Serious Metaphysics and the Vindication of Reductions[1]

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Suppose you wanted to write up a complete list of everything there is, making it as short as possible. Following Frank Jackson, call 'serious metaphysics' any attempt to do just that, to say what the world is like "in terms of a limited number of more or less basic notions".[2] Call 'a general metaphysical thesis,' any serious metaphysical thesis that identifies a particular set of notions as the privileged, basic ones. (Physicalism, the thesis that everything is physical, is one such example.)

Defending some general thesis requires showing that one's list really is complete by locating where on one's list of basic stuff is what makes each truth true. Reductions are theses that attempt to do just that; they specify what makes some non-basic truths[3] true in terms of what makes some more basic ones true.[4] Reductions in this sense are metaphysical theses, claims about what some target of investigation fundamentally is or is constituted by. An example of a reduction in this sense in the philosophy of mind is the thesis that the truths about pain in human beings are made true by what makes the C-fiber firing truths true or pain (in humans) is C-fibers firing. A metaethical example is the thesis that goodness for x just is the satisfaction of x's ideal desires.

If a putative, non-basic truth cannot be located among the basic ones, it must be eliminated. After all, holding onto such truths, absent their location, falsifies the general thesis. (An example here is the forced choice of either giving up the existence of pain or rejecting physicalism, if the pain truths cannot be located among the physical ones.)

Recently, a debate has emerged over what is required to defend a reduction against its rivals when there is no background general thesis shared by the disputants. On

the one side, Frank Jackson, David Chalmers, and Brie Gertler all hold that a reduction's adequate defense requires conceptual analysis.[5] This is just what Ned Block, Robert Stalnaker, Brian McLaughlin, and Christopher Hill on the other side all deny.[6] Each then offers a rival account of what, in the absence of analysis, would be sufficient to justify reductions.

Here I argue with Block, Stalnaker, McLaughlin, and Hill that conceptual analysis in the Jackson/Chalmers sense is not required to vindicate reductions. However, with Jackson, Chalmers, and Gertler, I will also argue (though in less detail) that it's unclear how the Block/Stalnaker/McLaughlin/Hill account of what would be sufficient to vindicate reductions could be sufficient to justify their modal strength against a dualist challenge in a context in which no background general thesis is presupposed. What emerges from this is a new account of what, in the absence of analysis, would be sufficient to vindicate reductions, one that accepts, with Jackson and Chalmers, that vindicating such theses requires saying something about how the world is such that it is "epistemically transparent" why a reduction is, in fact, true.[7] I'll call the method this account warrants 'the semantic method'.

Briefly, the central idea is this: The Jackson, Chalmers, and Gertler arguments all suggest that in cases in which a putative reduction is contested and a shared background general metaphysical thesis is absent, we need an account of how the extensions of our non-basic terms are fixed. The alleged need for an analysis comes in via the assumption that our competence with our terms requires that we have a priori knowledge of those extension-fixers, even if only implicitly. What we get when we make explicit our

implicit a priori knowledge of those extension-fixers is an analysis of our associated concept. I'll argue, in contrast, that:

1) Our understanding of what fixes a term's extension is at least sometimes delivered a posteriori. Given this, even if we grant the need for extension -fixing stories for our non-basic terms in order to fully justify reductions in the contested cases, we don't need to grant the claim that those stories must be known a priori.

2) This allows for a way of justifying reductions that relies on a priori entailments, but not a priori known extension-fixers and so not on conceptual analyses.

3) Given wide-spread skepticism that such analyses are generally available, non-reliance on analyses is one of the two great strengths of the semantic method.

4) Its second strength is its ability to justify the metaphysical necessity that I'll argue in section II reductions require.

In section IV, I describe this new account more fully and show how, unlike either of the two main existent methods discussed in sections II and III, the semantic method allows for vindications of reductions that have the features that make the Jackson/Chalmers/Gertler method attractive without requiring analyses. Finally, I defend that method against objections in section V.

Section I: The Issue

General metaphysical theses hold that what's on some list of basic stuff explains what makes all truths true. Defending a general metaphysical thesis such as physicalism

requires locating what makes each non-basic truth true among what makes the basic ones true. To see what's involved in locating a non-basic truth among the basic ones, consider Jackson's solidity example.[8] Suppose one is a physicalist. Then one holds that what makes the truths about the solidity of medium-sized objects true is on the list of basic, physical stuff. Earned confidence in that claim requires identifying where on that basic list is what makes those solidity truths true.

One way of solving the physicalist's location problem for solidity is by accepting the thesis that solidity is constituted by the lattice-like array of the molecules or, more modestly, that what makes the solidity truths true at the actual world just is what makes the truths about the molecular array true. According to the present physicalist story about solidity, lattice-like arrays of molecules explain the presence and location of solid things, as well as explaining the behavior of solid things. Importantly, the former explanation is metaphysical, not nomic. The molecular arrays don't explain the existence and location of solid things by being the reliable cause of their solidity, but by constituting it.

This example illustrates how reductions are solutions to location problems. Since solving location problems provides some evidence for a general thesis, part of vindicating a general thesis is vindicating such reductions. A proponent of some general thesis, then, owes two accounts, namely:

1. A metaphysical explanation given in and by the reduction itself, e.g. the molecular facts metaphysically explain the solidity facts by constituting the solidity facts,
2. A reason for thinking that a putative reduction's metaphysical explanation is genuine. Such a justification should make it transparent how it is that some

set of basic facts make some set of non-basic truths true.[9] In the solidity example, such a justification should make it transparent why we should think it is the *molecular* facts make the solidity truths true.

But when we focus on a clear case of a reduction, one might reasonably wonder whether we really need an account of the second kind.[10] Consider the reduction of water to H_2O. Isn't it just a brute fact that water is H_2O? If so, do we really need an answer to the question: why is it that the *water* facts are the H_2O facts? The answer, I think, is "yes, we do", even if we grant that it is a metaphysically brute fact that water is H_2O. That's because that water is H_2O isn't a priori. Whenever we claim to have discovered an identity or a constitutive truth a posteriori, we need a justification for a) thinking that there really is an identity of the alleged kind, a reason to think that, for example, water and H_2O aren't merely co-instantiated, but one and the same, and b) thinking that the reduction is metaphysically explanatory. In the water case, we need an explanation for why the facts about H_2O are what explain why the water truths are what they are. For example, we need a reason to think that it is that sixty percent of the earth's surface is covered with H_2O that explains why sixty percent of the earth's surface is covered by water.

In sections II-IV, I consider the advantages and disadvantages of three different methods for justifying such reductions so that they provide both such accounts. In section III, I'll identify certain features it would be better for such a method to possess than not and in section II, a feature such a method must possess. In section IV, I'll argue that the semantic method has all of these features without requiring conceptual analyses.

