

Physicalism, Conceivability and Strong Necessities

Jesper Kallestrup. Forthcoming in *Synthese*.

David Chalmers' conceivability argument against physicalism relies on the entailment from a priori conceivability to metaphysical possibility. The a posteriori physicalist rejects this premise, but is consequently committed to psychophysical strong necessities. These don't fit into the Kripkean model of the necessary a posteriori, and they are therefore, according to Chalmers, problematic. But given semantic assumptions that are essential to the conceivability argument, there is reason to believe in microphysical strong necessities. This means that some of Chalmers' criticism is unwarranted, and the rest equally afflicts the dualist. Moreover, given that these assumptions are independently plausible, there's a general case to be made for the existence of strong necessities outside the psychophysical domain.

I. Physicalism and Two-Dimensionalism

Physicalism says that all facts, including all phenomenal facts, are metaphysically necessitated by the microphysical facts. If P is a statement that reports all the microphysical facts and Q is a statement that reports all the phenomenal facts, all physicalists agree that physicalism is true at our world only if

(Entailment Thesis) $P \rightarrow Q$ is metaphysically necessary.

A priori physicalists¹ believe in addition that if physicalism is true at our world, then all facts are a priori deducible from the physical facts, and so in particular that physicalism is true at our world only if:

(A priori Entailment Thesis) $P \rightarrow Q$ is a conceptual truth.

Consequently, they don't believe that, in the knowledge argument, Mary-before-her-release lacks knowledge of facts about colour experience. Mary-after-her-release gains a set of abilities to imagine, recognise and remember colours, and that's all. A posteriori physicalists, however, deny

¹ Jackson (1998).

(A priori Entailment Thesis): all facts are metaphysically, but not conceptually, necessitated by the microphysical facts. Some a posteriori physicalists deny that even ordinary macrophysical facts are a priori entailed by microphysical facts, e.g. the fact that most of the earth is covered by water isn't a priori entailed by the fact that the earth is covered by H₂O and the fact that H₂O is the watery stuff. They have general semantic doubts about conceptual analysis: we don't know a priori that if water exists, water is the watery stuff.² Other a posteriori physicalists only deny that phenomenal facts are a priori entailed by microphysical facts. They advance particular worries about any non-phenomenal analysis of phenomenal concepts. Consequently, they accept that Mary-before-her-release knows all the facts about colour experience, yet they deny that she has complete knowledge of all the facts. Mary-after-her-release gains new knowledge of an old fact. To know what it's like to experience colours requires possession of phenomenal concepts, which in turn requires having had just those visual experiences that Mary-before-her-release lacks.

Chalmers also believes that (A priori Entailment Thesis) is a necessary condition on the actual truth of physicalism, but unlike a priori physicalists, he doesn't think this condition can be satisfied, and so he rejects physicalism. This is what his conceivability argument aims to show. It relies on a particular interpretation of two-dimensionalism, so a quick reminder is in order.³ One can assign two distinct functions to a statement S depending on how a possible world is conceived. In considering a world as actual, one asks: what if the actual world turns out such-and-such a way? In considering a world as counterfactual, one asks: given the way the actual world is, what if it had been such-and-such a way? The primary intension of S is a function from worlds considered as actual to truth-values⁴, and the secondary intension of S is a function from worlds considered as

² Block & Stalnaker (1999).

³ For more details see Chalmers (1996, 56-71; 2002a; 2004).

⁴ More precisely, primary intensions are functions from centered worlds—worlds centered on the speaker at the time and place of her utterance—to referents.

counterfactual to truth-values. Similarly, the primary intension of a term T is a function from worlds considered as actual to referents, and the secondary intension of T is a function from worlds considered as counterfactual to referents. Primary intensions are a priori, because they are knowable independently of which world is actual, whereas secondary intensions are a posteriori, because they require empirical knowledge about which world is actual. Moreover, S is primarily ideally conceivable when the justification for the conceivability that S is actually the case is undefeated by better reasoning, and S is secondarily ideally conceivable when the justification for the conceivability that S might have been the case is undefeated by better reasoning. S is primarily possible when S is true at a world considered as actual, and S is secondarily possible when S is true at a world considered as counterfactual. That is, S is primarily possible just in case the primary intension of S is true at some world, and S is secondarily possible just in case the secondary intension of S is true at some world. Primary conceivability entails primary possibility, and secondary conceivability entails secondary possibility, but primary conceivability doesn't entail secondary possibility *except when the primary and secondary intensions are identical*. For suppose S* is primarily conceivable. Then S* is primarily possible, which means that its primary intension is true at some world. But if the primary and the secondary intensions of S* are identical, then its secondary intension is also true at some world, which means that S* is secondarily possible. So, S* is also secondarily possible, if S* is primarily conceivable.

Let's run through a familiar example. Suppose the reference of 'water' is fixed by the property of being watery, and suppose that Twin Earth is in a different world. Then the primary and secondary intensions of 'water' pick out the watery stuff and H₂O, respectively, at Twin Earth. The primary intension of the statement that water is H₂O is true at the actual world, but false at Twin Earth, and so is contingent. If Twin Earth turns out to be actual, 'water' refers to XYZ since XYZ is the watery stuff on Twin Earth. But the secondary intension of this statement is true at both the

actual world and Twin Earth. Given that Earth is actual, ‘water’ refers to H₂O at all counterfactual worlds. So, the secondary intension of the statement that water is H₂O is necessary, but understanding yields knowledge of primary intensions, and it’s a posteriori that the watery stuff is H₂O. Thus no single intension is both necessary and a posteriori.⁵ Moreover, the statement that water isn’t H₂O is primarily ideally conceivable, because it’s conceivable that Twin Earth turns out to be actual, but it’s secondarily ideally inconceivable, because it’s inconceivable that water might have been XYZ, if water is H₂O. So, the statement that water isn’t H₂O is primarily possible since it’s true if Twin Earth turns out to be actual. But the statement that water isn’t H₂O is secondarily impossible since it’s false at all counterfactual worlds, if Twin Earth doesn’t turn out to be actual. Hence, there’s no inference from the primary ideal conceivability of this statement to its secondary possibility. And the reason for this is that its primary and secondary intensions are distinct.

So much for stage setting. Here’s the plan. In Sec. II I set up the conceivability argument, and go through the premises. In Sec. III I sketch the a posteriori physicalist’s response to the argument, and show why this view has to embrace so-called strong necessities within the psychophysical domain. Chalmers suspects that belief in any such modality is unwarranted, but in Sec. IV I argue that the conceivability argument rests on assumptions that make it reasonable to posit strong necessities outside that domain. So, whatever problems are associated with strong necessities are problems not just for the a posteriori physicalist. Finally, in Sec. V I try to independently justify the existence of strong necessities.

