former things and properties are likewise relationally individuated. This is to say that the things and properties specified by lower level homuncular descriptions may be relationally individuated. And if the relevant relations for the higher-level properties extend beyond the boundary of the individual, so too must those for the lower-level properties. So while there may be some sense in which lower-levels “constitute” higher levels, neither need be exhausted by the subject or bearer’s intrinsic, physical properties, i.e., by those properties usually taken to physically constitute an individual.

In effect, a homuncularly decompositional view that takes relational individuation seriously entails rejecting a premise crucial to reductionist views of the mind, a variation on the sufficiency thesis, viz., that the physical constitution of an individual determines what mental properties that individual has. There are metaphysical (vs merely pragmatic) grounds for construing homuncular functionalism as a *non-reductive* view, and which point to the need for

proponents of such functionalism to transcend their implicit reliance on the standard view of realization.

6. UNDERSTANDING BACKGROUND CONDITIONS

Those sympathetic to the standard view should be most skeptical of the very idea of wide realizations, particularly when we consider mental properties. The positive intuition underlying the standard view is that total realizations *themselves* always satisfy the constitutivity thesis, even if ascribing *any* property to an entity, including mental properties, presupposes that certain beyond-the-individual background conditions hold. That is, even if we come to recognize a place for background conditions in our metaphysics of realization, all total realizations are in fact entity-bounded, and we should not mistake some of these background conditions for (parts of) the realization itself. Putative examples of wide and radically wide realizations should be reinterpreted within the parameters of the standard view, modified so as to acknowledge just the first two forms of context-sensitive realization that I have identified.

Of critical importance is how well the standard view so modified allows us to make sense of the full range of properties and kinds posited across the various sciences, as well as those found in our common sense discourse. Most problematic here are social actions which, I have suggested, not only have political, economic, and legal background conditions but which also themselves literally extend into the world beyond the individual who enacts them. Thus even their *core* realizations do not stop at the skin. Holding a pen and writing on paper are not background conditions for the realization of the action of signing a piece of paper but part of that action itself, and thus *its* realization. They are properties of the person, things that she *does*, not merely general features of the social and institutional environment in which she acts. Entity-bounded conceptions of realization are unable to account for such world-involving activities.

There is a fundamental problem for the standard view of realization here. The basic idea of the current proposal is to utilize a more encompassing notion of background conditions, one that includes what I have been subsuming as (wide) parts of the total realization

of the property itself. Yet making the background conditions for the total realization of mental states more extensive highlights the fact that realizations so-conceived are *not* metaphysically sufficient for the properties they realize. Insisting on a view of realization that distinguishes between a restricted set of physical states – namely, those that are intrinsic to individuals – and the “context” specified as background conditions limits the significance of the concept of realization for articulating physicalism. A single neuron firing in my head at a given time could *totally* realize a range of mental states – from pain to the belief that trees are green to anxiety – provided that we supply just the right background conditions or context in each case. In effect, giving background conditions this expanded role to play in a defense of the standard view of realization makes total realizations not only metaphysically context-sensitive but also *epistemically* context-sensitive in much the way that we saw that core realizations were. I take this to be a *reductio* of the reinterpretative response to the challenge of accounting for contextual aspects of the metaphysics of realization.

On the context-sensitive view that I have introduced, background conditions are necessary for there to be a functioning system that (totally) realizes an individual’s properties. To be a realist about properties, and so about mental properties, is to be a realist about at least their total realizations, and thus about the systems with respect to which total realizations are defined. Thus the distinction between background conditions and non-core parts of total realizations is required by the realism implicit in the view I have defended (see also section 8 below). We don’t simply get to decide where to draw the line between realization and background conditions, and in particular it is not simply up to us to decide that the realizations must be entity-bounded. Given that the systems in terms of which realizations are characterized are robust entities either that form parts of individuals or that individuals form a part of, background conditions have a more restricted role to play than this modification of the standard view suggests.