Section II: The Inferential Method

The inferential method for justifying reductions is so-called since its strategy is to justify such theses via inferences to the best explanation.[11] The basic idea is that a reduction is justified when it is, of the hypotheses compatible with the evidence, the one that best satisfies an array of methodological desiderata. The problem with the inferential method is that it is unclear how the methodological desiderata most commonly appealed to are sufficient to decide between reductions and their counterpart dualist theses of nomically necessary co-instantiation and so how, without supplementation, the inferential method could fully justify reductions in the context of the debates of concern here.

To see this, consider the two methodological constraints most commonly appealed to in support of reductions, namely, the confirmation of the predictions they generate and ontological simplicity. In the case of the former, it is alleged that evidence for a reduction A_1-ness =B_1-ness is that the assumption of its truth generates the prediction that property A_1 and property B_1 will always be co-instantiated. When their co-instantiation is observed, the truth of that prediction counts in favor of that reductive hypothesis. But whether such an observation supports that hypothesis over its rivals depends upon what those rivals are. In the context of a debate in which no general thesis is presupposed, such correlations cannot be treated as straightforward evidence for the reduction. Consider again the reductive hypothesis that pain (in human beings) is constituted by the firing of C-fibers. (In what follows, I take the qualification "in human beings" as implied.) The dualist hypothesis that there is a nomically necessary connection between pain and C-fibers firing will generate the same predictions as the reduction (so long as the dualist holds that C-fiber stimulation is the only cause of pain in human beings) and thus

will receive the same degree of warrant from the observed correlation. In short, predictive success cannot tell in favor of monism over dualism when dualism generates the same predictions. And so long as dualism treats the connection between the two properties its monist rival holds are one as nomically connected, those predictions will always be the same.

Ontological simplicity is also often cited in defense of reductions. The idea behind this desideratum is that one's theory should not posit entities beyond those needed to account for the empirical evidence. In the present context, the appeal to simplicity is to favor the monist constitution claim that all instantiations of A_1-ness are constituted by instantiations of B_1-ness over the equally empirically well-confirmed dualist universal generalization. I'll argue that the problem with the appeal to simplicity in such cases is its inability to justify the metaphysical necessity of a monist reduction since it's often that modal strength that's precisely at issue between the dualist and monist. Let me explain.

Since the argument to follow rests on the claim that the kind of reductions at issue in the debate between the dualist and the physicalist must be metaphysically necessary, it is important first to see why this claim is true. As background, consider first a thesis accepted both by proponents of the analytic method, such as Jackson, and the inferential method, such as McLaughlin. McLaughlin and Jackson both accept that for physicalism to be true, so must a certain supervenience thesis we might call 'the minimal physical duplicate thesis' or

(MPD) "Any world which is a minimal physical duplicate of our world is a duplicate simpliciter of our world."[12]

A minimal physical duplicate in the sense relevant here is any world that one gets by duplicating our world's physical features and not adding any others. A duplicate simpliciter is an exact qualitative duplicate of our own world. The idea behind MPD is that if physicalism is true at our world, then what makes the physical truths true is determinative of all of the truths. But if what makes the physical truths true is determinative of all of the truths, then any minimal physical duplicate world is one which reproduces all of the truths at the actual world. If one could populate a world with the pattern of instantiation and distribution of the physical properties and kinds characteristic of the actual world and (without adding anything else) fail to get some truth at the actual world, say some phenomenal truth, then physicalism is false, i.e. in the actual world what makes the physical truths true fails to determine all of the truths.

So far we have that, if physicalism is true, then so is MPD. But for MPD to be true, the reductions that are to show that MPD is true must be metaphysically necessary. We can see that this is so by considering what kind of challenge the possibility of zombies would pose to physicalism. Suppose that at the actual world, whenever a certain pattern of physical properties are instantiated, so is pain. This fact would be compatible with the truth of two very different general metaphysical theses, namely, physicalism, which holds that the pain facts are nothing over and above and so are fully determined by, the physical facts, and a dualism according to which some complex physical properties are nomically correlated with non-physical phenonomenal properties, such a being in pain. Suppose, further, it turns out that zombies, physical duplicates of ourselves that don't feel pain, are metaphysically possible. If they are, then physicalism is false. That's because if it's metaphysically possible to duplicate the actual world in its physical qualitative respects

and (without adding anything else) fail to get some truth at the actual world, e.g. that someone is in pain, the pattern of instantiation and distribution of the physical properties at the actual world does not, as physicalism's truth requires, fully determine all of the truths.

So physicalism's truth requires that there is some complex physical property P such that □(∀x)(x is P⊃ x is in pain). More generally, it requires that for every property H that is not itself a basic physical property, there is some complex pattern of instantiation of basic physical properties P such that:

(H) □(∀x) (x is P ⊃ x is H)[13]

If these considerations are correct, then the reduction of any H to any P must be metaphysically necessary. More broadly, if we think of any general thesis as a thesis to the effect that everything is or is constituted by the basic stuff alone, then settling what that basic stuff is like, its properties and distribution, must by itself settle what everything else is like, its properties and distribution. It follows that any general thesis is committed to the basic truths alone entailing the non-basic ones in the medium-strength 'necessarily truth-determining' sense of 'entailment'. Call this commitment "the entailment commitment" of any general thesis. This means that in order to solve particular location problems, reductions must themselves be metaphysically necessary; they must say which basic truths *necessarily* determine which non-basic ones.

With this as a background assumption, it is easy to see that considerations of simplicity cannot decide between monist and dualist hypotheses that are equally compatible with empirical observations precisely because what is at issue between the monist and dualist is the modal strength of the conditionals that instantiate (H). To see

this, first consider an example of a nomically necessary, metaphysically contingent,[14] universal generalization, namely, that all nuclei containing more than one proton contain at least one neutron. In this example, the appeal to simplicity fails because we independently think that the counterfactuals show that the property of being a nucleus with more than one proton is not the same property as the property of being a nucleus with at least one neutron. If ontological simplicity were enough to show that these two properties were one and the same, we would be forced to accept counterfactuals that our modal intuitions reject. Yet there seems to be no good reason to reject those modal intuitions. Indeed, it's precisely because of our modal intuitions that we reject the identity and accept that the world has two distinct properties, being a nucleus with more than one proton and being a nucleus with at least one neutron.[15] To appeal to ontological simplicity in such a context would be in effect to stipulate that the counterfactuals are other than they intuitively are. That shows that the appeal to simplicity in cases in which the modal truths are at issue cannot help settle the modal question. What's needed is some consideration that independently supports the metaphysical necessity of the monist's claim.

