Against the Doctrine of Microphysical Supervenience*

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I. The Doctrine

The doctrine of microphysical supervenience, to a first approximation, asserts that the exemplification of intrinsic qualitative properties by an object supervenes on the properties and interrelations of the microphysical entities that compose that object. We can state this doctrine more carefully as:

> **Microphysical Supervenience (MS)** Necessarily, if atoms A_1 through A_n compose an object that exemplifies intrinsic qualitative properties Q_1 through Q_n, then atoms like A_1 through A_n (in all their respective intrinsic qualitative properties), related to one another by all the same restricted atom-to-atom relations as A_1 through A_n, compose an object that exemplifies Q_1 through Q_n.[1]

MS is a conjunction of two theses. The first thesis is that an object's intrinsic qualitative properties supervene on the intrinsic qualitative properties and (restricted) interrelations of its constituent atoms.[2] The second is that whether individual atoms

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[1]The necessity here is metaphysical or broadly logical. MS is implicitly universally quantified. The atoms of MS are the atoms of microphysics, not Democritus. Anyone committed to MS will probably think that the properties of both atoms and macrophysical objects supervene on the features and interrelations of yet smaller particles. My arguments against MS could easily be adapted to undermine a similar thesis about what supervenes on, for instance, quarks, leptons, and gauge bosons.

[2]This first thesis is the claim that an object's qualitative properties <u>weakly</u> supervene on the features and interrelations of its constituent atoms. I will show that MS, as stated, is false. This implies that any doctrine which replaces MS's claim of weak supervenience with one of strong supervenience, but is otherwise the same as MS, is also false. (To change MS to include a claim about strong supervenience,

compose an object depends on only the intrinsic qualitative properties of each of those atoms and the ways those atoms are (restrictedly) interrelated.

I shall show that MS is false by showing it entails a contradiction. But first I must say a little more about restricted atom-to-atom relations and qualitative and intrinsic properties.

Restricted atom-to-atom relations are the spatiotemporal and causal relations that hold between atoms. So note that, for example, the relation atoms would stand in to each other by composing an object that is square and red is not a (restricted) atom-to-atom relation. And it is a good thing. For if that relation, and others like it, were among the restricted atom-to-atom relations, MS would be wholly trivial. And MS is not intended to be trivial. (It is trivial to say that the existence of a square red object composed of atoms supervenes on atoms' standing in the composing a square red object relation.)

Qualitative properties include all general, non-quidditative properties. Consider the possibility of two objects composed of qualitatively identical atoms standing in the very same restricted atom-to-atom relations. Given MS, it would not be possible that, for example, one of these objects be a tree, and the other not, or that one be conscious, and the other not. But it is consistent with MS that one have the non-qualitative property of, for example, being identical with O, while the other lack it.

In explaining what intrinsic properties are, we must be careful not to stipulate that by the definition of 'intrinsic', an object's intrinsic properties are all and only those that depend on the intrinsic features of, and interrelations among, that object's parts. This definition, which makes use of a claim about the intrinsic features of parts in its definiens, is circular.[3] And, more importantly for our purposes, if "depends on" means

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simply add a 'necessarily' after the 'then'.) See Kim (1987) for definitions and discussions of weak and strong supervenience.

[3]We could not simply drop the problematic use of 'intrinsic', asserting instead that an object's intrinsic properties depend on (all) the features of, and interrelations among, its parts. To see the problem here, note that I could have a part which has the property of being three feet from a dog.

"supervenes on", this definition renders the first thesis of MS trivial, making it amount to no more than the vacuous claim that an object's properties that supervene on its atoms (because they supervene on its parts), supervene on its atoms.