II. The Conceivability Argument

⁵ Note that the *rigidified* primary intension of this statement—the watery stuff in the actual world is H₂O—is both a posteriori and necessary. I take ‘the watery stuff’ to be a non-rigidified description.

The conceivability argument runs as follows⁶:

(P1) It's primarily ideally conceivable that $P \ \& \ \neg Q$.

(P2) Whatever is primarily ideally conceivable is primarily possible.

(C1) It's primarily possible that $P \ \& \ \neg Q$.

(P3) The primary intensions of Q and P are identical to the secondary intensions of Q and P .

(C2) $P \ \& \ \neg Q$ is secondarily possible.

(P4) Physicalism is false if $P \ \& \ \neg Q$ is secondarily possible.

(C3) Physicalism is false.

The justification for (P1) is that it's conceivable on ideal reflection that *zombie worlds*—minimal physical duplicates of our world that lack phenomenal consciousness—are actually the case. What does that mean? Note first that primary conceivability, as opposed to secondary conceivability, is always a priori: it's to conceive of ways the actual world might turn out such that empirical knowledge about how the actual world has turned out is irrelevant. But that's not all. Chalmers also distinguishes between *negative* conceivability and *positive* conceivability. S is negatively conceivable when it's not a priori that $\neg S$, and S is positively conceivable when one can modally imagine a coherent situation that one takes to verify S .⁷ So, $P \ \& \ \neg Q$ is negatively, primarily, ideally conceivable when on ideal reflection it's not a priori that $P \rightarrow Q$ is actually the case, and $P \ \& \ \neg Q$ is positively, primarily, ideally conceivable when on ideal reflection one can modally imagine an actual, coherent situation that one takes to verify $P \ \& \ \neg Q$. To modally imagine that S is neither to have a perceptual mental image of S , nor to merely entertain the proposition that S . It's to imagine a coherent configuration of objects and properties, which intuitively seems as a situation in which S .

⁶ Chalmers (1996, 94-99, 123-124, 131-134; 1999; 2002a, 196-197)

⁷ Chalmers (2002a).

The conceivability argument is concerned with positive conceivability: on ideal reflection one can modally and coherently imagine that the actual world turns out to be a zombie world.

(P2) rests on the modal rationalist thought that there ought to be some a priori access to real world modalities. If conceivability weren't a reliable guide to real possibility, it would be a mystery how we could ever justifiably come to believe such metaphysical necessities. For instance, we know just by reflection on possible cases that true identity statements flanked by rigid designators are metaphysically necessarily true if true at all. We know a priori that if water is H₂O, water is metaphysically necessarily H₂O. A posteriori knowledge of the antecedent thus a priori entails a posteriori knowledge of the consequent. For how could science help us with the conditional? In much the same way, we know a priori that if P & ¬Q is primarily ideally conceivable, then P & ¬Q is primarily possible. That is, we know a priori that if it's conceivable on ideal reflection that the actual world turns out to be a zombie world, it's possible that the actual world turns out to be a zombie world. Primary conceivability and primary possibility both pertain to the primary intension of the statement conceived, and primary intensions are themselves a priori. So, it would seem that since it's ideally conceivable that the actual world turns out to be a zombie world, we can a priori deduce that it's possible that the actual world turns out to be a zombie world. Idealisation is important. For instance, it's prima facie primarily conceivable yet primarily impossible that water isn't watery, and it's prima facie secondarily conceivable yet secondarily impossible that water isn't H₂O. Conceivability reliably entails possibility only when all relevant—conceptual or empirical—information is in and there are no cognitive shortcomings.

In order to appreciate the motivation behind (P3), we need to distinguish between a *semantic and a metasemantic account of considering a world as actual*.⁸ Chalmers' favours the former according to which terms have the same reference-fixing properties at all worlds considered

⁸ Stalnaker (2000). See also Chalmers (2004).

as actual. Consequently, primary intensions are a priori as the reference-fixing properties are knowable independently of which world is actual, and some statements have assigned *necessary primary intensions*, i.e. they return the same truth-value at all worlds considered as actual. Such statements are a priori. If the reference of ‘water’ is fixed by the property of being watery at all worlds considered as actual, the statement that if water exists, water is the watery stuff has a necessary primary intension, and so is a priori.⁹ On the metasemantic account, however, primary intensions aren’t a priori, because no terms have the same reference-fixing properties across all worlds considered as actual. All intensions are dependent on both linguistic and non-linguistic facts. This means that no primary intension is necessary: to say that a statement’s primary intension is necessary is to say that it’s true at all worlds considered as actual regardless of how the reference of its constituent terms is fixed at those worlds.

The point is now that on the semantic account, the primary intension of a term is identical to the secondary intension of its reference-fixing description, e.g. ‘water’ picks out at worlds considered as actual what ‘the watery stuff’ picks out at worlds considered as counterfactual. Primary intensions fix reference at worlds considered as actual, whereas secondary intensions determines reference at worlds considered as counterfactual. So, the primary and secondary intensions of a term are identical if the secondary intensions of the term and its reference-fixing description are identical. This happens if the reference of the term is fixed by the *same property* that it picks out, and this is highly plausible in the case of phenomenal terms: they designate the same phenomenal property at all worlds regardless of how they are considered.¹⁰ But even if the reference of a phenomenal term is fixed by a property distinct from the one it picks out, the argument still goes through as long as it is itself phenomenal. Here’s Chalmers:

⁹ If pictured in a two-dimensional matrix, the diagonal is true all the way down. Thus if Twin Earth turns out to be actual, then ‘water’ picks out XYZ, but XYZ is watery, and so the statement is true.

¹⁰ This mirrors Kripke on ‘pain’ (1980, 152). See also Loar (1997). More on this in Sec. V.

”...it is very plausible that the most important phenomenal concepts do indeed have the same primary and secondary intensions, so that Q at least can be accommodated here. And even if this is false, Q's primary intension can be seen as the secondary intension of some other truth Q', which stands to Q roughly as "watery stuff" stands to "water". As long as P has the same primary and secondary intension, then the primary possibility of P&~Q will entail the secondary possibility of P&~Q', which will itself entail the falsity of materialism.”¹¹

Suppose Q is the property of having phenomenal consciousness, and that Q' is the distinct property of having a certain phenomenal feel. Then if the reference of Q is fixed by Q', and P has the same primary and secondary intension, the primary intension of P & ¬Q is identical to the secondary intension of P & ¬Q'. So, the primary conceivability of P & ¬Q entails the secondary possibility of P & ¬Q', which is enough to refute (Entailment Thesis). Remember that zombie worlds are physically identical to the actual world but with no phenomenal properties *at all*, and (Entailment Thesis) dictates that P metaphysically necessitates *all* facts.