So too ontological simplicity cannot decide between the physicalist's needed reduction, $\Box(\forall x)(x \text{ is } P \supset x \text{ is in pain})$, and the dualist claim that $(\forall x)(x \text{ is } P \supset x \text{ is in pain})$ is nomically necessary. That the physicalist's thesis is ontologically simpler than the dualist's thesis does not settle whether the world is simple when that simplicity presupposes the modality that is at issue. Perhaps the ontological simplicity of a reduction can always tell in its favor when its rival is a less simple thesis of the same modal strength. But it cannot decide between a monist's metaphysically necessary

reduction and a dualist's nomically necessary correlation in a context in which simplicity brings with it an assumption about modal strength that is itself contested. That contention must be settled first.

Section III: The Analytic Method

So, when a monist's reduction is to rebut dualism, it needs to be justified by something more than predictive success and ontological simplicity. What is that 'something more'? According to Jackson, Chalmers, and Gertler, that 'something more' is conceptual analysis.

An *analysis* of the concept associated with a term, in their sense, would express the a priori, extension-fixing story for that term. We may represent that extension-fixing story as a function from each possible world considered as actual (W_a) to that term's extension in W_a.[16] So, for example, if the extension of 'water' in W_a is fixed by whatever is in the lakes and streams in W_a, then that's the story which, together with the facts about the actual world, tells us that water is H_2O. To be a priori in the relevant sense here is to be capable of being known "independently of knowing what the actual world is like".[17] This, for Jackson, is the hallmark of an analysis—it's apriority.

I'll argue that conceptual analysis in this sense is not necessary for justifying reductions. That said, it may be that their justification does require something to play the role that Jackson, Chalmers, and Gertler see conceptual analysis as uniquely able to play. The necessity of occupying that role is an open question, as far as the considerations raised here go. Here I argue that identifying an occupant for that role, together with the relevant empirical truths, suffices for their justification. What is not necessary is for an

analysis to occupy that role. That's because an a posteriori extension-fixing story can occupy that role equally well.

So, what is the role that according to Jackson, Chalmers, and Gertler needs occupation? And why do Jackson, Chalmers, and Gertler all think that only conceptual analyses can fill it? Putting together their separate arguments, we arrive at a list of what are, according to them, three requirements on justifications for reductive theses.

1) Defending reductions requires *defining the subject matter* of the target of reduction (e.g. solidity, water, goodness, or pain) in a way that connects the vocabularies of the target with that of its reduction base.[18] According to Jackson, defining the subject matter to be reduced in a way that connects it to a reduction's base is required to put a reduction's truth beyond doubt. (Question: What is it about Ps that makes them Hs (i.e. within the extension of "…is an H")? Answer: Because our semantics tells us that to be an H just is to be a filler of the H-role and Ps are H-role fillers.)
2) Their full justification requires *avoiding 'acts of faith'* by making the connection between the reduced property and its base "epistemically transparent".[19] We may think of epistemic transparency as breaking down into two components. A justification is epistemically transparent when a) it identifies the features of the world that make it the case that some reduction is true and b) there is no epistemic gap between seeing that the world has those features and seeing that the reduction is true. A gapless justification, then, avoids acts of faith by removing all sources of doubt as to the reduction's truth.

3) A defense of a reduction must *explain how it is that putative evidence for its truth counts as evidence*.[20] (Question: Why does the fact that the stuff in our lakes and streams is H_2O count as evidence that water is H_2O? Answer: Because 'water' just is a term for the stuff in our lakes and streams.)

Two illustrations below will make these requirements more clear.

Jackson and Chalmers use 'reductive explanation' as a term for a reduction's vindication that has all three of these features. Their complaint against the inferential method is that its vindications are not reductive explanations in this sense.[21] Since according to Jackson and Chalmers, only with the aid of an analysis could a vindication of reduction be a reductive explanation, they hold that the source of the failure of the inferential method is its failure to make use of analyses.

It's important to note, though, that their arguments for the need for analysis are in fact at most arguments for the need for something to play the role that they see analysis as uniquely able to play. I'll let "reductive explanation" serve to pick out any justification that has all three features. Below I'll challenge that assumption about unique occupation and so argue that reductive explanations in the sense their arguments warrant caring about don't require analyses. But first I'll say something about the advantages of a method that satisfies their requirements.

In section II, I argued that when a reduction is to rebut dualism, its justification must include a justification of its metaphysical necessity. While I don't assume that the Jackson/Chalmers/Gertler conditions (1-3, above) are requirements, I do assume that a method that satisfies them is superior to one that does not. Taken together, this means that the holy grail here is to find a strategy for vindicating reductions that

1) satisfies all three of the Jackson/Chalmers/Gertler requirements

and

2) justifies their metaphysical necessity.

I'll argue that the analytic method satisfies both #1 and #2 and that what allows it to do so is the extension-fixing role analyses play in that account. To fix ideas, consider first an example of how the right kind of semantic story, here given by an analysis, would allow a justification of a reduction to satisfy all three of the Jackson/Chalmers/Gertler requirements--avoiding acts of faith, defining the subject matter to be reduced, and identifying what would count as empirical evidence in favor of the reduction.

1. Water is the actual watery stuff (e.g. the stuff in our lakes and streams, etc.). [by analysis]
2. The actual watery stuff is H_2O. [by science]
3. Therefore, water is H_2O. [by transitivity of identity]

The example is an application of the analytic method. Given that the example is intended for illustrative purposes only, we may assume that our concept of water has an analysis and let "the actual watery stuff" stand in for whatever that analysis is. The first premise, by giving that analysis, defines the subject matter to be reduced as whatever stuff is in our lakes and streams (etc.). Moreover, thanks to the analysis, it's clear why the facts cited in the second premise, i.e. that the stuff in our lakes and streams is H_2O, gets to count as evidence for the truth of the conclusion. Together, these two premises make it epistemically transparent why the conclusion must hold. Once one sees that water just is whatever is in the lakes and streams and that what's in the lakes and streams is H_2O, there is no further question as to whether water is H_2O. Here the a priori reference-fixing story given in the analysis plays a crucial role in allowing the

justification of the reduction to have the features it needs to have to count as a reductive explanation in the sense used here.

Here the premises not only justify the conclusion while satisfying all three of the Jackson/Chalmers/Gertler requirements, it is easy to see that the reductive conclusion must be metaphysically necessary. Given that 'H_2O' is a rigid designator and that the reference-fixing description for 'water' is a rigidifying one, we may conclude that □water= H_2O.

