REALIZATION, REDUCTIOS, AND CATEGORY INCLUSION *

(final draft for J. Phil.)

I. Thomas Polger and Laurence Shapiro argue that Carl Gillett's much publicized dimensioned theory of realization is incoherent, being subject to the following *reductio*:

> (P1) Everything that is realized is a property instance, and at least one property instance is realized. (Gillett's account)
> (P2) Some things that are realized are multiply realized. (assumption)
> (P3) No property instance is multiply realized. (trivial)
> (C1) Some property instances are multiply realized. (from P1 and P2)
> (C2) Not (P1). (*reductio* from P3 and C1) [1]

The *reductio* turns on the fact that (P1) makes property *instances* the exclusive relata of the realization relation, while the conjunction of (P2) and (P3) implies its denial, namely, that *properties* are the relata of the realization relation on occasions of multiple realization. Polger and Shapiro are correct too see an apparent puzzle here. Gillett defines realization in terms of property instances, and he accepts the multiple realization of properties. [2] He is not alone. Sydney Shoemaker appears to accept (P1) when he says: "to speak of one property as realizing another is shorthand for saying that instances of the one are among the possible realizers for instances of the other." [3] And he also accepts the multiple realization of properties, thus giving credence to (P2) and presumably (P3). But I am not primarily concerned about whether Polger and Shapiro are correct in attributing the corresponding beliefs to Gillett, or whether they can be extended to others like Shoemaker. [4] Rather, I am interested in the more general issue their argument raises for theories of realization and their underlying metaphysics. In particular, regarding (P1) they say: "On Gillett's account, realization is defined as a relation between

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* I thank John Carroll, Carl Gillett, and Jaegwon Kim for some helpful comments and discussion.

[1] T. Polger and L. Shapiro, "Comments and Criticism: Understanding the Dimensions of Realization," This JOURNAL CV (2008), p. 214.

[2] See C. Gillett, "The Dimensions of Realization: A Critique of the Standard View," *Analysis* 62 (2002), p. 322, where he defines realization in terms of property instances.

[3] S. Shoemaker, *Physical Realization* (Oxford: Oxford University Press, 2007), p.3.

[4] In personal communication Gillett says he rejects (P1). See also his "Multiply Realizing Scientific Properties and their Instances," forthcoming in *Philosophical Psychology*. But his reasons are different than mine. Cf. my discussion in sec. IV.

property instances. It follows that only property instances can be realized on his view." [5] But a definition of realization cast in terms of property instances does not imply (P1) by itself, since one can add an auxiliary assumption that allows the concept of realization to range over multiple ontological categories. To that end I will supplement a dimensioned theory with the necessary category-inclusive proposition. Consequently, one may consistently reject (P1) on grounds that properties are also realized. Alternatively, one may consistently reject (P3) on grounds that property instances are also multiple realizable. [6] I will then offer a few reasons to justify the proposed category-inclusive view of realization.

II. Consider a parallel case. Jaegwon Kim describes a concept of *event* supervenience, which picks out a relation of determination between particulars. [7] Kim also allows for the possibility that certain properties have *multiple* subvenient bases, as required by certain strong interpretations of multiple realizability. [8] So event supervenience concerns particular instances, while multiple supervenient bases concern properties. That fact notwithstanding, one should not accept the following *reductio* of Kim's ideas about event supervenience:

> (P1*) Everything that supervenes is a property instance or token event, and at least one property instance or token event supervenes.
> (P2*) Some things that supervene have multiple subvenient bases.
> (P3*) No property instance or token event has multiple subvenient bases.
> (C1*) Some property instances or token events have multiple subvenient bases. (from P1* and P2*)
> (C2*) Not (P1*). (*reductio* from P3* and C1*)

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[5] Ibid., p. 214.

[6] One may find the denial of (P3) especially objectionable on grounds that only properties can have multiple instances. But compare Richard Boyd's claim about the transworld compositional plasticity for token events in his "Materialism without Reductionism: What Physicalism Does Not Entail," in N. Block, ed., *Readings in Philosophy of Psychology* 1 (Cambridge MA: Harvard University Press, 1980), p. 99. The denial of (P3) is also possible on metaphysical schemes that identify particulars with properties, say, a bundle theory minus individual nonduplicating heacceities.