It's more questionable whether the primary and secondary intensions of P are also identical, but it suffices for now that—as the passage just quoted highlights—it's an assumption that Chalmers makes. Certainly, microphysical terms pick out the same property at all worlds considered as counterfactual. If there were counterfactual worlds at which 'H₂O' didn't refer to H₂O, it wouldn't be necessarily true that water is H₂O. It's also plausible that microphysical terms pick out the same property at all worlds considered as actual; or so we shall assume for now.¹² It seems that both microphysical and phenomenal terms have as their reference-fixers the very properties that they pick out. Both are, in Chalmers' terminology, *subjunctively* and *epistemically rigid*, i.e. they pick out the same property at all worlds considered as counterfactual and as actual,

¹¹ (2002a, 197). See also his (1996, 133-134; 2002b).

¹² I return to this issue in Sec. V.

respectively. Moreover, the property that they pick out at all worlds considered as counterfactual is the same property that they pick out at all worlds considered as actual.¹³

(P4) is indisputable on all accounts. To say that $P \ \& \ \neg Q$ is secondarily possible is to say that $P \ \& \ \neg Q$ is true at some counterfactual world. (Entailment Thesis) says that P metaphysically necessitates Q , hence that there're no metaphysically possible world at which $P \ \& \ \neg Q$ is true. And the metaphysically possible worlds are just the counterfactually possible worlds, e.g. to say that the statement that water isn't H_2O is metaphysically impossible is just to say that there are no worlds considered as counterfactual at which it's true; after all this statement is true at some worlds considered as actual. In short, secondary necessity corresponds to the notion of metaphysical necessity that (Entailment Thesis) pertains to. So, if $P \ \& \ \neg Q$ is secondarily possible, (Entailment Thesis) is false, but physicalism is true only if (Entailment Thesis) is true.

III. A posteriori Physicalism

Let's now turn to the physicalist responses to the argument. The a priori physicalist claims that $P \rightarrow Q$ is a conceptual truth, hence that $P \rightarrow Q$ is a priori knowable. This implies that (P1) is false: $P \ \& \ \neg Q$ is positively, primarily, ideally inconceivable. On this view, it's ruled out a priori that our world turns out to lack phenomenal consciousness. Since the main concern in this paper is with a posteriori physicalism, I shall not have much to say about this reply. The firm intuition behind (P1) is that there's no *conceptual incoherence* in the notion of a zombie world; for instance, nothing

¹³ Note that Chalmers' distinction corresponds to Evans' (1985) distinction between superficial and deep rigidity. Note also that the secondary intension of an epistemically rigid term is a priori, e.g. that 'pain' picks out a certain phenomenal property at all worlds considered as counterfactual.

rules out a priori that someone is physically and functionally identical to me yet there's nothing it's like to be that individual.¹⁴

The a posteriori physicalist, however, is happy with (P1), because she doesn't think phenomenal concepts are subject to an a priori analysis in non-phenomenal terms. On her account, the reference of phenomenal terms is fixed by the very same intrinsic, phenomenal properties that they pick out. This contrasts with natural kind terms whose reference is fixed by distinct, relational, physical properties, e.g. 'water' is fixed by the property of being watery.¹⁵ This means that $P \ \& \ \neg Q$ is primarily ideally conceivable. But zombie worlds are metaphysically impossible, so the inference from primary ideal conceivability to secondary possibility is unwarranted; or so the a posteriori physicalist claims. As the conceivability argument is presented this is a two-stage inference from primary ideal conceivability to primary possibility via:

(P2) Whatever is primarily ideally conceivable is primarily possible,

and then from primary possibility to secondary possibility via:

(P3) The primary intensions of Q and P are identical to the secondary intensions of Q and P.

So, which premise does the a posteriori physicalist deny? As we saw in Sec. II, if phenomenal terms have their reference fixed by the same properties that they pick out, then on the semantic account of

¹⁴ Stalnaker (2002) thinks it's conceivable that the actual world turns out such that there might have been zombie worlds. If we're actually in a world in which physicalism is false, but everything else is just as it actually is, and we can't know a priori that we're not, then phenomenal properties are epiphenomenal, and Q isn't metaphysically necessitated by P. So, if this world turns out to be actual, we might have been in a zombie world. That is, zombie worlds are actually metaphysically impossible, because physicalism is actually true, but physicalism isn't a priori true, so it's conceivable that zombie worlds are metaphysically possible. See also Braddon-Mitchell (2003) who argues that phenomenal concepts have a kind of disjunctive semantics that can accommodate this primary-secondary possibility of zombie worlds.

¹⁵ See e.g. Tye (2002) and Loar (1997).

considering a world as actual the primary and secondary intensions of Q are identical. If, as we'll assume from now on, the a posteriori physicalist accepts this account, then she'll also accept that the primary and secondary intensions of Q are identical. That leaves P, which I'll get back to in Sec. IV, but let's assume for now that the a posteriori physicalist also accepts that the primary and secondary intensions of P are identical. This means that phenomenal and microphysical terms are both epistemically and subjunctively rigid. Consequently, (P3) is fine by her, and she must deny (P2).¹⁶ It's worth bearing in mind that the a posteriori physicalist doesn't dispute modal rationalism across the board. For instance, once empirical investigation has established that water is H₂O, she'll accept that armchair reflection suffices for knowledge that water is metaphysically necessarily H₂O. What she does deny is that the primary conceivability that P & ¬Q entails the primary possibility that P & ¬Q. Chalmers says that S is primarily possible iff S is true at some world considered as actual. What does that mean? At places he suggests this should be taken in a purely *epistemic* sense: S is true at some world considered as actual only if S is possible for all we know a priori. Thus understood, (P2) appears harmless by a posteriori physicalist lights. But at other places, Chalmers suggests that this has *ontological* implications: S is true at some world considered as actual only if S's primary intension is true at some world considered as counterfactual. The problem is that if S is

¹⁶ Stalnaker (2000) and other a posteriori physicalists reject the semantic account. This means that (P3) is false. On the metasemantic account no statement has the same primary and secondary intension, because although some terms are subjunctively rigid, no term is epistemically rigid. A term is epistemically rigid, remember, only if it has the same reference-fixing property at all worlds considered as actual. There're two reasons why we assume the semantic account. First, we are interested in a different line of resistance: there's a way to defend a posteriori physicalism against the conceivability argument *even if* we grant this assumption. Second, we wish to defend the existence of strong necessities, but as we'll see, such necessities require necessary primary intensions, which are ruled out by the metasemantic account. I should like to thank an anonymous referee for comments on this dialectical point.

substituted with $P \ \& \ \neg Q$, and the primary and secondary intensions of P and Q are identical, then $P \ \& \ \neg Q$ is primarily possible only if $P \ \& \ \neg Q$ is true at some world considered as counterfactual. So, given that the a posteriori physicalist accepts (P3), she will reject (P2) when read in the metaphysical way.