What about cases that don't involve the identity of two rigid designators? What about the case of constitution? Many physicalists regard the claim that phenomenal states are necessarily constituted by physical ones as more plausible than the claim that the former are type-identical to the latter. Since phenomenal states are widely regarded as providing the greatest challenge to physicalism,[22] it's important to see how the analytic method applies in the case of constitution. Moreover, since the fan of the inferential method can also appeal to the rigidity of the designators to justify the metaphysical necessity of reductions such as water= H_2O, the above case is not one that gives the analytic method a clear advantage over the inferential one.

Consider again the claim that necessarily, the lattice-like structure of the molecules that make up an object constitutes its solidity. The analytic method can be applied here too to yield a justification that satisfies the Jackson/Chalmers/Gertler requirements. But the application is a bit more complicated than in the case involving an identity statement containing two rigid designators. The trick is to see how that method secures the needed necessity in cases of constitution. Here's that application:

1. Solidity is constituted by whatever explains the resistance of resistant objects. [by analysis][23]
2. Given their causal powers and the laws they enter into, the lattice-like structure of the molecules, L, that comprise resistant objects explains their resistance.[24] [by science]
3. An object's solidity is constituted by the lattice-like array of the molecules that comprise it.[25]

Since the description in #1 isn't rigidifying, the conclusion of this entailment does not yet have the needed metaphysically necessity. So how do we introduce it? First, consider what that needed necessity would be. If the facts about lattice-like arrays *determine* the solidity facts in the way necessary for physicalism about solidity to be true at the actual world,[26] then in any world in which the facts about such arrays are the same as in the actual world (including their causal powers and the laws they are subject to), the facts about solidity will be the same. If that is not the case, if duplicating the facts about the arrays does not bring with it the duplication of the solidity-facts, then the facts about those arrays do not determine the facts about solidity at the actual world. But that's just to say:

(S) $\Box(\forall x)$(x has L (and L has the causal powers and enters into the laws that it does at the actual world) $\supset$ x is solid).

So how does one move from the above entailment to the needed, metaphysically necessary (S)? Remember that we're assuming for the purposes of illustration that the premises are true. The answer, then, is: By the a priori entailment itself. That it's an entailment guarantees that in any world in which the premises are true, so is the conclusion. That the entailment is a priori means that one need no justification beyond

the premises to appreciate the conclusion's truth. If we follow Kripke (as Jackson does and many do) in using our terms with the meanings they actually have to describe counterfactual worlds[27], then (assuming for the purposes of illustration that the first premise really is an analysis) every world in which the second premise is true is a world in which the conclusion is true. That's because, assuming that the first premise is true, to find the solidity-facts in a world W_n, we go and look for what answers to the description "whatever explains the resistance of resistant objects" in W_n. But then any world in which the L-facts are duplicated (including, as noted in the second premise, their causal powers) are worlds in which any object with L is solid. But to say that every world in which P is the case is a world in which Q is the case is just to say $\Box(P \supset Q)$. This principle, together with the considerations just mentioned, means that (S), the metaphysically necessary version of the conclusion, #3, is true.

Section IV: The Semantic Method

So analyses could play an important role in the defense of reductions. Must they play that role? Above I've given some reason to think that, without further supplementation, the inferential method is insufficient to fully defend reductions against dualist challenges. Here I argue for the non-necessity of the analytic method by defending a claim about what would be sufficient to defend reductions in the absence of analysis.

I'll argue that it's not analyses that allow the analytic method to satisfy the Jackson/Chalmers/Gertler requirements while justifying a reduction's metaphysical necessity. Rather, it has these features because it requires something to play the role that its proponents hold that only analyses could play. That role is occupied by any semantic

story that says how some non-basic term for a reduction's target finds its extension in the actual world and across counterfactual worlds. By definition, analyses are a priori knowable such stories. I'll argue that it's because reductive explanations contain a premise that gives an extension-fixing story that they meet the Jackson/Chalmers/Gertler requirements while justifying a reduction's metaphysical necessity, not because they contain an a priori such story.

The central idea is that a posteriori, extension-fixing stories can occupy the role analyses play in the Jackson/Chalmers account equally well. On the resulting account, reductive explanations require a priori entailments, but they do not require analyses. Such a method has the advantages of the analytic method without requiring analysis, itself an additional advantage, given that some have despaired of the wide availability of analyses for many of our non-basic concepts.[28]

Call this method 'the semantic method'. Perhaps the best way of introducing the semantic method is via its application to the water and solidity cases and then by highlighting its similarities to and differences from the analytic method. The two cases are examples of what I'll call 'vindicating entailments', so-called because the truth of such entailments, together with the truth of their premises, vindicate their conclusions precisely by entailing them. Either the conclusions are themselves metaphysically necessary reductions (as in the case of metaphysically necessary identities illustrated by the water case) or an appropriate, metaphysically necessary reduction follows from the truth of the entailment itself (as in the case of metaphysically necessary constitution, illustrated by the solidity case). Thus, such entailments are vindications of metaphysically necessary reductions. Here is the water example:

1. Water is what's rigidly designated by 'water' in an initial baptism with a baptiser's use of the description 'that liquid in our lakes and streams'.
2. What's rigidly designated in that baptism by 'that liquid' is H_2O.
3. Therefore, □water is H_2O.[29]

As in the Jackson/Chalmers example, we may let the story given in the first premise stand for whatever the true, empirical account is of how the orthographic sequence <water>[30] came to have its extension. In contrast with the analytic method example, though, I'm here defending the claim that sometimes vindicating entailments are available. So, though I'm not committed to the existence of any conceptual analyses and I'm not committed to any particular story being the correct, empirical story for how some orthographic sequence came to have the extension it does, I am committed to the existence of such empirical stories. So I need to say why I think there have to be such stories.

Actually, that there are should be pretty uncontroversial. No one should think that it is an a priori matter that any particular orthographic or phonetic sequence has the extension it does, when it does have one. This is easily shown. In the sense at issue here, the actual world's empirical features are those that distinguish it from other, merely possible worlds, considered as actual. Here, we need merely see that there are possible worlds considered as actual in which the orthographic sequence <water> doesn't function as an English expression at all, and also that there are such worlds in which it does, but has a very different extension than the one it actually has. Given that, it follows

that that <water> is a word in English and has water as its extension depends upon empirical features of the actual world.

Moreover, this will be true for any term we take. For example, all rigid designators refer across counterfactual worlds to whatever they refer to in the actual world, given that the actual world's empirical features determine that they refer as they do. As soon as we see that those extension-fixing features may be different in different worlds considered as actual, we see that those features must be empirical in the sense at issue here. Empirical features of the world, though, are features we can only know of a posteriori, by knowing what distinguishes the actual world from other merely possible ones. So knowledge of what those extension-fixing features are is a posteriori in the Jackson/Chalmers sense. Any story that specifies what those features are is what I'm calling 'an a posteriori extension-fixing story' and may serve as a semantic premise in a vindicating entailment. (Below I'll consider some objections to the claim that there generally are such empirical, extension-fixing stories.)