Intrinsic properties are non-relational. So MS allows that two objects could be composed of qualitatively and interrelationally exactly similar atoms, yet differ in their relational properties. One of those objects could be three feet from a dog, the other not. MS would not, however, allow one of those objects to be oblong, and the other round. Intrinsic properties, for our purposes, do not include properties "rooted" in the past or future. So MS does not imply that my having smiled yesterday supervenes on the features of, and interrelations among, my atoms (i.e., the current features of and interrelations among the atoms that now compose me).[4]

The following is a "mark" of being intrinsic: an object's intrinsic properties are those properties that it is metaphysically possible that the object exemplify if that object and its parts (if any) are the only objects that exist. This "mark" is not an analysis of being intrinsic. And, if we tried to turn it into an analysis, it would have to be complicated to avoid some counterexamples. (Being the only object in the universe and having danced last week are not intrinsic, but bear the mark.) But excluding cases which rely on other objects' failing to exist or on what the object in question did in the past or will do in the future, this mark seems to get things right and so it is useful.[5] Being oblong comes out as intrinsic, since it is possible that the only object in the universe be oblong. But being three feet from a dog does not.

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[4]I will also assume that modal properties, properties such as my possibly being ten feet tall, are not intrinsic. Of course, genuinely intrinsic properties entail modal properties. My being over five feet tall entails that I am possibly over five feet tall.

[5]Whether or not this mark, or something very close to it, can be worked into an analysis of being intrinsic is the subject of debate. (See Kim (1982), Lewis (1983), and Vallentyne (1997).) No matter how the debate is ultimately concluded, the fact that the mark is such a natural place to hope to find an analysis shows us that it captures something very important in our intuitive understanding of being intrinsic.

II. The Argument

Suppose that P is a human being. Being a well-functioning human being, P enjoys the rich subjective mental life generally associated with human persons. Let's describe this fact about P by saying that P exemplifies the property of being conscious.

Being conscious is an intrinsic property.[6] Consider the fact that most theists believe that God might never have created; they believe there is a possible world that contains only God. This implies that there is a possible world that contains just a single conscious entity. This implication is coherent; at least, it is not rendered incoherent by the nature of being conscious. If it were, presumably, someone would have developed an argument for atheism along these lines. (Contrast this implication with the claim that there is a possible world that contains just a single entity, three feet from a dog.) If you don't have a taste for theology, consider the solipsistic hypothesis that I—a conscious entity—am all that exists. While surely false, this hypothesis is not rendered incoherent simply by the nature of being conscious. So being conscious bears the "mark" of being intrinsic. And an object's being conscious does not require that no other objects exist nor is it rooted in the past or the future. Being conscious is an intrinsic property.

P is a normal human being who exemplifies the intrinsic property of being conscious. Suppose that P accidentally slices off her left index finger and thereby "shrinks". Let's also suppose that at the very first instant at which P has lost her left index finger, the atoms that at that moment come to compose P remain just as they were—intrinsically and in all their restricted atom-to-atom relations—immediately before the finger is removed.[7] Post-amputation, those atoms compose P. But before

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[6]Being conscious has to do with subjective mental life; it does not involve wide content. This is to ensure that it is a non-relational (intrinsic) property.

[7]Of course those atoms must change in some ways. For instance, after amputation, but not before, those atoms stand in the relation of composing P. But composing P is not a restricted atom-to-atom relation. The second thesis of MS is the non-trivial assertion that atoms' composing an object supervenes on restricted atom-to-atom relations. If we allowed composing P to be one of the atom-to-atom relations upon which composition supervened, such "supervenience" would be trivial. I am not, however, assuming that

amputation, they did not compose P. For before amputation, if they composed any object at all, they composed a proper part of P.

The friend of MS must deny that those atoms composed any object at all before amputation. For suppose for reductio that those atoms did compose an object. Let's name it 'the finger-complement'. The finger-complement, before amputation, was exactly like post-amputation P, insofar as the features and interrelations of all of its constituent atoms are concerned. And, by MS, anything exactly like post-amputation P in this way must have all the same qualitative intrinsic properties as P. Specifically, it must be conscious. So, given MS, if the finger-complement existed, it was conscious.

But the finger-complement was not conscious. For it is false that, before amputation, there were two conscious entities—P and the finger-complement—sitting in P's chair, wearing P's shirt. So, the friend of MS must conclude, there was no finger-complement before amputation. She must conclude, that is, that the atoms that, before amputation, filled the space occupied by P minus her left index finger composed no object at all.