Recall that entity-bounded and wide realizations are species of total realization that correspond to two strategies of explanation, those of constitutive decomposition and integrative synthesis. If both of these strategies make for successful theorizing about the

world, as I have argued they do, then that gives some reason to accept the reality of both types of total realization, and some defense of the trichotomy of core realizations, non-core parts of total realizations, and background conditions. Understanding the metaphysics of realization in general is better served by that trichotomy in *both* the case of entity-bounded realization and that of wide realization, rather than simply by a dichotomy between total realizations, which must be entity-bounded, and background conditions.

7. CONTEXT-SENSITIVITY WITHIN THE STANDARD VIEW

To further highlight the limitations of the standard view, consider two recent physicalist proposals that *have* acknowledged the role of context in the metaphysics of mind: Terence Horgan's (1982, 1993) idea of *regional supervenience* and Denis Walsh's (1998) more recent defense of a view he calls *wide content individualism*. While neither of these discussions focus on the notion of realization *per se*, both views can be construed as attempts to provide a role for context that maintain some version of the constitutivity thesis about realizations. Their shortfalls *qua* modifications of the standard view are my concern here.

Horgan (1982) introduced a thesis of supervenience that in his (1993) he christened *regional supervenience*:

There are no two P-regions [spatio-temporal regions of a physically possible world] that are exactly alike in all qualitative intrinsic physical features but different in some other qualitative intrinsic features. (Horgan, 1993, p. 571)

Regional supervenience was introduced to account for what Horgan calls an individual's context-dependent properties¹⁰ by extending the subvenient base to the spatio-temporal region that contains that individual so as to include the relevant contextual factors in that base. If we were to consider this as extending the realization base beyond the individual, we would have something like a wide realization (though note that I have defined these in terms of entity-like *systems*, rather than spatio-temporal regions). But this, of course, would be to give up the constitutivity thesis. Horgan himself thinks that the realizers for such properties are typically *narrower* than the corresponding subvenient base, suggesting that he views realizations as satisfying the constitutivity thesis.¹¹ Such a view, however,

can claim only that realizations, together with the larger spatio-temporal region of which they are a part, determine the properties they realize, giving us realizers that by themselves do not satisfy the sufficiency thesis. What satisfies the sufficiency thesis is the regional supervenience base, but clearly *that* does not satisfy the constitutivity thesis. Furthermore, to pursue a strategy of *up-shifting* and consider reformulations of the sufficiency and constitutivity theses with respect to the entire *region* would be to concede that the individualistic notion of realization implicit in the standard view needs to be given up.

Walsh's chief aim is to articulate a position that resolves what he calls the antimony of individuation: that combining the claim that token thoughts of the same psychological kind have the same (wide) contents with individualism entails that "[t]oken thoughts which are instances of the same physiological kind have the same wide contents" (1998, p. 626), a conclusion generally regarded as extremely implausible. Walsh's solution to the antimony is to reformulate each of these three claims so as to make explicit the way in which psychological states are context-sensitive. These three principles, which together he calls wide content individualism, are (Walsh, 1998, p. 640):

- (1) Necessarily, if individuals have thoughts of the same psychological kinds with respect to a context, then their thoughts have the same (context sensitive) content with respect to that context.
- (2) Necessarily, states of the same physiological kind which share a context realise states of the same psychological kind with respect to that shared context.
- (3) Necessarily, states of the same physiological kind which share a context realise thoughts with the same content with respect to that context.

As in the original antinomy of individuation, (1) and (2) entail (3), but (3), Walsh suggests, is true.

(2) implies that identical intrinsic, physical states of individuals in the same context realize the same psychological states with respect to that context, while (3) spells out this implication for the special case of *intentional* psychological states. While Walsh suggests that this is a way of reconciling wide content with individu-

alism, consider (2) and especially (3) in light of the constitutivity and sufficiency theses and my argument thus far. In effect, (3) says that if you take realizers that satisfy the constitutivity thesis *and* fix their context you have realizations of intentional states with the same content. Yet as the conjunction here makes clear, the realizers that satisfy the constitutivity thesis themselves satisfy the sufficiency thesis with respect to intentional states only in conjunction with their context. Thus, we lack any one realizer that satisfies *both* theses. This is precisely the problem that we identified with Horgan's regional supervenience thesis considered as an attempt to develop the standard view of realization in a way that accounts for the context sensitivity of mental states.