The first premise in this example, then, just stands in for whatever the true account is of what empirical facts make it the case that <water> is a word in English that rigidly designates water. As such, knowledge of its truth is a posteriori. The first premise also allows the overall justification to satisfy the first of the Jackson/Chalmers/Gertler requirements. That premise defines the subject matter of the reduction in a way that allows us to connect it with H_2O.

The second premise in this example describes a straightforwardly empirical fact about what the object the speaker intended to refer to is like. Thanks to the semantic truth cited in the first premise, it's clear why the empirical truths cited in the second

premise count as evidence for the conclusion. Together they allow for an entailment that makes it epistemically transparent why water just is H_2O. Once one accepts the truth of the premises, there is no room for doubt about the conclusion's truth.

This means that one can move from knowledge of the premises to knowledge of the conclusion without the addition of any further empirical evidence, but "from the armchair", making this entailment a priori in the Jackson and Chalmers sense.[31] It's because the entailment is a priori that it provides an epistemically gapless story about why the reduction cited in its conclusion is true. This gaplessness of the justification means that the reduction's acceptance requires no 'act of faith'.

So here the first premise fills exactly the role that Jackson and Chalmers see conceptual analysis as uniquely able to fill, namely, of allowing for a justification for a reduction that has the features necessary to count as a reductive explanation. Finally, because the designators are both rigid, the example not only satisfies the Jackson/Chalmers/Gertler requirements, it does so while also justifying the reductive conclusion's metaphysical necessity.

Briefly, the case of solidity will also work just as on the analytic method, but substituting (1') below for (1) in that entailment:

(1) Solidity is constituted by whatever explains the resistance of resistant objects. [by analysis]

(1') Solidity is constituted by what's designated by 'solidity' in an initial baptism with the baptizer's use of the non-rigidifying description 'whatever explains the resistance of resistant objects'.

where here too, I'm letting the facts cited in (1') stand in for whatever the true empirical account is for how <solidity> manages to have solidity as its extension.

For the second premise in the analytic entailment, i.e.,

(2) Given their causal powers and the laws they enter into, the lattice-like structure of the molecules, L, that comprise resistant objects explains their resistance

the semantic method substitutes

(2') What's designated in that baptism by 'whatever explains the resistance of resistant objects' is the lattice-like structure of molecules, L (given its causal powers and the laws it enters into), that comprise objects of the kind the baptizer indicated.

The conclusion of both entailments is:

(2) An object's solidity is the lattice-like array of the molecules that comprise it.

As in the analytic case, we move from the vindicating entailment to the needed

(S) $\Box(\forall x)$(x has L (and L has the causal powers and enters into the laws that it does at the actual world) $\supset$ x is solid).

by considerations that are true if the entailment is, together with the Kripkean assumption that we use our word 'solidity' with the semantics it actually has to describe counterfactual worlds. If the premises are true (as we are assuming for purposes of illustration) and the entailment is correct, then, given the Kripkean assumption, every world in which (2') is true is a world in which (3) is true. Holding the semantics given in (1') fixed, we find the solidity-facts in a counterfactual world W_n by looking for what explains the resistance of resistant objects in W_n. But then any world in which the L-facts are duplicated (including

their causal powers) are worlds in which any object with L is solid. And that means that (S) is true.

These examples show that the semantic method is able to satisfy the Jackson/Chalmers/Gertler requirements while securing a reduction's needed necessity as well as the analytic method does. It's able to do so by letting a posteriori semantic stories play the role of analyses in vindicating entailments. Such entailments are reductive explanations in the only sense the Jackson/Chalmers/Gertler arguments warrant caring about, namely, vindications of reductions that satisfy all three of their requirements. This means that in order to be a reductive explanation, a reduction's vindication need not contain an analysis.

Section V: Some Objections and Replies

Objection from the Jackson/Chalmers side: A priori entailments that contain an a posteriori semantic truth in the premises do not have the form required to be Jackson/Chalmers reductive explanations. To see this, recall the arguments from section II that showed that general theses, such as physicalism, come with entailment commitments. General theses are theses to the effect that some limited list of basic stuff is what makes all truths true. Given that such theses are theses of metaphysical determination, it follows from them that all of the truths are entailed by the basic ones alone, in the 'necessarily truth-preserving' sense of 'entailment'. Reductive explanations are supposed to make the truth of such entailment commitments epistemically transparent. They are supposed to show how it is that the basic truths *alone* entail all of the truths.

An a priori entailment that contains an empirical, semantic premise, such as the semantic method's water example, does make it epistemically transparent why the conclusion must be true. But since semantic truths aren't basic, such transparent entailments aren't entailments of some non-basic truth from the basic ones *alone*. Given this, they don't make it epistemically transparent how what makes the basic truths true alone make the non-basic truths true.

Reply: The short reply to this objection is that there is no reason to assume, as the objection does, that vindicating entailments make it epistemically transparent how a general thesis' entailment commitments are correct by *being* the needed entailments. After all, those entailment commitments are commitments to the basic truths alone entailing all of the truths in the 'necessarily truth-preserving' sense of 'entailment'. That sense doesn't settle whether there may be non-basic, empirical information required to appreciate that there is such an entailment.

On the semantic method, those entailment commitments are discharged not by vindicating entailments themselves, but by the reductions those entailments justify.[32] In the above example, since the semantic truths about 'water' cited in the first premise don't appear in the reductive conclusion, what makes them true can't be part of what makes the water truths true.

A more careful reply needs to say how vindicated reductions discharge those commitments. To see how, notice that if some reductive hypothesis is true, then what makes the targeted basic truths true makes the targeted non-basic truths true. Hence, there must be an entailment in the necessarily truth-preserving sense of the latter from the former alone. To see this, consider again the water case. If water just is H_2O, then it

follows that what makes the H_2O truths true fixes what the water truths are. And if that's true, then there is a necessarily truth-preserving entailment of the latter from the former. In general, if □a=b, where 'a' is a non-basic kind term and 'b' a basic one, then all of the a-truths are made true by what makes the b-truths true and hence all of the a-truths are entailed by the b-ones alone. Similarly, if □(∀x) (x is P ⊃ x is H) where 'P' is a basic term and 'H' a non-basic one, then the P-truths necessarily determine the H-truths.