[7] J. Kim, "Epiphenomenal and Supervenient Causation," *Midwest Studies in Philosophy* 9 (1984): 257- 270.

[8] Ibid., p.261. Also his "Concepts of Supervenience," rpt. in *Supervenience and Mind* (London: Cambridge University Press, 1993), p.65.

This *reductio* is unacceptable because Kim defines supervenience in terms of families of *properties*, and then he explains event supervenience in terms of property supervenience. [9] Specifically, for the latter project he offers the following category-inclusive coordinate definition:

> (CD_s) An event, *x*'s having *F*, supervenes on the event, *x*'s having *G*, just in case *x* has *G* and *G* is a supervenience base of *F*. [10]

This permits Kim to say that both properties and events stand in a supervenience relation, contrary to the exclusive claim represented by (P1*). However, the unacceptable *reductio* is just Polger and Shapiro's *reductio*, only cast in terms of supervenience rather than realization. This suggests that one can avoid their argument on the model provided by Kim, specifically, by defining a dimensioned theory of property realization and then sketching a larger category-inclusive theory whereby property instance realization is explained in terms of property realization.

III. Gillett says that a "flat" theory presents realization in terms of the same object instantiating the realized and realizing property, while a "dimensioned" theory presents realization in terms of an object and its proper parts, where the causal powers of the former are composed from the several causal powers of the latter in a way befitting that dimensioned mereology. [11] Hence a dimensioned theory of *property realization* must incorporate these claims. I propose:

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[9] Kim defines supervenience as a relation between families of properties in various places, e.g., in "Concepts of Supervenience," ibid., p.65; and his "Supervenience as a Philosophical Concept," rpt. in *Supervenience and Mind*, p.140.

[10] "Epiphenomenal and Supervenient Causation," *Midwest Studies*, p.262.

[11] C. Gillett, "The Dimensions of Realization: A Critique of the Standard View," ibid.; also his "The Metaphysics of Realization, Multiple Realizability, and the Special Sciences," This JOURNAL C (2003): 591-603. Gillett states his version of a dimensioned theory as follows: "Property/relation instance(s) P_1-P_n realize an instance of a property *F*, in an individual *s*, if and only if *s* has powers that are individuative of an instance of *F* in virtue of the powers contributed by P_1-P_n to *s* or *s*'s constituent(s), but not vice versa" ("The Dimensions of Realization," p.322, with variables changed to match my own). Like Gillett's definition, my definition (DR_p) only mentions the realized *F* and the realizing proper part properties P_1-P_n, not some additional organizational feature, or

(DR_p) Property F is dimension realized by properties P_1-P_n if and only if (i) there is an object s with proper parts p_1-p_n such that F is instantiated by s and P_1-P_n are instantiated by p_1-p_n, and (ii) the causal powers that F bestows upon s are composed from or otherwise determined by the distinct causal powers that P_1-P_n bestow upon p_1-p_n.

The notion of dimensioned realization for *property instances* can then be explained on the basis of this notion of dimensioned property realization by means of the following category-inclusive coordinate definition:

(CD_r) Property instance, s having F, is dimension realized by the collection of property instances that constitute its proper parts, p_1-p_n having P_1-P_n, just in case p_1-p_n instantiate P_1-P_n and the collection of properties P_1-P_n is a realization base for the property F.

Like Kim's coordinate definition for supervenience (CD_s), I formulate (CD_r) so that the realization of properties is a necessary condition for the realization of property instances. As such, it does not provide a reductive analysis. [12] Even so, with (CD_r), both properties and property instances can be said to stand in a dimensioned realization relation, contrary to premise (P1) of the *reductio*. My proposal also accords well with a large number of statements about realization in the philosophical literature that involve different ontological categories. Thus, Ernest Lepore and Barry Loewer say that an event with a physical property realizes an event with a mental property. [13] But Colin McGinn says that a physical property realizes an intentional property. [14] Even the same philosopher crosses ontological categories. Putnam not only speaks about the realization

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structural property, or role-player possessed by s. So the definition only presents a core notion of dimensioned property realization.

[12] E.g., the definition of property realization (DR_p) only mentions objects instantiating properties, so it does not imply property instances without an additional existence condition for property instances mentioned in the paragraph that immediately follows.