The absurd result that there were two conscious entities—indeed, two persons[8]—wearing P's shirt and sitting in P's chair before amputation leads to even greater absurdities. For if there was such an object as the conscious finger-complement before amputation, it seems like the friend of MS should also say the same about the conscious tooth-complement, thumb-complement, toe-complement, and a great number of other objects. And as it goes for P and her complement of complements, so, presumably, it goes for all of us. But this is simply incredible.[9] There is not a mighty host of conscious, reflective, pain- and pleasure-feeling objects now sitting in my chair, now wearing my

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composing P does not supervene on some restricted atom-to-atom relation—to assume that would beg the question against MS.

[8]The finger-complement would enjoy as rich a mental life as P. That seems sufficient for its being a person.

[9]And it has disastrous consequences. See Unger (1980).

shirt, now thinking about this paper.

So the friend of MS must conclude that there was no such object as the finger-complement before amputation (cf. van Inwagen, 1981). There were of course the atoms that filled the space occupied by P except for P's left index finger. But those atoms, if there was no finger-complement, failed to compose some further object.[10] Thus we can conclude:

> (1) If MS is true, before the amputation of P's left index finger there was no object composed of the atoms that filled the space occupied by P minus her left index finger.[11]

My defense of (1) involves the claim that P survives the loss of a finger. But I can accommodate even the mereological essentialist. For all that defense requires is that some conscious being or other (not necessarily P) exists after finger amputation. And surely someone is there. This, conjoined with MS, implies that if there was such an object as the pre-amputation finger-complement, then it too was conscious; for the finger-complement would have been microindiscernible from the conscious being (whoever she is) existing right after amputation. But we have seen that the existence of a conscious pre-amputation finger-complement leads to an unacceptable multiplication of persons.[12]

If P loses her left index finger, certain atoms compose a left-index-fingerless

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[10]We may also want to add that there is no object that is P's left index finger. We would then have the not-very-difficult task of redescribing our case in a way that did not refer to left index fingers. We could do this in terms of the atoms that fill the area that is shaped and located just where P's left index finger would be, were there any such thing.

[11]Note that MS provides another reason to deny the existence of "arbitrary undetached parts" like the finger-complement. Presumably, if P's mental states supervene on the features and interrelations of certain atoms, it is the features and interrelations of those atoms in her brain; the condition of the atoms in P's feet is not relevant. But if there are many composite objects (like the finger-complement, the tooth-complement, the toe-complement) that have all of the atoms of P's brain as parts, there are many objects that seem to have as good a claim to a mental life as does P. This results in an unacceptable multiplication of persons. The friend of MS can sidestep these worries by denying the existence of all these other objects. She can then say that P is the only object that has a claim to all of P's atoms that are arranged brain-wise.

[12]And the argument of this paper—which involves a physical object, P, shrinking—is even consistent with the claim that human persons are not, in fact, physical. The argument requires only, possibly, a conscious being is composed of atoms and a conscious being results from amputation.

person (presumably P). Those atoms compose an object that exemplifies, among other things, the property is shaped like a normal human minus her left index finger. But we have supposed that the atoms that compose a person after amputation are intrinsically, and atom-to-atom interrelated, as they were immediately before the finger was removed. But then MS commits us to the claim that before amputation those atoms composed an object shaped just like a normal human minus the left index finger. So we must conclude:

> (2) If MS is true, before the amputation of P's left index finger there was an object composed of the atoms that filled the space occupied by P minus her left index finger.

(1) and (2) show that MS entails a contradiction. MS entails that before finger amputation there both was, and was not, an object composed of exactly the atoms that filled the space occupied by P minus her left index finger. MS is false.

III. Three Objections

A. Objection One: The argument above assumed that when P's finger is removed, the rest of her atoms remain unchanged in their intrinsic features and restricted atom-to-atom relations. But this assumption is clearly false—remove the finger, and, e.g., blood starts clotting.

By way of response, the argument against MS need not involve anything so large as a finger. Imagine instead that one of P's constituent atoms, an atom in P's finger, is instantaneously annihilated. It seems plausible to suppose that, at the first instant that the atom fails to exist, the atoms that then compose P have not yet reacted to the change. And MS can then be shown to imply that the pre-annihilation atom-complement exists, and also to imply that it does not exist.