Furthermore, since Walsh's view invokes a relatively unconstrained notion of context, it would seem subject to a variation on the single neuron objection that I introduced in the previous section. Walsh says that he thinks of a context "as corresponding to a set of properties of an individual's environment" (1998, 627 fn). If we make the context rich enough – including, for example, properties that might normally be determined by an individual's internal, functional organization – then two identical single neurons that realize the same physiological state (and so satisfy the constitutivity thesis) could also realize the same psychological state relative to that context. But this does not so much provide us with a realization that also satisfies the sufficiency thesis as indicate a problem with drawing on such a notion of context as a way of saving the standard, entity-bounded view of realization.

Considered in tandem, Horgan's and Walsh's views illustrate that the basic tension in the standard view of realization between the constitutivity and sufficiency theses is not easily relieved. Placing emphasis on the need to move beyond the boundary of the individual subject in order to have a determinative base for mental states, as Horgan's regional supervenience does, highlights the point that realizations satisfying the sufficiency thesis do not themselves satisfy the constitutivity thesis. And emphasizing that realizations that satisfy the constitutivity thesis determine mental states only given a shared context, as Walsh's (2) does, suggests, conversely, that in at least some cases realizations that satisfy the constitutivity thesis do not satisfy the sufficiency thesis.

8. WIDE REALIZATIONS AND MENTAL PROPERTIES: THREE QUESTIONS¹²

Those willing to hum along with the tune in this paper and entertain the idea that properties at least sometimes have wide realizations might reasonably wonder whether that idea has implications for how we think about the mind that are *more* radical than I have been suggesting thus far. I want to take up three such putative implications briefly in this section since they raise some interesting, broader issues in the metaphysics of mind.

(i) **Why doesn't this view lead to an irrealist position on mental states?** Consider the very idea of a physical state's being "metaphysically sufficient" for a given mental state. At the end of section 3 I said that, strictly speaking, metaphysical sufficiency requires both that some physical system be in a certain state (a total realization) and that certain background conditions hold, thus making total realizations *metaphysically* context-sensitive. This view of total realizations underwrites the realism about mental properties that I invoked at the end of section 6, a realism that would be called into question if it could be shown that total realizations are also *epistemically* context-sensitive, as core realizations are. A sufficient condition for an individual having a given mental state is that there be a total realization of that state whose core part lies wholly or in large part in that individual. But if that total realization is epistemically context-sensitive, then so too is that state itself, and mental states start to sound more like *merely* ascribed states of individuals.

This irrealist challenge can be arrested. In the first place, epistemic context-sensitivity is not simply inherited by total realizations from their constituent core realizations. A total realization of H could have been defined simply as *a state of S that is metaphysically sufficient for H*, i.e., by dropping the relative clause that refers to core realizations, without significantly changing the view that I have defended. There can be multiple total realizations not because there are multiple core realizations that are epistemically context-sensitive, but because, given the complexity of the sort of systems there are, there will at least typically be many ways in which those systems can be arranged or instantiated, each of which will metaphysically suffice for H. Consider pain. The nociceptive system that

realizes pain is complicated, and there are many states it can be in that would metaphysically suffice for an individual organism to be in pain. Even given a particular core realization of pain (say, as a particular instance of C-fiber stimulation), there remain multiple total realizations for that core realization because there are various non-core parts of the realization that could suffice for the mental state of pain, even though just one of these will, in any given instance, form part of *the* total realization in that case.