But one thing is to deny a premise in an argument against a view, another is to sustain the view in light of this denial. Let me explain why the latter seems to prove difficult. There's a popular Kripkean model, at least in the literature if not in Kripke¹⁷, according to which:

(KM) All a posteriori necessities $a = b$ entail a posteriori contingencies $Da = Db$, where Da and Db are the corresponding reference-fixing descriptions, such that the seeming possibility $a \neq b$ is *explained away* by the real possibility $Da \neq Db$.

By contraposition, if $Da = Db$ isn't contingent a posteriori, $a = b$ isn't necessary a posteriori. So, whenever something seems possible, something is possible, yet often what seems possible isn't what is possible. It seems possible that water isn't H_2O , but this appearance is explained away by the real distinct possibility that the watery stuff isn't H_2O . It also seems possible that pain isn't C-fibre stimulation, but this appearance can't be explained away by the real possibility that the painful state (or pain presents) isn't C-fibre stimulation, because this possibility isn't distinct from the possibility that pain isn't C-fibre stimulation. In short, the disanalogy is that watery non-water and non-watery water are possible, but painful non-pains and painless pains are impossible.

It's clear that the conceivability argument deploys (KM): if $P \rightarrow Q$ is necessary a posteriori, $DP \rightarrow DQ$ should be contingent a posteriori, but on the shared assumption that the primary and secondary intensions of P and Q are identical, if $DP \rightarrow DQ$ is contingent a posteriori, so is $P \rightarrow Q$. That is, $P \ \& \ \neg Q$ seems possible, but can't be explained away by a distinct real

¹⁷ See Kripke (1980), and for example Yablo (2000).

possibility $DP \ \& \ \neg DQ$, so $P \ \& \ \neg Q$ is a real possibility. If, as the a posteriori physicalist assumes, the properties that microphysical and phenomenal terms pick out, are the properties that fix their reference, the possibility that $DP \ \& \ \neg DQ$ is just the possibility that $P \ \& \ \neg Q$.

Given (KM) and our assumptions about reference fixing, it's not difficult to bring the a posteriori physicalist into trouble. Suppose $P^* = Q^*$ is a particular psychophysical identity, e.g. pain = C-fibre stimulation. If phenomenal properties are presented to us via intrinsic, phenomenal qualities, and $P^* = Q^*$ is necessary a posteriori, as at least the reductive physicalist would have it, then (KM) rules that $DP^* = DQ^*$ is contingent a posteriori. But $DP^* = DQ^*$ is itself a psychophysical identity, hence should be necessary a posteriori. So, by (KM), there should be another a posteriori contingency $DDP^* = DDQ^*$ that explains why $DP^* = DQ^*$ seems contingent but is not. And so on *ad infinitum*. It would seem that $DP^* = DQ^*$, or $DDP^* = DDQ^*$, etc. is either not necessary or not a posteriori. In either case, a posteriori physicalism is false.¹⁸

There's no way for the a posteriori physicalist but to reject (KM): if she accepts that phenomenal and microphysical terms are both epistemically and subjunctively rigid yet express a priori independent concepts, the a posteriori necessity $P \rightarrow Q$ can't be modelled on standard a posteriori necessities. The latter have necessary secondary intensions and contingent primary intensions. But $P \rightarrow Q$ will have a necessary secondary intension *as well as a necessary primary intension*, and yet the claim is that $P \rightarrow Q$ is a posteriori due to the conceptual independence of P and Q. This means that $P \rightarrow Q$ is a so-called *strong necessity*: an a posteriori necessity with a

¹⁸ White (1982) took the second way out. Levine (1993; 1998) suggests that all the a posteriori physicalist needs to do is to identify two distinct relational properties under the descriptions DP^* and DQ^* , e.g. 'the state that normally causes such-and-such behavioural effects' and 'what I'm now consciously experiencing'. This surrenders the assumption that when it comes to a phenomenal property, the role of the reference-fixer is played by this property itself; an assumption Levine himself concedes elsewhere (1993, 134).

necessary primary intension. The problem is however that, according to Chalmers, there's no reason to believe in any such modality that goes beyond (KM).

IV. A Dilemma

Let me take stock. We have been trying to defend a posteriori physicalism against the conceivability argument. Denying (P2) while conceding (P3) means, however, that psychophysical necessities can't be modelled on Kripkean a posteriori necessities. What we shall now argue is that the a posteriori physicalist can use (P3) to set up a dilemma: either the dualist must embrace microphysical strong necessities, or she'll have to accept implausible consequences concerning the modal status of certain statements. Finally, in Sec. V I'll provide additional support for the existence of such necessities.

Note for a start that the conceivability argument against physicalism is cogent only if (P3) The primary intensions of Q and P are identical to the secondary intensions of Q and P, is true. And note also that (P3) can be divided up into:

(P3.1) The primary intension of Q is identical to the secondary intension of Q, which the a posteriori physicalist endorses, and:

(P3.2) The primary intension of P is identical to the secondary intension of P, which we have yet to consider. This means that (P3) is true iff (P3.1) and (P3.2) are true. There are, on reflection, two ways of rendering (P3.2) true. The first way is if microphysical terms are both epistemically and subjunctively rigid such that they pick out the same referents at all worlds considered as actual or as counterfactual. It's precisely epistemic and subjunctive rigidity that makes (P3.1) true: phenomenal terms pick out the same referents at all worlds no matter how they are considered. The second way is if microphysical terms are both epistemically and subjunctively

flexible such that they pick out different referents at different worlds, but always the same referent at a world considered as actual or as counterfactual. Suppose we stipulate that ‘Julius’ is short for the subjunctively flexible description ‘the inventor of the zip’, and suppose that Jones invented the zip in world w^* . Then ‘Julius’ refers to Jones in w^* regardless of whether w^* is considered as actual or as counterfactual.¹⁹