Nor does it matter if, in fact, the remaining post-annihilation atoms would react instantaneously to one of their kin's annihilation. All the argument against MS requires are the following two things. First, it is possible that after the annihilation of one of the atoms that compose a person P, a person exists who is composed of the atoms that originally composed P except the annihilated one. Secondly, it is possible that, at the

very first instant that the annihilated atom ceases to exist (or—if there is no "first instant"—at some instant very shortly afterward), the atoms then composing a person are, in their intrinsic properties and restricted interrelations, just as they were at the preceding moment. These seem possible and indeed compossible. Given MS, they lead to the impossible. So MS is false.

B. Objection Two: The argument against MS requires that post-amputation P and pre-amputation finger-complement are exactly alike at the atomic level. But given four-dimensionalism, all that follows from the story of P's finger amputation is that the temporal part P has right after amputation is atomically just like the temporal part the finger-complement has right before amputation. That is a far cry from P and the finger-complement being exactly alike in the intrinsic features and interrelations of all their constituent atoms. So if persons are four-dimensional, the above argument against MS fails.

In response, the four-dimensionalist gambit to save MS—unless accompanied by the assertion that enduring three-dimensional objects are impossible—simply misses the mark. For if enduring objects are possible, then MS can be shown to be possibly false. And if possibly false, then MS, which purports to be a necessary truth, is actually false. Moreover, even if (per impossibile, I say) it is a necessary truth that objects are four-dimensional, composed of temporal parts, I will argue that we should reject MS.

Or rather, we should reject the four-dimensionalist's version of MS. MS, as it stands, is ill-suited to capture the intuitive notion of microphysical supervenience in a four-dimensional world. This is because it is more accurate to say that four-dimensional objects are composed of the temporal parts of atoms than to say they are composed of (entire) atoms.[13] So consider the following statement of microphysical supervenience

[13]If at one time (as we would normally say) atom A composes an object O and at another A exists but does not compose O, then the four-dimensionalist must hold that all of A is not a part of O. Instead, only a proper temporal part of A is among O's parts.

recast so as to be more congenial to four-dimensionalism:

> **Four-Dimensional Microphysical Supervenience (4DMS)** Necessarily, if atomic temporal parts T_1 through T_n compose a four-dimensional object that exemplifies intrinsic qualitative properties Q_1 through Q_n, then atomic temporal parts like T_1 through T_n (in all their respective intrinsic qualitative properties), related to one another by all the same restricted atomic-temporal-part-to-atomic-temporal-part relations as T_1 through T_n, compose a four-dimensional object that exemplifies Q_1 through Q_n.[14]

Suppose that P is a four-dimensional person who lives exactly eighty years and is then instantaneously annihilated. Suppose further that (in the same world) another person, P*, is for the first eighty years of her life microphysically intrinsically just like P, although she outlives P by a decade. In other words, the atomic temporal parts that P* has for the first eighty years of her life are exactly like (in intrinsic features and restricted atomic-temporal-part-to-atomic-temporal-part relations) the atomic temporal parts that wholly compose P. Given 4DMS, it follows that the atomic temporal parts that P* has for the first eighty years of her life compose a person just like P. But they do not compose a person at all. Rather—if they compose any object—they compose a proper temporal part of a person.[15] They compose a proper part of P*. So 4DMS is false.[16]

C. Objection Three: The argument against MS turns on the claim that being conscious is intrinsic. The real lesson here is not that MS is false, but rather that being

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[14]The supervenience base in 4DMS—if 4DMS is to include within its purview claims about persisting four-dimensional objects like persons—must include the microphysical world at all times at which some temporal part or other of the object in question exists. Thus 4DMS, unlike MS, involves some properties rooted in the past or future. I think that this touches on a much larger issue. The endurantist and four-dimensionalist must be committed to fundamentally different understandings of time (See Merricks (1995)).

[15]If that proper part of P* were itself a person indiscernible from P, then the friend of MS should say something similar about many of P*'s proper parts. This leads to the result that—if you are four-dimensional—there are many persons, not just two, who share your current temporal part and enjoy your current mental life. I think that the fact that 4DMS (like MS) implies a multiplication of persons is sufficient reason to reject 4DMS. (Although David Lewis holds that there are "continuum-many" persons where we would normally think that there is exactly one (see Lewis, 1976, 31).)