To make things more explicit, we might introduce what I'll call 'locating entailments'. Discharging a general thesis' entailment commitments requires locating where among what makes some set of basic truths true is to be found what makes some non-basic truths true. Suppose our general thesis is a version of physicalism. Now we are faced with the water truths, for example, the truth that water covers most of the earth. How are we to locate this truth among the physical ones and so discharge physicalism's entailment commitment with respect to the water truths? At the semantic method's first stage, we vindicate the reduction □water=H_2O via the two premise entailment given above:

1. Water is what's rigidly designated by 'water' in an initial baptism with a baptizer's use of the description 'that liquid in our lakes and streams'.
2. What's rigidly designated in that baptism by 'that liquid' is H_2O.
3. Therefore, □ water is H2O.[33]

At the second stage, we may rely on the truth of the reduction of water to H_2O to locate particular water-truths. Consider, for example, the particular truth that water covers 60 percent of the earth's surface. We might show how the H_2O-truths make that truth true as follows:

1. □ Water is H_2O. [By vindicating entailment (see above)]
2. H_2O covers 60 percent of the earth's surface. [By science]
3. Therefore, water covers 60 percent of the earth's surface.[34]

Mutatis mutandis for the solidity case.[35]

Objection from the Gertler side: According to Brie Gertler, a priori knowable facts are required to render certain a posteriori knowable facts relevant to securing a term's extension. Presumably in the 'water' case, for example, those elements are that the speaker intends to use 'water' rigidly to pick out the kind instantiated in the spot she gestures at using her baptismal description.[36] Those elements are, of course, not universally a priori knowable, but they're at least so knowable for the speaker. Since there are no fully a posteriori extension-fixing stories, there can be none to play the role of analyses in reductive explanations.

Reply: There are a couple of things to say here. The first is that it's an open question whether a speaker's intentions are always a priori knowable by her. For Jackson and Chalmers, we have a priori knowledge of the contents of our referential intentions thanks to our ability to identify what we'd count as the extension of our terms under the supposition that various possible worlds are actual. Since speakers consider those worlds as hypothetically-actual, our reaction, here what we'd recognize as water in each world, is a priori knowable since it doesn't depend upon any belief about what the actual world is like. And since those reactions provide evidence for hypotheses about the contents of our referential intentions, their a priori-knowability arguably renders those contents a priori knowable as well.[37]

But what if we instead discover the content of our reference-fixing intentions for a term by observing what we'd recognize as that term's extension (after sufficient reflection) should we come to believe that a certain world is actual? Knowledge of one's actual reaction to the belief that the world is a certain way is a posteriori knowledge in the Jackson/Chalmers sense for two reasons. First, because it depends upon believing that the actual world has certain empirical features, for example, that it's among the proper subset of worlds in which it's H_2O in the lakes and streams. Second, this way of discovering our reference-fixing intentions is a posteriori because it requires knowing something about which world is actual, namely, that one is in one of the worlds in which one's reaction to the belief that such-and-such is so-and-so (e.g. one reacts to the belief that it's H_2O in the lakes by calling H_2O 'water'). The point here is not that the contents of one's referential intentions couldn't be a priori knowable. For all that is said here, perhaps they generally are. The important point is that sometimes our knowledge of their contents is discovered a posteriori, through the empirical observation of our actual descriptive tendencies.

In any case, the question of whether one's own referential intentions are always a priori knowable to oneself is beside the point in the context of the present example. The crucial claim here is not that there is no a priori extension-fixing story that could be plugged in for the semantic premise in vindicating entailments, but rather that that premise need not be a priori for those entailments to vindicate their reductive conclusions. Since the first premise in the semantic method's water-entailment has third personal content, granting that one's own referential intentions aren't a priori knowable by others is enough to grant that it is a posteriori.

There is a third way to see that there must be a posteriori semantic stories to plug into vindicating entailments. Recall that in the Jackson/Chalmers sense, a world's empirical features are those that distinguish it from other worlds considered as actual. To see that the first premise in the water entailment is a posteriori, we need only note that there are other worlds considered as actual in which <water> is not a denoting term at all. This shows that even if the first premise in that entailment is false, there must be some such empirical story for that baptismal story to stand in for. In other words, there must be an a posteriori, extension-fixing story for <water> and likewise for any denoting term we take.[38]

Objection from the Jackson side[39]: All sides to the dispute agree that water is H_2O. So, minimally, any account in this area must show why it is more warranted to believe that water is H_2O than that it isn't. But the semantic method can't do that. That's because if the first premise in vindicating entailments is a posteriori, they are no better off evidentially than the following entailment, which we reject:

1. Water is the stuff in our lakes and streams.
2. The stuff in our lakes and streams is H_2O.
3. Therefore, the stuff in our lakes and streams is not water, it's H_2O and #1 is false.

Only by treating 'the stuff in our lakes and streams is water' as a priori and hence unassailable can we reject #3 with warrant.

Reply: Jackson and Chalmers both assume that one's referential intentions determine the extension of one's terms and that evidence for the contents of those intentions is the discovery of how one is prepared to describe worlds considered as actual. Suppose we share these assumptions. One way to discover the contents of those intentions, then, is to

observe one's reflective, actual descriptive reaction to the belief that a certain world is actual, for example, that the stuff in our lakes and streams is H_2O. But, again, an actual reaction to the belief that the world has certain features is something one discovers a posteriori in the Jackson/Chalmers sense, that is, something the knowledge of which requires some knowledge as to which world is actual. This is true even for a baptizer herself. That she's inclined to call the stuff in the lakes and streams "water" is not a feature of every world considered as actual. This makes it an empirical feature of this one. If we assume that descriptive tendencies fix the extensions of her terms, then her knowledge of those extension-fixers may sometimes be a posteriori.

It follows that one way for one to reject #3 with warrant is to appeal to a speaker's actual reaction on coming to believe that the stuff in our lakes and streams is H_2O. When her actual reaction is to recognize H_2O as the stuff she intended to refer to with 'water', then #3 is false and we are justified in concluding that water is H_2O.

Objection from the McLaughlin side: The primary challenge to the sufficiency of the inferential method rests on a false assumption, namely, that reductions must be metaphysically necessary. True contingent identities, e.g. that Ben Franklin is the First Postmaster General, are fully reductive, though not metaphysically necessary. Since nothing bars the physicalist from helping himself to contingent identities, that simplicity cannot justify metaphysical necessities does not show that it cannot fully justify physicalist reductions.[40]

Reply: Reasonable philosophers may disagree about whether contingent identities are reductive in any attractive sense. For the sake of argument, let's suppose that they are. It's still pretty clear that they're not reductive in the sense needed for purposes of the

present debate. If we agree that if physicalism is true, then so is MPD, as both Jackson and McLaughlin do, then for the reasons given in section II, it seems to follow that reductions must be metaphysical necessary. But it is worth saying more about why, exactly, those reasons show that contingent identities could not help the physicalist against the dualist.