While it is also true that there may be multiple candidate systems for “the” system in which H is realized, and thus for where one draws the line between what falls within the system (and so can be part of the total realization for any properties it realizes) and the background conditions for its existence and operation, it is not simply up to us to determine what constitutes a system or the system of relevance. Like the individuals that they either constitute (in cases of entity-bounded realization) or that constitute them (in cases of wide realization), systems have individuation conditions, and these do *not* depend on epistemic proclivities and fancies. That is why we discover, rather than invent, what physically constitutes the digestive system; the same is true of cognitive systems, whether they be entity-bounded or wide.

Cases in which there are genuinely alternative systems which we could, plausibly, identify as the locus of a given total realization are likely to be rare. Again, focus on the physiological systems that are a paradigm here. While it is logically and metaphysically possible that there be two or more candidate systems for the realization of any biological function (respiration, circulation, digestion, reproduction), the requisite complexity to each of these systems in practice makes it relatively unproblematic to single out what “the” relevant system is for any given property. The same is true of cognitive systems. As with any systematic theorizing, in science or elsewhere, this theorizing about both entity-bounded and wide cognitive systems is subject to error, modification, and revision, but this is not the sort of epistemic context-sensitivity that would undermine a realist view of the ascription of psychological states.

(ii) Why aren’t subjects or bearers of mental states themselves wide? My characterization of wide realizations preserves

the idea that properties with such realizations are still properties of *individual subjects*. Thus, fitness remains a property of individual organisms even though its realization is wide. And my belief that Paris is the capital of France remains *my* belief even though it has a wide realization. I think that this is also true even in cases of radically wide realization, paradigmatically in those involving social actions: Jane's signing a cheque is *her* action because the core realization of that action is realized in large part (even if not wholly) by something that *she* does (e.g., moving her pen-grasping hand over a piece of paper). To my mind this is a desirable feature of my view of mental properties in particular because it maintains an individualistic view of subjectivity and in so doing readily allows for both third- and first-person perspectives on the mind.

One might well challenge this aspect of my view as unnecessarily and unjustifiably conservative. Unnecessarily, for once realization goes wide surely we are on our way to undermining subjectivity and the misplaced position of privilege that the individual subject has in our thinking about the mind. And unjustifiably, since in at least some cases of wide realization, particularly those of radically wide realization, there is non-arbitrary way to single out individuals as the subjects or "owners" of the corresponding mental properties. If we have wide realizations of mental states, and thus wide mental states, so too we should have "wide subjects" of those states. Andy Clark and David Chalmers suggest something like this view of the self as a consequence of their endorsement of what they call "the extended mind" (Clark and Chalmers, 1998).

There may, of course, be interesting science fiction or other fanciful examples that pull our intuitions towards such radical conclusions, but it is important not to lose sight of the fact that, at least in the world that we actually inhabit, and being the creatures that we actually are, there *is* a basis for marking out individuals as the subjects of properties, even those properties with wide realizations. Individuals – and here, as always, our paradigms are individual people and individual organisms – are spatio-temporally bounded, relatively cohesive, unified entities that are continuous across space and time. Recall that the possibility of wide systems was modeled on the actuality of systems that formed part of such individuals as exemplified by the variety of physiological systems

theorized about in biology and medicine. While these narrow systems (e.g., the circulatory system) share some of the features that make individuals metaphysically distinctive and certainly have their own properties, they are not themselves individuals, and it seems strained or at best derivative to view *them* as the subjects of the sorts of properties that we would intuitively ascribe to the individuals they constitute. For example, the visual system and its parts can be lesioned, can have imbalances in levels of neurotransmitters, and have certain of its pathways blocked (either experimentally or “in the wild”). But it is the individual who perceives, who suffers from a visual agnosia, who experiences a hallucination. The same is true of wide systems, and this provides a principled basis for ascribing mental properties in particular to individual subjects rather than the wide systems of which those subjects are a part. In the actual world, it is individuals who form and maintain beliefs, experience emotions, and wonder about what will happen next, even if those individuals form part of what I have called folk psychological systems.