This provides sufficient background to face the dualist with the following *dilemma*: either there are strong necessities outside the psychophysical domain, or *scientific reductions*—identity statements flanked by microphysical and natural kind terms—are contingent. For suppose we go for the first way of making (P3.2) true: microphysical terms are both epistemically and subjunctively rigid. We know that natural kind concepts are modally rigid. This means that scientific reductions are necessary in the metaphysical sense if true at all, e.g. that water is metaphysically necessarily H_2O if water is H_2O . Such statements are Kripkean a posteriori necessities: they have a necessary secondary intension, but a contingent primary intension. But if microphysical terms are both epistemically and subjunctively rigid, there’s bound to be some identity statements flanked by distinct microphysical terms with a necessary secondary intension and a necessary primary intension. Examples of such *microphysical identifications*, as we might call them, are:

(*) Hydrogen = the so-and-so quantum mechanical state

(**) Protons = UUD (two up quarks and one down quark)

(***) Quarks = Fermions (a particle with an odd half-integer spin).

¹⁹ For the record this was not how Evans’ (1985) example was supposed to work.

But all such identifications are a posteriori. Microphysics is at times highly speculative, but the justification for (i)-(iii) is surely dependent on empirical findings. So, there are strong necessities that aren't psychophysical.²⁰

Chalmers claims that the a posteriori physicalist better not invoke psychophysical strong necessities since we have no reason to believe that such modalities exist: they are supposedly ad hoc, unsupported by analogy, incoherent, inexplicable and lead to an undesirable proliferation of modalities.²¹ The foregoing suggests that at least some of his scepticism is unfounded. If there are strong necessities outside the psychophysical domain, the invocation of such necessities inside that domain isn't ad hoc or just a manoeuvre to save physicalism. What is more, even the dualist will have to concede the existence of microphysical strong necessities. For the conceivability argument is cogent only if (P3.2) is true, and according to this way of making (P3.2) true, there will be strong necessities. So, the dualist has a cogent argument only if she endorses the existence of such necessities. Given that (KM) is unavailable, it may prove difficult to satisfactorily *explain* strong necessities, but the a posteriori physicalist can at least take comfort in the fact that whatever difficulties they do give rise to are difficulties also for the dualist.

Now suppose we go for the second way of making (P3.2) true: microphysical terms are both epistemically and subjunctively flexible such that they pick out different referents at different worlds, but always the same referent at a world considered as actual or as counterfactual. This means that microphysical identifications will have a contingent primary intension as well as a contingent secondary intension, and so they will not be cases of strong necessities. But making the assumption that microphysical terms are subjunctively flexible has unpalatable consequences. We have to give content to the idea that 'H₂O', 'electron', 'quark', etc., have different referents at

²⁰ See also Hawthorne (forthcoming) who offers an example of a purely phenomenal strong necessity deploying the possibility of dancing qualia.

²¹ See (1996, 136-138; 1999). I shall try to answer some of the other objections in Sec. V.

different worlds considered as counterfactual. We have to make sense of the idea that the statement 'H₂O might not have been H₂O' has a true reading, namely when 'H₂O' takes wide scope with respect to the modal operator. That seems incredible. What's more, how can we account for the a priori truth of, say, 'if water is H₂O, water is necessarily H₂O'. If 'water' is subjunctively rigid, and 'H₂O' is subjunctively flexible, 'water is H₂O' is contingent if true. In fact, all true scientific reductions and microphysical identifications will then come out contingent a posteriori, because identity statements flanked by one or two flexible designators are contingent if true. But there's an overwhelming intuition—and an intuition that stems from no prior conviction about the viability of physicalism—that such reductions and identifications are metaphysically necessary if true.

In short the dilemma is this: the conceivability argument against physicalism is cogent only if (P3) is true. (P3) is true only if (P3.2) is true, and there are two ways of rendering (P3.2) true. If we opt for the first way, there're going to be strong necessities that aren't psychophysical. However, if we opt for the second way, a number of statements that intuitively are necessary a posteriori come out contingent a posteriori. So, on the first horn, some of the dualist's criticism of the a posteriori physicalist's invocation of strong necessities falls away and the remaining difficulties equally afflict the dualist. On the second horn, the dualist is forced to concede counterintuitive consequences concerning the modal status of scientific reductions and theoretical identifications. This strongly indicates that (P3) serves the physicalist rather than the dualist. At several places Chalmers (2002a, 197) suggests that a:

"...loophole emerges: it is not clear that P has the same primary and secondary intension. It can reasonably be argued that physical concepts have their reference fixed by some dispositional role, but refer to an underlying categorical property. If so, their primary intensions pick out whatever plays a certain role in the world (irrespective of categorical nature), while their secondary intensions pick out instances of a certain categorical property (irrespective of its role). If so, the purported

"zombie world" in which the primary intension of $P \ \& \ \neg Q$ holds may be a world in which the secondary intension of P is false, so we cannot infer the secondary possibility of $P \ \& \ \neg Q$."

So, the thought is that microphysical concepts work in much the same way natural kind concepts work: their reference is rigidly fixed by the property of playing a certain dispositional-functional role, which is a contingent property of whatever underlying categorical property they pick out. For instance, 'electron' rigidly refers to whatever plays the role in the best physical theory about electrons such that what actually plays the role might not have done so. The property of playing the electron role, i.e. the property of being a stable, fundamental particle with mass 9.11×10^{-31} kg and negative electric charge $-e$ that is found in quantum mechanical orbits about neutral atoms, is a contingent property of the underlying categorical property picked out by 'electron'. So, the primary intension of 'electron' picks out at a world whatever underlying categorical property plays the electron role at that world, while the secondary intension picks out at a world the underlying categorical property that actually plays the electron role.

Let's thus assume that the primary and secondary intensions of microphysical terms differ: they are subjunctively rigid, but epistemically flexible. Let P' be a statement that reports all the microphysical *role facts*, i.e. all the facts about the dispositional-functional roles. Given that the primary intension of a term is identical to the secondary intension of its reference-fixing description, and that reference-fixing descriptions pick out the properties of playing certain dispositional-functional roles, the primary intension of P is identical to the secondary intension of P' . This means that the argument now runs as follows:

(P1) It's primarily ideally conceivable that $P \ \& \ \neg Q$.

(P2) Whatever is primarily ideally conceivable is primarily possible.

(C1) It's primarily possible that $P \ \& \ \neg Q$.