We might observe first that physicalism is not an ontological thesis about which particular entities exist, but a metaphysical thesis about what what exists is like. This is just to say that physicalism is a thesis about what the world is like qualitatively. In order for contingent identities such as the one involving Ben Franklin to serve as a model for reductions, it must be extendable to the case of properties and kinds. Moreover, when extended, the result must be something metaphysically explanatory.

As we saw in section I and II, solving a general thesis' location problems requires showing how listing some truths would be redundant. Contingent identities may satisfy that requirement. If Ben Franklin=the First Postmaster General, then listing the truths about both Franklin and the First Postmaster would be redundant. But, if the considerations from section II are correct, vindicating a general thesis, such as physicalism, also requires vindicating a corresponding thesis about metaphysical determination.

Metaphysical determination is absent in the case of uncontroversial contingent identities, such as the one involving Ben Franklin. Settling how the world is Ben-Franklin-wise does not settle how the world is first Postmaster-General-wise. If it did, then it would be metaphysically necessary that Ben Franklin was the first Postmaster

General. Metaphysical determination requires metaphysical necessity. So, contingent identities are not theses of metaphysical determination.

Objection from the Block and Stalnaker side:[41] We often don't know what the extension-fixing stories are for our general terms, e.g. 'water'. Nonetheless, we know that □water= H_2O. So we can't be required to know the extension-fixing stories for our non-basic in order successfully reduce the kinds or properties they pick out.

Reply: Recall first that the present claim is not that knowledge of such extension -fixing stories is necessary for reduction. Rather, the claim is only that they could be part of a larger justification that is sufficient.

But even after noting this, there seems to be something left to the objection. After all, if such stories aren't very often available, they won't be very often useful. There are a couple of things to say here. The first is that insofar as this is an objection, it's an objection against the need for conceptual analysis as well. Both methods rely on the availability of extension-fixing stories. So the analytic and semantic methods are in the same boat here.

Second, it may be that the semantic method is most useful in contexts in which modal intuitions clash. In the case of successful scientific reductions, e.g. of water to H_2O, this is not the case. That would explain why in the water case, the inferential method does seem sufficient, though in the pain case it seems question-begging. So it may be that the semantic method need not be very often useful. Its usefulness is confined to cases in which what's contested are whether we have a case of metaphysically necessary identity or constitution or a case of nomic necessity. That's just what we get in

a case in which modal intuitions clash about whether, for example, zombies are metaphysically possible.

Third, though there may not be many such cases, such cases are nonetheless important. True, we don't know what, exactly, is the right extension-fixing story for 'pain' or 'goodness'. But no one said that settling metaphysical disputes as to their underlying nature would be easy. And it may be that nothing more complicated than the relaxed account involving a posteriori discovered extension -fixing intentions is required for the application of the semantic method. Indeed, I see no reason why anything stronger than that relaxed account is required. The failure to locate the phenomenal properties among the physical ones, for example, may rest on no more than our failure thus-far to be confronted with the scenario that would elicit our recognition of which complex physical property is the one we intend to refer to with, e.g., "pain". Again, nothing here depends on whether we do or don't have a priori access to the extension-fixers for our terms. All that is required is that sometimes we have a posteriori access to them. And clearly we sometimes do, as the relaxed account suggests.[42]

Conclusion:

Every general metaphysical thesis is committed to there being metaphysically necessary reductions that locate where among what makes the basic truths true is to be found what makes the non-basic truths true. Part of defending any general thesis, then, involves identifying and defending appropriate reductions. The vindicating entailments of the semantic method are at least one way of adequately defending such reductions. Since the application of that method is possible absent the assumption of some general thesis, it allows for the vindication of such theses indirectly.

Moreover, the semantic method has several advantages over its rivals, the inferential and analytic methods. Unlike the inferential method, its justifications render a reduction's truth epistemically transparent. This transparency extends to the justification for the claim that a reduction has the necessity it needs. So that method shares the advantages of the analytic method without requiring the aid of analyses that might well be widely unavailable in practice, even if not in principle. Altogether, this means that the semantic method has two important desiderata, non-reliance on conceptual analysis and the ability to vindicate a reduction's needed metaphysical necessity, not jointly possessed by either the inferential or the analytic method.

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[1] Special thanks to Brie Gertler, Frank Jackson, and Brian McLaughlin and to an anonymous referee for *Philosophical Studies* for very helpful comments on earlier drafts of this paper. Thanks also to Sean Foran, Thomas Polger, David Sobel, and David Velleman for helpful discussions of the ideas raised here.

[2] Frank Jackson, From Metaphysics to Ethics: A Defence of Conceptual Analysis, pp.4-5. (Oxford: Clarendon Press, 1998) .

[3] By "a truth" here I mean a true sentence. The difference, then, between basic and non-basic truths when they share a truth-maker is a difference in vocabulary. Basic truths are truths expressed in the basic vocabulary (plus connectives) alone.

[4] For more on this way of framing the issues, see Jackson [1998].

[5]See Frank Jackson and David Chalmers "Conceptual Analysis and Reductive Explanation" Philosophical Review, 110, (2001) and Brie Gertler, "Explanatory Reduction, Conceptual Analysis, and Conceivability Arguments about the Mind", *Nous* 36, (2002).

[6] Ned Block and Robert Stalnaker, "Conceptual Analysis and the Explanatory Gap", Philosophical Review 108, (1999); Brian McLaughlin, "In Defense of New Wave Materialism" in Physicalism and Its Discontents, ed. Carl Gillett and Barry Loewer, pp.319-330**.** (Cambridge: Cambridge University Press, 2001); Christopher Hill, Sensations, (Cambridge: Cambridge University Press, 1991); and Brian McLaughlin and Christopher Hill, "There Are Fewer Things in Reality Than Are Dreamt of in Chalmers's Philosophy", Philosophy and Phenomenological Research 69 (1999).

[7] Chalmers and Jackson [2001]; Jackson [1998]; and David Chalmers, the Conscious Mind. (New York: Oxford University Press, 1996).

[8] Jackson [1998] pp.3-4.

[9] Jackson and Chalmers also mark a distinction of this kind in their [2001].

[10] Among those who doubt we need such an explanation are Block and Stalnaker [1999]. See also Jackson and Chalmers [2001] pp.353-54 for their discussion of this doubt.

[11] For some advocates of this method, see McLaughlin [2001] and Hill [1991] and Block and Stalnaker [1999].

[12] This formulation of MPD is Frank Jackson's. See his [1998] p.12. For Brian McLaughlin's acceptance of a version of this thesis, see his "A Priori versus A Posteriori Physicalism", Philosophy-Science -

Scientific Philosophy, Main Lectures and Colloquia of GAP 5, Fifth International Congress of the Society for Analytical Philosophy, 2003, eds. Christian Nimtz and Ansgar Beckermann, pp.267-285. (Paderborn: Mentis, 2005).