[16]This argument against 4DMS is inspired by arguments in van Inwagen (1981 and 1990a), although van Inwagen's arguments do not target 4DMS or anything like it.

conscious is not intrinsic.

One way to respond to this challenge is to note that my attack on MS could proceed with the same logical force if we turned our back on consciousness and concerned ourselves with an oak—assuming that there is not a forest of oaks where we normally think there is but a single tree—that exemplifies being a tree but then loses a branch by pruning. MS could then be shown to commit one to both the existence and the non-existence of the pre-pruning branch-complement. Similar comments apply to being a dog, trimming a dog's toenail, and the existence and non-existence of the pre-trimming toenail-complement. And so on.

But let's return to the property of being conscious. Note that—setting aside for the moment whether that property is intrinsic or not—the arguments of this paper have demonstrated something important about being conscious. They have demonstrated that either it is not intrinsic or it is intrinsic yet such that the existence of a conscious person does not supervene on the features of, and interrelations among, that person's constituent atoms. In either case, the existence of a conscious person does not supervene on the features of, and interrelations among, the atoms that compose her, and so some common assumptions about psychophysical supervenience are false.[17]

I am most interested, however, in showing that MS is false, and in using the property of being conscious to do so. So here is how the discussion for the rest of this section will proceed. I will assume that, pre-amputation, there is such an object as the finger-complement. One could reject this. But since MS entails that the finger-complement exists, this would be tantamount to rejecting MS, and the game would then

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[17]This has significant implications for philosophy of mind and personal identity. For example, a familiar thought experiment asks me to suppose that my atoms are scattered. Later, say in one year, those atoms are brought back and placed in just the same atom-to-atom relations they were in immediately before scattering. I am then asked whether I think the resulting person would be me. This question may presuppose too much. If MS is false, those atoms might not compose an object, or, if they do, that object might have no mental life and thus, presumably, would not be a person. If, instead, MS is true but being conscious not intrinsic, it is possible that an atom-for-atom duplicate of me fail to be conscious.

be over. So I will assume the finger-complement exists before amputation. This alone does not imply the dreaded multiplication of pre-amputation persons. For the friend of MS who denies that being conscious is intrinsic could insist that the finger-complement is not conscious and not a person. This is how denying that being conscious is intrinsic allows one to avoid the above argument against MS. I will argue, however, that the existence of a non-conscious finger-complement undermines reasons for endorsing MS and also for denying that being conscious is intrinsic.

Why might one think that the moral of P's mishap is that being conscious is not intrinsic? One might be convinced that accepting that being conscious is intrinsic and MS false implies that being conscious does not supervene on the doings of the microphysical world. But, one might add, being conscious's failing to be intrinsic does not undermine its supervening on the microphysical. And so insofar as one is more certain that consciousness supervenes than one is that being conscious is intrinsic, one will conclude from the above arguments that being conscious is not intrinsic. Anyone who thinks that being conscious must consist in, or be analyzed in terms of, microphysical doings will say similar things. But I'll focus on only the weaker claim, the claim that consciousness supervenes on the microphysical.

Presumably, the defender of this claim will insist that being conscious not only supervenes on microphysical doings, but on doings that are intuitively relevant. She would not be pleased to learn, for instance, that whether I am conscious turns on how atoms light years away from me are arranged. By the same token, she should be dismayed that whether one is conscious turns on whether one is next to the atoms of a left index finger, or on any of the other piddling microphysical relations P stands in but finger-complement and atom-complement do not.

I think the case of P and the finger- and atom-complements shows that our hope that differences in being conscious—whether intrinsic or not—supervene on intuitively relevant and significant microphysical differences is in vain. If being conscious is

relational and supervenient, differences in consciousness supervene on—and perhaps even consist in—minuscule relational differences. In the case of P and the atom-complement, for example, it comes down to the relations an object bears, or does not bear, to a single atom in a finger. So our choice is between my claim that differences in being conscious do not supervene on the microphysical or, almost as striking, the claim that they supervene on paltry and seemingly irrelevant microphysical detail.