(iii) Why don't all mental states have wide realizations?

Suppose that we accept the view that at least some mental states have wide realizations. Might we replace the existential by the universal quantifier here, and suggest that the moral of the story so far is that mental states have individualistic core realizations but wide total realizations? Given that social actions appear to have radically wide realizations, and the ways in which at least our common sense conception of the mind is linked to such actions via the idea of a *reason* for acting, we might have pause about the latter of these two views. Here I want to make some brief comments about the former claim, the idea that *all* mental states might have wide realizations.

One natural thought in response to the claim that all mental states have wide realizations is that mental properties typically denoted by monadic predicates – such as pain – surely have entity-bounded realizations, since their presence at a time or over a time interval *is* determined solely by what is going on within the boundary of the individual who has the property. In fact, given that the nociceptive system is a proper part of an individual organism, as I suggested earlier (e.g., see footnote #5), this conclusion about pain seems

inescapable.¹³ More generally, there would seem to be a range of mental states and processes that form part of entity-bounded systems: good candidates include fear (LeDoux, 1996; LeDoux and Rogan, 1999), motor imagery (Jeannerod, 1994), and haptic perception (Cholewiak and Collins, 1991; Klatzky, 1999). It has been the working assumption of much traditional cognitive science, committed as it has been to individualism about the mind, that *all* mental states and processes can be viewed in such a way, with the task of cognitive science being to uncover what these entity-bounded systems are. While I think that there is little reason to think that such a general view of cognition can be sustained (Wilson, 1995, 1999, 2000), my point here is that the individualistic view of at least some cognitive processes does seem correct. This suggests a general conclusion – that whereas some of our mental states have an entity-bounded realization, others have a wide realization – with which I am in sympathy.

If some of our mental states *do* have entity-bounded realizations, while others have wide realizations, then there is a respect in which the standard way of characterizing (total) realizations via the Ramsey-Lewis method for defining theoretical terms – a method commonly used to characterize functionalist views in the philosophy of mind (e.g., Block, 1980; Lewis, 1972) – is both restricted and misleading.¹⁴ Ramsey-Lewis sentences purport to represent *complete* theories for a given domain and are constructed by conjoining all of the truths specified by such theories; one derives the total realization for a particular property or state by conjoining its core realization to the realization of complete theories for the domain. Here let us simply grant that such a conception of folk and scientific theories is coherent and a close-enough approximation of the theories we have actually developed to model those theories usefully. Now, if some part of psychology is wide, then since the total realization for a complete psychology will be a wide realization, that for any particular psychological state will also be wide. Given the wide nature of the propositional attitudes and at least some subpersonal psychological states, the goal of characterizing a complete psychology implies that the total realizations of *any* psychological state must be wide.

If we follow Brute Intuition and our brief reflection on cognitive science, and insist that surely *some* psychological properties have entity-bounded realizations, and thus accept my claim that not all psychological properties do, then the Ramsey-Lewis method appears to provide us with no way to represent a significant distinction. The most obvious modification to the standard Ramsey-Lewis view – to attempt to define properties like being in pain by reference to a theory of pain, and properties like believing that *p* by a theory of belief – fails, since each of these theories will almost certainly mention terms from the other, and so will not allow one to define properties with entity-bounded realizations. I leave further exploration here to those more enamored with the Ramsey-Lewis method than am I.

ACKNOWLEDGEMENTS

A leave from Queen's University that I spent as a Visiting Fellow in the Department of Philosophy at the University of Western Australia in 1995 allowed me to begin work on this paper, and during an appointment as a Fellow at the Center for Advanced Studies at the University of Illinois, Urbana-Champaign, in 1998 I came close to completing it. I thank all three institutions for this support. Over the years, Sydney Shoemaker has provided encouragement to develop the nebulous ideas in various drafts. I would like to thank John Heil, Paul Teller, and J.D. Trout for written comments on an early draft, and graduate students in my seminar on individualism and intentionality at Queen's in the Winter of 1996, especially Allison Dawe and Andrew Sneddon, for their reactions. For feedback on versions more like the current one, thanks to Karen Bennett, Steven Wagner, Robert McKim, Paul Teller (again), David Lewis, Terry Horgan, Gary Ebbs, and Gabe Segal; and audiences at the University of Wisconsin, Madison; the University of Michigan, Ann Arbor; the University of Illinois, Urbana-Champaign; and the joint philosophy colloquium at Illinois State and Illinois Wesleyan universities.