(P3*) The primary intensions of Q and P are identical to the secondary intensions of Q and P' .

(C2*) P' & ¬Q is secondarily possible.

(P4*) Physicalism is false if P' & ¬Q is secondarily possible.

(C3*) Physicalism is false.

On the face of it (P4*) is false. The truth of P' & ¬Q is compatible with the truth of (Entailment Thesis). So, the resultant view is clearly physicalist in *definition*. But given that it's metaphysically possible for phenomenal facts to obtain in the absence of any microphysical role facts, it's maybe not physicalist *in spirit*. Chalmers (2002a, 198) calls this view *panprotopsychism*: it's the view that the phenomenal facts are metaphysically necessitated by the *filler facts*, i.e. by the facts about the underlying categorical properties.²² To my knowledge it's an open question whether the filler facts should count as physical. Stoljar (2001), for instance, argues that once the physicalist avails herself of an object-based conception of the physical, underlying categorical properties count as physical even though the concepts required to express them are potentially beyond complete physical theory.²³ I shall not adjudicate this dispute here. The point is that even if the resultant view turns out to be a version of physicalism, it's surely not a version all physicalists will be happy with. It's therefore fortunate that those discontented physicalists still have the option of maintaining (P3) while denying (P3*). Consequently, what they must show is that microphysical concepts are more akin to phenomenal concepts than one might initially have thought. Let me finally try to address this issue.

²² Note that the panprotopsychist isn't committed to strong necessities: $P \rightarrow Q$ doesn't have a necessary primary intension, because P is epistemically flexible.

²³ According to Stoljar's (2001, 270) *a priori o(bject)-physicalism*, phenomenal facts not only metaphysically supervene on the physical role and filler facts, they are also a priori deducible from these physical facts. Nevertheless, Mary-before-her-release lacks knowledge of facts that count as physical on the object-based conception, and so she can't a priori deduce knowledge that seeing red is like thus-and-so, because all she knows is what physical theory can tell her, and physical theory is concerned only with the role facts; or so Stoljar assumes.

V. Strong Necessities

A strong necessity is an a posteriori necessity with a necessary primary intension. If, as the a posteriori physicalist has it, $P \rightarrow Q$ is a strong necessity, then no matter which world is considered as actual, $P \rightarrow Q$ is true. This contrasts with Kripkean a posteriori necessities, which have a contingent primary intension. $P \rightarrow Q$ also has a necessary secondary intension, which means that it's true at all worlds considered as counterfactual. So, $P \rightarrow Q$ is true at all worlds no matter how they are considered yet $P \rightarrow Q$ is supposed to be a posteriori. This combination of features gives rise to at least two worries, or challenges if you like, which I shall only briefly sketch here since my main concern is with the positive case for strong necessities.

The first worry is that if $P \rightarrow Q$ is necessary a posteriori, there ought to be some primarily, positively conceivable world in which $P \ \& \ \neg Q$ is true. That is, if there were no primarily, positively conceivable world in which $P \ \& \ \neg Q$ is true, Q would seem to be a priori deducible from P . But $P \rightarrow Q$ is supposedly true at all worlds. It would seem the proponent of strong necessities needs a distinction between conceivability and possibility at the level of worlds: $P \rightarrow Q$ is true at all metaphysically possible worlds, but false at some conceivable worlds. This conceivable world is logically possible yet metaphysically impossible.²⁴ This problem concerns the metaphysics of modality: if such necessities did exist, the space of logically possible worlds would allegedly have to outstrip the space of metaphysically possible worlds.

The crucial assumption is that if a statement is necessary a posteriori, its primary intension is false at some conceivable world, where this means that if this world turns out to be

²⁴ See Chalmers (1999) and also his (1996, 136-138).

actual, the statement is false. For instance, the primary intension of the statement that water is H₂O is false at some conceivable world: if Twin Earth turns out to be actual, water isn't H₂O. But if we reject (KM), we also reject the claim that all primary positive conceivability claims are made true by real-world modalities, e.g. the primary, positive conceivability that water isn't H₂O is made true by the genuine possibility that the watery stuff isn't H₂O. According to the a posteriori physicalist, P & ¬Q is primarily, positively conceivable yet there are no world-like truth-maker for this claim.²⁵

The second worry is this: if a statement S has a necessary primary intension, S is true no matter how the actual world turns out. Understanding is knowledge of primary intensions, so someone who understands S knows that S is true no matter how the actual world turns out. To know that S is true no matter how the actual world turns out is to know that S is true independently of any empirical knowledge about the actual world, hence to know that S is true a priori. But knowledge of S is a posteriori only if understanding S is insufficient for knowledge that S is true. So, it's impossible that S is strongly necessary. But given that S could be any statement, the very notion of a strong necessity seems incoherent.

I think the best response is to deny that if the meaning of a term A is what one knows when one understands A, and *meaning is transparent* in the sense that if A and B have the same meaning, then someone who fully understands A and B knows that they have the same meaning, then *meanings aren't primary intensions*. The reason for this is that *primary intensions aren't transparent*: it's possible to know a priori that A has a necessary primary intension, and to know a priori that B has a necessary primary intension, and that A and B have the same necessary primary

²⁵ Of course a lot more needs to be said; see in particular Yablo (1999, 2000). Note that if one is asked for a *psychological* explanation of the zombie intuition, one could appeal to the distinct imaginative or cognitive processes by which we conceive of microphysical and phenomenal properties; see Hill (1997). Chalmers (1999) objects that Hill's account at most explains why zombies are conceivable, not why the conceivability is unreliable with respect to real possibility.

intension, but not know a priori that they have the same necessary primary intension. This kind of failure of transparency is illustrated by (*)-(***). If, on the other hand, meaning isn't transparent, primary intensions can be meanings. But in that case knowledge that a statement with a necessary primary intension is true requires more than mere grasp of the meaning of the statement.²⁶

Now, let's turn to the positive case for strong necessities. We have seen that strong necessities are a posteriori yet have a necessary secondary intension as well as a necessary primary intension. We know that an a posteriori identity statement $A = B$ has a necessary secondary intension only if both A and B are subjunctively rigid. Correspondingly, an a posteriori identity statement has a necessary primary intension only if both A and B are epistemically rigid.²⁷ For suppose that A is epistemically flexible while B is epistemically rigid. This implies that for some worlds considered as actual A picks out a property, which B fails to pick out. Hence, $A = B$ is false at some worlds considered as actual, and so doesn't have a necessary primary intension. Similarly, if both A and B are epistemically flexible. So, in order to show that there exist microphysical strong

²⁶ We have made some headway towards explaining the special *semantic* features of phenomenal and microphysical concepts, but clearly a lot more needs to be said. In particular, an explanation of why a priori knowable primary intensions aren't transparent is called for. I shall not attempt to do that here. But two points are worth bearing in mind. First, a number of semantic externalists have claimed that although we have privileged access to the wide contents of our own occurrent beliefs, these contents aren't transparent in the sense that one can know their logical properties just by reflection. Think of so-called slow switching cases. So, a priority is compatible with lack of transparency in this sense. Second, if meaning is transparent, then arguably meaning shouldn't be individuated modally in terms of functions from worlds to truth-values, but in a more fine-grained manner in terms of cognitive significance; see Loar (1997) and Balog (1999).