So whether or not being conscious is intrinsic, we must reject the intuitively compelling picture of significant differences in being conscious supervening on relevant and correspondingly significant microphysical differences. And—this brings us to the question of whether or not being conscious is intrinsic—once we abandon the intuitive picture, I think there is little motivation to resist the conclusion that being conscious is not supervenient on the microphysical at all, and so little motivation to resist that conclusion by insisting that being conscious is not intrinsic. For once the intuitive claim about supervenience is gone, there is little initial plausibility to the remnant—that though consciousness supervenes on the microphysical, whether it does can be a matter of a single atom in a left index finger. Given these considerations, and given the "mark" of being intrinsic and the possibility of a lonesome conscious entity discussed above, we should conclude that being conscious is intrinsic.

IV. Conclusion

A standard version of microphysical supervenience, a version less ambitious than MS, states only that an object's intrinsic qualitative properties supervene on the features of, and restricted interrelations among, its constituent atoms. MS endorses this much—this much is what I called "the first thesis" of MS—and adds that whether there is any object composed of certain atoms, whether such an object exists at all, supervenes on the features and restricted interrelations of those atoms.

The denial of MS is consistent with the less ambitious version of microphysical supervenience. But if the less ambitious version is true and MS is false, then whether

atoms compose some object or other does not supervene on the features of those atoms and the restricted atom-to-atom relations they exemplify. This would entail that there is no answer to what Peter van Inwagen calls "The Special Composition Question" purely in terms of the causal and spatiotemporal relations among the atoms that compose an object.[18]

So rejecting MS amounts to at least one of two surprising theses. Either microindiscernible macrophysical objects can differ with respect to their intrinsic qualitative properties or whether atoms compose some object does not supervene on the features of, or causal and spatiotemporal interrelations among, those atoms.

Given one further assumption, we can show that the denial of MS implies the denial of Global Microphysical Supervenience (GMS), the doctrine that possible worlds qualitatively exactly alike at the microphysical level are qualitatively exactly alike at the macrophysical level. The added assumption involves the notion of a "duplicate". Two objects are duplicates if and only if they exemplify exactly the same qualitative intrinsic properties. The assumption is that, roughly, for any objects existing in a single world, there is another world that contains just duplicates of those objects, and, in that other world, the duplicates are interrelated in just the same ways as the originals of the first world. This implies that if there is a brown flea in this world, there is another world that contains nothing but a brown flea. It also implies that if there is a brown flea on a red dog in this world, there is another world that contains nothing but a brown flea on a red dog.[19]

Given the denial of MS, we know that it is possible that there is some object O of

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[18]This would in turn imply, I think, that van Inwagen's answer to the Special Composition Question is mistaken. As evidence for this, note that one of van Inwagen's starting points in developing his answer is that "Whether certain objects add up to or compose some larger object does not depend on anything besides the spatial and causal relations they bear to one another" (1990b, 12).

[19]This assumption is similar to one defended by Lewis (1986, 86-92). But there are important differences. For instance, Lewis' understanding of a duplicate involves the notion of "natural properties" (cf. 1986, 60ff.), whereas I define a duplicate in terms of intrinsic properties.

which the following two claims are true. First, in a possible world Alpha, atoms A_1 through A_n compose O, and O exemplifies certain qualitative intrinsic properties. And secondly, there is a possible world Beta which includes atoms just as A_1 through A_n are in Alpha (in intrinsic qualitative features and restricted atom-to-atom relations), but those atoms fail to compose an object that is just like O in its intrinsic qualitative properties. (They fail to do so because they compose no object at all or, instead, compose an object that differs from O in intrinsic properties.)

Given the above assumption about duplicates and possible worlds, there is some world Gamma that is just like a part of world Beta; Gamma contains only atoms like A_1 through A_n (and their parts and whatever they compose), but does not contain an object like O. Likewise, there is a world Delta that is just like a part of Alpha; it contains only atoms like A_1 through A_n (and their parts and whatever they compose), and does contain an object like O.[20] Gamma and Delta are microindiscernible while differing at the macrophysical level. So—if the assumption about duplicates and possible worlds is right—the denial of MS entails the denial of GMS.

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[20]Recall the "mark" of being intrinsic: If O exemplifies an intrinsic property, then it is possible that O exemplify that property even if O is the only object in the universe.

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