[13] E. Lepore and B. Loewer, "More on Making Mind Matter," *Philosophical Topics* 17 (1989), p.179.

[14] C. McGinn, "Philosophical Materialism," *Synthese* 44 (1980), p.196.

of objects like Turing machines but also the realization of their state types. [15] A category-inclusive view of realization explains this linguistic variation. Of course other explanations are possible. For example, some philosophers might maintain a category-exclusive view by treating the language of property realization uniformly as a convenient shorthand for longer statements about property instance realization. [16] But if so, it is incumbent on that philosopher to provide a clear meaning for the language of multiple realization involving properties when, on their view, realization is always property instance realization. That may be a small chore, but the alternative category-inclusive view faces no such task, since it takes the language of property realization at face value.

It is also worth emphasizing that a category-inclusive result is not achieved by the definition of property realization (DR_p) alone. First, (DR_p) only refers to an object instantiating a property, which does not imply that there exist items from the further category of property instances unless it is taken in conjunction with the appropriate metaphysical assumption according to which a property instance *s* having *F* exists when the object *s* instantiates property *F* (there are more sparse ontologies which deny that assumption.) Second, even if one accepts the required existence condition, (DR_p)'s domain of discourse is explicitly stated to be properties in the definiendum. Hence the role of the coordinate definition (CD_r) is to extend the interpretation of its key predicate '*x* is realized by *y*' to include property instances. Similar remarks would apply if one were to begin with a definition of dimensioned realization stated in terms of particular instances. The appropriate category-inclusive coordinate definition would then serve to extend the interpretation of its realization predicate to include properties.

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[15] See H. Putnam, "Minds and Machines," rpt. in *Mind, Language and Reality: Philosophical Papers*, vol. 2. (London: Cambridge University Press, 1975), p.371; and his "The Nature of Mental States," rpt. in *Mind, Language and Reality*, pp.434, 438. Technically (CD_r) does not address object realization. But one can formulate the appropriate coordinate definition by linking object realization to property realization.

[16] As I stated in the introduction, Shoemaker appears to take a category-exclusive position when, in *Physical Realization* he says: "to speak of one property as realizing another is shorthand for saying that instances of the one are among the possible realizers for instances of the other" (p.3). But, after stating that what is realized is a property instance for both "same object realization" and "microphysical realization," Shoemaker also says: "it is not excluded that other sorts of entities should be said to be realized" (p.4). My category-inclusive proposal can reconcile such remarks.

IV. I think the category-inclusive view of realization represented by (CD_r) succeeds in avoiding the stated *reductio*, meaning that it permits a consistent set of beliefs regarding properties and their instances as the relata of the designated realization relation. But it does not establish that such a view is *plausible*. Is it justified to extend the interpretation of the realization predicate, or the concept expressed by that predicate, in a category-inclusive way?

One might think that a category-inclusive view of realization is justified with the aid of general metaphysical principles. For example, a doctrine of property immanence ensures that particulars are present whenever properties are realized, and an account of realization adorned with a causal theory of properties makes both properties and their instances relevant to the realization relation because such an account requires that the realized and realizing properties contribute powers to their instances. [17] But such metaphysical doctrines only ensure that items from the stated categories are present and relevant when realization occurs. A category-inclusive coordinate definition is still needed to ensure that a theory of realization picks out the desired items as the relata of the realization relation. After all, a given property and its instance are distinct entities. The former can exist apart from the latter. Moreover, a concept or theory of realization can track just the property but not the particular instance. Compare that a concept can track just one among multiple co-occuring events, or just one among multiple co-extensive properties (by some accounts, even just one among multiple lawfully co-extensive properties).

Worse, other metaphysical relations can elicit the opposite category-exclusive judgment in spite of the truth and application of the same general metaphysical principles. For example, some philosophers believe that token events are the relata of the causal relation, not objects *per se*, and not properties either. [18] Yet certain properties of

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[17] Gillett argues along these lines in his "Multiply Realizing Scientific Properties and their Instances."