NOTES

¹ Kim, of course, approaches this issue via his more substantial work on mind-brain supervenience. See Kim (1978, 1982, 1984a, 1984b, 1987, 1988, 1990).

² Epiphobia being the fear that one is becoming an epiphenomenalist (Fodor, 1989, p. 137).

³ And again: “When P is said to ‘realize’ M in system s, P must specify a microstructural property of s that provides a causal mechanism for the implementation of M in s . . .” (1993a, p. 343; see also his 1982, 1984a, 1993b). Such a view is also manifest in Kim’s enthusiasm for the prospects of understanding “mind-body supervenience as an instance of mereological supervenience” (1993b, p. 168; cf. his 1994).

⁴ This is my gloss; I make no claim about whether Shoemaker intends the notion of a core realization to be understood in *precisely* this way.

⁵ In the case of pain, the appropriate system is the *nociceptive* system, containing mechanical and polymodal nociceptors in the skin (muscles and viscera), myelinated and unmyelinated axons (the latter being the famed C-fibers), spinal neurons, parts of the brainstem and thalamus, and the somatosensory area of the cerebral cortex. For more details, see, for example, Hendry, 1999.

⁶ One further way to get at the difference between the non-core part of a total realization and the background conditions of that realization is to consider the refinements of our common sense view of circulation offered by circulatory physiologists. While we would expect physiologists to offer a more precise specification of both the core and total realizations of the properties of this system, we wouldn’t expect them to contribute much to our understanding of the background conditions of these realizations. See also section 6 below.

⁷ While there are general ways in which physicalism has been thought to lend support to individualism (see Kim, 1982; Wilson, 1995, ch. 1), perhaps surprisingly this specific connection between physicalism and individualism has not been drawn.

⁸ [deleted self-reference]; cf. also McClamrock (1995, esp. ch. 6), Houghton (1997), Hutchins (1995, esp. ch. 9), and Clark and Chalmers (1998) for related explorations.

⁹ Fitness is also predicated of organismal-level traits or phenotypes, such as running speed, resistance to particular diseases, and body pigmentation, as well as genotypes and genes. The general point that I make in this paragraph holds of these related uses of fitness.

¹⁰ Horgan’s examples include being President of the United States, being a bank, and knowing that Oscar Peterson is a jazz pianist (1982, p. 33).

¹¹ Horgan earlier cautioned that “philosophers certainly should not assume . . . that realization is just the converse of supervenience. The supervenience base is frequently broader than the realizing property.” (1993, 573 fn.). In recent correspondence he has reaffirmed this distinction between realizations and the supervenience base.

¹² These three questions derive from discussions with, respectively, Gary Ebbs, Andy Clark, and Paul Teller.

¹³ What one should say about pain in particular, however, depends entirely on one's theory of pain, since it is that theory that specifies the system with respect to which realizations are characterized. Consider the general functionalist theory of pain that identifies pain with a certain complicated web of causes and effects (albeit one never seriously specified by any functionalist thus far). Now, if *these* causes and effects are not located entirely within the individual – as I take common sense to imply – pain will have a wide realization. Unless I am mistaken about the commitments of common sense, this is the view of pain that an *analytic* (or *conceptual*) functionalist should adopt (see Block 1980; Shoemaker 1981).

¹⁴ David Lewis has suggested to me (in correspondence) that this should be called the Ramsey-Carnap-Lewis method, but I follow established usage in omitting Carnap's name here.

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