²⁷ A similar point doesn't apply to a priori identities: the statement that the oldest bachelor in China is the oldest unmarried man in China has a necessary secondary intension, but both descriptions are subjunctively flexible, and the statement that if water exists, water is the watery stuff has a necessary primary intension, but both 'water' and 'the watery stuff' are epistemically flexible.

necessities, the a posteriori physicalist needs to argue that microphysical terms are both subjunctively and epistemically rigid. Consider for a start what Chalmers (1996, 135-136) says in response to the panprotopsychist's claim that microphysical terms are subjunctively rigid but epistemically flexible:

“Arguably, physical predicates apply even a posteriori on the basis of extrinsic relations between physical entities, irrespective of any hidden properties. This is a purely conceptual question: if electrons in our world have hidden protophenomenal properties, would we call an otherwise identical counterfactual entity that lacks those properties an electron? I think we would. Not only is reference to electrons fixed by the role that electrons play in a theory; the very concept of an electron is defined by that role, which determines the application of the concept across all worlds. The notion of an electron that has all the extrinsic properties of actual protons does not appear to be coherent, and neither does the notion that there is a world in which mass plays the role that charge actually plays.”

Chalmers concludes that panprotopsychism gives a false account of the semantics of microphysical concepts. Our a posteriori physicalist should welcome this conclusion and the a priori reasoning that leads to it. For it suggests that microphysical terms have a semantics that sustains the existence of microphysical strong necessities. There are in fact four counterintuitive consequences of the supposition that such terms are semantically on a par with natural kind terms. Suppose that ‘electron’ were like ‘water’ in picking out an underlying categorical property P_C across counterfactual worlds regardless of whether P_C plays the electron role in those worlds. In that case, we would have to allow that just as there are counterfactual worlds in which H_2O doesn't play the water role, and in which XYZ plays the water role, there are counterfactual worlds in which P_C doesn't play the electron role, and in which some entirely distinct underlying categorical property P^*_C plays the electron role. But the last two conceptual possibilities square badly with entrenched semantic intuitions. For we would have to say that electrons are P_C in those worlds, just as we

would have to say that water is H₂O in those worlds, hence that not electrons but something else plays the electron role in them. For instance, the notion of a quark with negative electric charge $-e$ and mass 9.11×10^{-31} kg that is found in quantum mechanical orbits about neutral atoms makes little sense. The lesson is however not that microphysical terms are subjunctively flexible with respect to the *filler properties*. That would take us back to the same counterintuitive consequences that confronted the dualist on the second horn of our dilemma. It's rather that microphysical terms are subjunctively rigid with respect to the *role properties*, e.g. 'electron' picks out at all counterfactual worlds the property of playing the electron role.

The other two counterintuitive consequences pertain to the supposition that 'electron' functions like 'water' in having different referents at different worlds considered as actual. For in that case, we would have to admit that just as there are worlds considered as actual in which H₂O doesn't play the water role, and in which XYZ plays the water role, there are worlds considered as actual in which P_C doesn't play the electron role, and in which P*_C plays the electron role. Again these last two conceptual possibilities are not in line with firm semantic intuitions. For we would have to say that electrons are P*_C in those worlds, just as we would have to say that water is XYZ in those worlds, hence that different properties play the electron role depending on which world is considered as actual. But it makes little sense to say that the actual world turns out such that quarks play the electron role.²⁸ Given that we seem unable to accommodate either possibility, 'electron' is

²⁸ It may be that electrons are in fact not fundamental particles, but that strings or some other smaller particles constitute electrons. It will still be true that if a configuration of such particles plays the electron role at some world considered as actual or as counterfactual, then it's an electron. All it takes to be an electron on our view is to be a property that plays the electron role. In fact, only if we assume that 'electron' is modelled on 'water' are we hostage to the open empirical question of whether electrons are fundamental. For if 'electron' rigidly refers to an underlying categorical property, which contingently plays the electron role, and it turns out that electrons are fundamental such that no such categorical property exists, then 'electron' turns out to be an empty term.

best seen as epistemically rigid: ‘electron’ picks out at all worlds considered as actual the property of playing the electron role. In short, Chalmers is right that the electron role determines the reference of ‘electron’ across *all worlds*. Moreover, as we have made no special assumptions about ‘electron’ or electrons, we can safely extend the conclusion to cover other microphysical terms. For instance, ‘quark’ picks out the property of playing the quark role at all worlds considered as actual or as counterfactual, where this role property is given by the best physical theory about quarks: it’s the property of being a fundamental particle with fractional electric charge ($\pm 1/3$ or $\pm 2/3$), odd half-integer spin ($1/2, 3/2, \text{etc.}$), a certain decay, colour charge and interaction with gravitational and electromagnetic forces. Even non-fundamental entities such as protons, hydrogen-atoms and H_2O molecules should be understood in this manner.²⁹ But if microphysical terms are both epistemically and subjunctively rigid, there’s bound to be microphysical strong necessities as in (*)-(***).

The foregoing provides strong intuitive support for the existence of strong necessities outside the psychophysical domain, but there’s an additional explanation of our intuitions. Consider Kripke’s famous account of ‘pain’ according to which pain is rigidly picked out by the property of being pain itself, i.e. the property that fixes the reference of ‘pain’ is the property that ‘pain’ rigidly refers to.³⁰ This means, as we saw in Sec. II, that the primary and secondary intensions of ‘pain’ are identical, hence that ‘pain’ is epistemically and subjunctively rigid. Kripke (1980, 152) famously explained these features in terms of the notion of a *qualitively identical epistemic situation*:

²⁹ Thus ‘ H_2O ’ picks out the property of playing the H_2O role given by the best physical theory about H_2O , e.g. the property of having two hydrogen atoms for every oxygen atom that are bound together by certain forces with certain force carrier particles, and so on. For what sense can we make of the idea that the actual world turns out such that XYZ or something else plays the role in the best physical theory about H_2O that H_2O actually plays?