[18] Most notably, D. Davidson, "Actions, Reasons, and Causes," and "Causal Relations," both reprinted in *Essays on Actions & Events* (Oxford: Oxford University Press, 1980), pp.3-19, 149-162, respectively. This view of particular events as the relata of causation also leads some philosophers to use a different term for the role of properties in causation, such as 'causal relevance' or 'quausation.' See T. Horgan, "Mental Quausation," *Philosophical Perspectives* 3 (1989): 47-76. As Yablo puts it: "Although

those events are certainly present and relevant on occasions of causation. Something can be judged present and relevant but not the relata of the relation in question. So a category-inclusive view does not appear to stand by doctrines of property immanence and causal powers alone.

Nevertheless, I think a category-inclusive view of realization can be justified. As a start, given the parallel between the proposed category-inclusive view of realization and Kim's treatment of property and event supervenience, it seems warranted to conclude that the former is justified if the latter is justified. At least this conditional judgment seems warranted until one explains why realization has certain distinguishing features that prevent the parallel category-inclusive analysis. Yet this result is not entirely satisfying, since one might also challenge the category-inclusive treatment of supervenience, and since other metaphysical relations like causation can elicit the opposite category-exclusive judgment. So an important question remains – why is it justified to treat supervenience and realization in a category-inclusive way, and causation in a category-exclusive way?

I think there is a plausible answer. Brain McLaughlin points out that, while 'supervenience' and 'realization' are philosophical terms of art whose stipulative meanings can only be judged by their theoretical utility, 'causation' is a term grounded in common usage that carries substantial pre-theoretic intuitions. [19] This suggests the

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causes and effects are events, properties as well as events can be causally relevant or sufficient," from his "Mental Causation," *The Philosophical Review* 101 (1992), p.247, fn.5. Of course not all philosophers exclude properties from the causal relation. See F. Jackson, "Essentialism, Mental Properties and Causation," *Proceedings of the Aristotelian Society* 95 (1995), p.254.

[19] B. McLaughlin, "Mental Causation and Shoemaker Realization," *Erkenntnis* 67 (2007), pp.149-150. John Carroll also made the same point in discussion. I add that, because 'realization' is largely a technical term of art when used by philosophers, it can pass certain ordinary language tests for category inclusion in a trivial way. Compare how Lowe explains why the verb 'to cause' has a different sense when applied to object causation versus event causation, namely, that while it is not incongruous to say "Smith and Jones together caused the collapse of the bridge," it *is* incongruous to say "The explosion of the bomb and Jones together caused the collapse of the bridge." See E. J. Lowe, *A Survey of Metaphysics* (Oxford: Oxford Press, 2002), p.196. But statements of mixed categories are perfectly fine for realization. So it is not incongruous to say "John's brain and its physical properties together realized John's mind and its mental properties" (object and property); or "John's brain event and its physical properties together realized

hypothesis that, while a category-inclusive analysis of supervenience and realization are justified by their theoretical utility, a category-inclusive analysis of causation falters, if it does falter, when it is weighed against additional pre-theoretic intuitions and ordinary language sentences that favor causes as concrete particulars. Moreover, like a category-inclusive analysis of supervenience, a category-inclusive analysis of realization is indeed theoretically useful. Why? Because, in either case, the pertinent coordinate definition provides a measure of unification under a core notion of determination. For supervenience, there can be no difference in one set entities (the supervenient ones) without a corresponding difference in another (the subvenient ones). That notion holds true for properties and property instances alike, and the coordinate definition (CD_s) fixes the extension accordingly. For realization, one entity (the realizer) lawfully necessitates another entity (the realized). [20] That notion holds true for properties and property instances alike, and the coordinate definition (CD_r) fixes the extension accordingly. A competing category-exclusive position would seem to multiply meanings beyond necessity, creating different senses for property and instance determination where there appears to be none.

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John's mind event and its mental properties" (event and property); or "John's brain and its physical events together realized John's mind and all its mental events" (object and event). In my view, these statements do not violate ordinary language conventions because, at present, ordinary language has *no* well-established conventions about the philosophical vocabulary of realization to violate.

[20] Philosophers typically analyze realization as a determinative relation that implies one-way conditional laws. See E. Lepore and B. Loewer, "More on Making Mind Matter," p.179; M. Tye, *Ten Problems of Consciousness* (Cambridge MA: MIT Press, 1995), p.41; and J. Kim, *Philosophy of Mind* (Boulder, CO: Westview Press, 1996), p.133.