[13] There's a surface complication here that needs to be set aside. What about worlds that are physical duplicates of the actual world, but not minimal duplicates? Why think that in those worlds everything that is P is also H? There are two ways we could think of such worlds. First, we could think of such worlds as excluded from evaluation for the purposes of stating the physicalist's distinctive commitment. On this way of thinking, the necessity of $(\forall x)$ (x is P $\supset$ x is H) is it's truth at all worlds that are minimal physical duplicates of the actual world. Or, we could think of it as a requirement on a world W's counting as a physical duplicate of our own, whether minimal or not, that all of the physical laws that obtain at the actual world are preserved in W. If that is so, then for any H, if H is a higher-order physical property fully determined by the pattern of instantiation of the primary physical properties, as physicalism's truth requires, any world that is a physical duplicate of the actual world, whether minimal or not, should yield the same H-truths. There may be additional H-truths in worlds that are physical duplicates, but not minimally so. But the presence of non-physical 'extras' that don't, by hypothesis, interfere with the operation of the physical laws, shouldn't effect of duplication of the actual H-truths, if physicalism is true. I myself prefer this second way of thinking of the relevant necessity, but the first way is an option.

[14]This is assuming pace Sydney Shoemaker that the laws of nature are not themselves metaphysically necessary. For Shoemaker's discussion, see his "Causality and Properties" in Properties, ed. D.H. Mellor and Alex Oliver, pp.228-254, (Oxford: Oxford University Press, 1997).

[15] Of course, if we think that laws of nature are metaphysically necessary, we might reject these counterfactuals. But metaphysically necessary connections between distinct existences would just be another case in which simplicity is question-begging.

[16] Jackson [1998] p.59.

[17] Ibid. p.51.

[18] Ibid. p.57.

[19] See Jackson [1998] pp.29-30, Chalmers and Jackson [2001], and Chalmers [1996].

[20] For an argument for this claim, see Brie Gertler, "Explanatory Reduction, Conceptual Analysis, and Conceivability Arguments about the Mind", Nous 36 (2002).

[21] See their [2001].

[22] See, for example, Chalmers [1996].

[23] Some may dispute that this premise expresses an analysis. Since I'm not here defending the analytic method, whether or not it is is not important. What is important is what the example illustrates.

[24] It might seem like there should be a rigidifying operator ("actually") in this second premise. But here, the claim in premise two is like the claim expressed by "Michael Jordan is tall". Both are contingent with the actual world as the default world of evaluation. To evaluate the truth of each at each counterfactual world W_n, we go and see how things are at W_n, not at the actual world.

[25] This treatment of the solidity case roughly reflects Jackson's discussion. See his [1998] chapter one.

[26] But see footnote 12 for an important caveat.

[27] See Saul Kripke, Naming and Necessity, pp.44-53. (Cambridge: Harvard University Press, 1972)

[28] For the expression of a few such doubts, see Block and Stalnaker [1999], Stephen Stich, "What is a Theory of Mental Representation?", Mind 101 (1992); Michael Tye, "Naturalism and the Mental", Mind 101 (1992); and Timothy Williamson, the Limits of Knowledge. (Oxford: Oxford University Press 2000) and Robert Stalnaker "On Considering a World as Actual" in Ways a World Might Be pp.188-200. (Oxford: Clarendon Press, 2003). .

[29] The metaphysical necessity of 'water is H_2O' is guaranteed in the usual, Kripkean way, i.e. by the presence of two rigid designators flanking the '='.

[30] Here and throughout I use corner quotes to indicate that it is the orthographic sequence referred to.

[31] See their [2001] p. 349.

[32] This is also the Block and Stalnaker [1999] view.

[33] Again, the metaphysical necessity of 'water is H_2O' is guaranteed in the usual, Kripkean way, i.e. by the presence of two rigid designators flanking the '='.

[34] Given the necessity in #1, we don't need to worry about Block and Stalnaker's [1999] possibility of ghost water blocking the inference from #1 and #2 to #3.

[35] More carefully, in the solidity case, the vindicating entailment warrants

(3) An object's solidity is constituted by the lattice-like array of the molecules that comprise it, given that array's causal powers and the laws it enters into.

The entailment itself plus the Kripkean assumption about how we describe counterfactual worlds then warrants

(S) □(∀x)(x has L (and L has the causal powers and enters into the laws that it does at the actual world) ⊃ x is solid).

Finally, (S) itself is taken as the first premise in locating entailments for the solidity truths.

[36] See her [2002] p.28.

[37] I say "arguably" since some deny this. See Steve Yablo, "Coulda, Woulda, Shoulda" in Conceivability and Possibility, ed. Tamar Gendler and John Hawthorne, (Oxford: Oxford University Press, 2002).

[38] One might object here that the a posteriori semantic premises vindicating entailments rely upon somehow themselves rely upon a priori analyses. (Thanks to an anonymous reviewer for *Philosophical Studies* for this suggestion.) Nothing I've said here decisively rules out this possibility. However, absent an argument showing how those a posteriori premises must universally rely on analyses, this isn't yet a real objection, so much as the form of one. For the possibility to be live, the details of that objection would need to be spelled out.

[39] This objection was posed by Jackson in conversation.

[40] For McLaughlin's defense of the claim that contingent identities are appropriately reductive, see his "Colour, Consciousness, and Colour Consciousness" in Consciousness: New Philosophical Perspectives, ed Quentin Smith and Aleksankar Jokic (Oxford: Clarendon Press, 2003).

[41] This objection is attributed to the 'Block and Stalnaker side' on the grounds that it mirrors one of their objections to conceptual analysis.

[42] There are a number of other objections that Block and Stalnaker consider against the Jackson and Chalmers conceptual analysis requirement and there is not sufficient space here to show that none of them translate into objections against the present account. It will have to suffice to note that several of their arguments don't really target the conceptual analysis thesis, that conceptual analysis is necessary for showing how e.g. the mental is nothing over and above the physical and hence closing the apparent gap between them. Rather, they target the view that conceptual analysis plus microphysics (in the case of physicalism) are sufficient for closing the gap. But how this matter is to be resolved is not something I need to take a stand on here. What's important is that on the present account the gap is closed in the first instance by reductions and then by the locating entailments they license, when vindicated, not by the vindicating entailments themselves. The punchline is that the Block and Stalnaker objections are here avoided by rejecting the view that the non-basic truths are located among the basic ones by being entailed from conceptual truths and basic truths alone which is, after all, the real target of many of their objections.