³⁰ Kripke (1980, 152-153) also says that the reference of ‘pain’ is fixed by an essential phenomenal property of the referent, say being painful. But being pain and being painful amount to much the same property, because ‘pain’ and ‘painful’ are co-referential across *all worlds*.

“To be in the same epistemic situation that would obtain if one had a pain *is* to have a pain; to be in the same epistemic situation that would obtain in the absence of pain *is* not to have a pain.”

The point is that if it seems in every way as if one has a pain, then one has a pain, and if it doesn't seem in any way as if one has a pain, then one doesn't have a pain. There's no pertinent *appearance-reality distinction* in the case of pain. This contrasts with manifest natural kinds, e.g. heat, light, water. Something can seem in every way as if it's water but not be water, and something can seem in every way as if it's not water and yet be water. Take counterfactual worlds in which XYZ plays the water role, and in which H₂O fails to play the water role.

If our a posteriori physicalist is right, microphysical properties resemble phenomenal properties by not exhibiting a relevant appearance-reality distinction. If something seems in every way as if it's an electron, then it's an electron, and if something seems in no way as if it's an electron, then it's not an electron. This is not about *infallibility*: to say that something seems in every way as if it's an electron is to say that it plays—not seem to play—the electron role, and to say that something seems in no way as if it's an electron is to say that it doesn't play—not doesn't seem to play—the electron role. Of course we may be wrong about whether some property plays the electron role, but if it does, there's no further question about whether it's an electron.³¹ The point is rather that in the case of water, the appearance-reality distinction is in place, because there's an underlying microphysical property H₂O, which is *both* contingently related to a number of manifest features—the watery stuff—in virtue of which water is experientially presented, and to which water is a posteriori reduced. But when it comes to electrons, there is no such property. Maybe being an

³¹ It might also turn out that electrons lack some, or even many, of the properties we thought for certain that they possessed. We can take 'playing the role' to require having enough of the properties. If we take Lewis' suggestion (1999, 258) that the role is a disjunction of all conjunctions of *most* of them, then playing the role is just to satisfy one such disjunct of properties.

electron can be a posteriori reduced to an underlying microphysical property, but if so the manifest features given by the electron role will be essentially connected to this property. It may also be that there is an underlying microphysical property, which does bear a contingent relationship to these manifest features, but if so being an electron can't be a posteriori reduced to this property. Being an electron is itself a microphysical property to which the electron role features are essential.³²

References

- Balog, K. (1999), 'Conceivability, Possibility and the Mind-Body Problem', *Philosophical Review*, 108: 497-528.
- Block, N. and Stalnaker, R. (1999), 'Conceptual Analysis, Dualism, and the Explanatory Gap', *Philosophical Review*, 108: 1-46.
- Braddon-Mitchell, D. (2003), 'Qualia and analytic conditionals', *Journal of Philosophy* 100:111-35.
- Chalmers, D. (1996), *The Conscious Mind: In Search of a Fundamental Theory*, New York, Oxford University Press.
- Chalmers, D. (1999), 'Materialism and the Metaphysics of Modality', *Philosophy and Phenomenological Research*, 59: 473-96.
- Chalmers, D. (2002a) 'Does Conceivability Entail Possibility?' in Gendler, T. S. & Hawthorne, J. (eds.), *Conceivability and Possibility*, Oxford: Oxford University Press, 145-200.
- Chalmers, D. (2002b) 'The Content and Epistemology of Phenomenal Belief' in Smith & Jovic (eds.), *Consciousness: New Philosophical Essays*, Oxford: Oxford University Press.

³² I am grateful to Lars Gundersen, Jakob Hohwy, Sven Rosenkranz and in particular David Chalmers for very helpful comments.

- Chalmers, D. (2004) 'The Foundations of Two-Dimensional Semantics' in Garcia-Caprintero, M. & Macia, J. (eds.), *Two-Dimensional Semantics: Foundations and Applications*, Oxford: Oxford University Press.
- Chalmers, D. and Jackson, F. (2001), 'Conceptual Analysis and Reductive Explanation', *Philosophical Review*, 110: 315-360.
- Evans, G. (1985), 'Reference and Contingency' in his *Collected Papers*, Clarendon Press, Oxford.
- Hawthorne, J. (forthcoming), 'Direct Reference and Dancing Qualia'.
- Hill, C. (1997), 'Imaginability, Conceivability, Possibility, and the Mind-Body Problem', *Philosophical Studies* 87: 61-85.
- Jackson, F. (1998), *From Metaphysics to Ethics: A Defence of Conceptual Analysis*, Oxford, Oxford University Press.
- Kripke, S. (1980) *Naming and Necessity*, Cambridge, Mass.: Harvard University Press.
- Levine, J. (1993) 'On Leaving Out What It's Like' in *Consciousness: Psychological and Philosophical Essays*, (eds.) M. Davies and G. W. Humphreys, Oxford: Blackwell, 121-136.
- Levine, J. (1998), 'Conceivability and the Metaphysics of Mind', *Nous* 32: 449-80.
- Lewis, D. (1999) 'Psychophysical and Theoretical Identifications' in his *Papers in Metaphysics and Epistemology*, Cambridge University Press, 248-61.
- Loar, B. (1997) 'Phenomenal States' (second version) in Block, N, Flanagan, O., Guzeldere, G. (eds.): *The Nature of Consciousness: Philosophical Debates*, MIT Press.
- Stalnaker, R. (2000), 'On Considering a Possible World as Actual', *Proceedings of the Aristotelian Society*, supp. Vol. 65: 141-56.
- Stalnaker, R. (2002), 'What is it like to be a Zombie?' in Gendler, T. S. & Hawthorne, J. (eds.), *Conceivability and Possibility*, Oxford: Oxford University Press, 385-400.

Stoljar, D. (2001), 'Two Conceptions of the Physical', *Philosophy and Phenomenological Research*, LXII, 253-81.

Tye, M. (2002), *Consciousness, Colour, and Content*, Cambridge, MIT Press.

Yablo, S. (1999), 'Concepts and Consciousness', *Philosophy and Phenomenological Research*, 59.

Yablo, S. (2000), 'Textbook Kripkeanism and the Open Texture of Concepts', *Pacific Philosophical Quarterly*, 81(1): 98-122.

White, S. L. (1982), 'Curse of the Qualia', *Synthese*, 68: 333-368.