

Ceteris Absentibus Physicalism*

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1 Introduction

In a slogan, microphysicalism is the view that there is nothing over and above microphysical facts in our world. But how are we supposed to understand this slogan? There is a popular picturesque explanation: once God had created all the microphysical facts, He was done creating the world as it is; there was nothing left for Him to do. Clearly, this is merely a metaphor, since God's creating the universe is incompatible with physicalism. However, the metaphor has heuristic value, and can guide our search for an adequate formulation of physicalism.

The metaphor is often used to introduce the concept of supervenience, which in turn figures in typical definitions of physicalism.¹ Supervenience comes in different versions, but the standard template is as follows: a class of facts X supervenes on a class of facts Y if and only if there are no two worlds that differ in X -facts without differing in Y -facts. Supervenience physicalism is then the following claim:

SP All facts supervene on the physical facts.

However, SP goes substantially beyond what is suggested in the creation metaphor. For one thing, the metaphor says nothing about worlds in which God's creativity found a different expression on the first six days, while SP has implications for those worlds too. For another thing, the metaphor, unlike SP, is silent about those

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¹Unless indicated otherwise, I use 'physical' and 'physicalism' as shorthand for 'microphysical' and 'microphysicalism'.

worlds in which He did not rest on day seven, or chose to resume his work on day eight. I want to focus on scenarios of this latter sort.

In the actual world, untouched after day six, it is a fact that there is no ectoplasm in the region occupied by the table in front of me. Let this actually obtaining fact be called “ $\neg Ectoplasm$.”² In some other world w_{Ect} , God infused the table with the non-actual, non-physical substance ectoplasm on day eight, leaving all the physical facts unchanged. Thus $\neg Ectoplasm$, true in the actual world, is false in the physical duplicate w_{Ect} , and hence SP is false. But intuitively, the possibility of w_{Ect} ought not to conflict with physicalism as a claim about our world @. Its truth should depend entirely on what God actually did on the first six days, not on what He could have done had He resumed his work later.

This is a familiar problem for the attempt to cash out physicalism as a supervenience thesis, and various proposals have been made to get around it.³ At bottom, the problem is that SP is non-contingent, while physicalism is contingent. In some possible worlds, there is nothing over and above physical properties. The possibility of worlds with ghostly, godly, ectoplasmic and suchlike features ought not to imply that physicalism, a thesis about the nature of a particular world, is necessarily false.

SP implies that the actual physical facts necessitate all actual facts. We have seen that they do not necessitate $\neg Ectoplasm$, or that there are no ghosts, or no gods. It seems that these are all examples of *negative* facts, as opposed to positive ones such as the fact that I have a non-zero mass. According to David Chalmers’s definition, physicalism is true in a world w if all *positive* facts of w hold in every physical duplicate of w . The claim that the definiens holds in our world I call “necessitation physicalism,” or “NP”:

NP The actual physical facts necessitate all positive actual facts.

Since $\neg Ectoplasm$ and the other examples are negative facts, their failure to hold in some physical duplicate of @ is compatible with NP. Thus Chalmers’s definition solves the familiar problem. But there is also a less familiar problem, illustrated

²I use ‘fact’ roughly like some other authors use ‘state of affairs’, or ‘proposition’. A fact is the instantiation of a property by an individual, or of a relation by a sequence of individuals. I use ‘ A is a fact of w ’ to mean that A holds, or obtains, in world w . Facts need not obtain in the actual world.

³For example in Chalmers [1996, pp. 39-40], Lewis [1983] and Jackson [1994]. The first of these will be discussed shortly, and the latter two in section 3.

by another alternative creation story.

In world w_{Alg} , God on day eight infused my foot with a non-physical substance different from ectoplasm—to be called “algoplasm.” Algoplasm makes phenomenal properties disappear. In w_{Alg} , I do not feel an itch in my right foot, i.e. the fact *Itch*, that I have the phenomenal property of feeling an itch in my right foot, does not hold. Since *Itch* is a positive fact, the possibility of w_{Alg} is incompatible not just with SP, but also with NP. But it should be compatible with physicalism, for the same reason as the possibility of w_{Ect} : what God could have done after day six ought not to bear on the question whether our world is physicalistic.

In this second scenario, *Algoplasm*, the fact that there is algoplasm in my right foot, is a “blocker” for the positive fact *Itch*; less interestingly, it is also a blocker for the negative fact \neg *Algoplasm*.⁴ Physicalism is compatible with the possibility, though of course not the actuality, of blockers for positive actual facts. After all, its distinctive claim is that the physical facts are sufficient for all actual facts. If God created only physical facts on the first six days and then stopped, the physical facts *are* sufficient. To be sure, the concept of sufficiency here is distinct from the one expressed by the locution ‘sufficient condition’ in logic and mathematics, where a sufficient condition is just a necessitating condition. It is *ceteris absentibus* sufficiency—sufficiency other things being absent.⁵ The “other things,” of course, are blocking facts such as the presence of Algoplasm. This concept of sufficiency is then deployed in the following definition: *ceteris absentibus* physicalism is true in world $w =_{df}$ the physical facts of w are *ceteris absentibus* sufficient for all facts of w .

How does this proposal classify w_{Ect} and w_{Alg} ? World w_{Ect} comes out as non-physicalistic because Φ , the set of actual physical facts, is not *ceteris absentibus* sufficient for *Ectoplasm*; if other things than Φ are absent, then in particular Ectoplasm is absent. Likewise, world w_{Alg} gets classified as non-physicalistic because Φ is not *ceteris absentibus* sufficient for *Algoplasm*, the fact that my right foot is infused with algoplasm.

Ceteris absentibus physicalism is the following claim:

⁴The possibility of blockers was first discussed in the literature by Hawthorne. Hawthorne also takes blockers to be conceivable, but thinks that if actual facts like *Itch* are blocked in some physical duplicate of our world, physicalism ought to be false. I briefly engage with his argument in section 3.

⁵Joseph [1980, p. 777] uses the term ‘*ceteris absentibus* clause’. He explores, but does not endorse, the view that laws of nature should be understood with a *ceteris absentibus* clause.

CAP The actual physical facts are *ceteris absentibus* sufficient for all actual facts.

While I can define my own technical terms, I obviously lack the authority to stipulate what ‘physicalism’ means. It is a substantive claim that CAP is an adequate explication, i.e. that the truth of CAP vindicates physicalism. I try to make this claim plausible in section 3.

It is one thing to ask how physicalism ought to be defined. It is another thing to ask whether we ought to believe that it is true. Typically, belief in it is justified by extrapolation from the success of physical sciences in providing reductive explanations. However, the legitimacy of such extrapolation has been challenged. In particular, some aspects of the mind seem to resist reductive explanation in principle. This is the upshot of the so-called “Conceivability Argument,” or “Zombie Argument,” presented in its sharpest form by David Chalmers. The argument tries to establish that physicalism cannot account for phenomenal facts, such as *Itch*. For those, no reductive explanation, or even a plausible sketch of one, has been provided so far, and the argument aims to show that none can be achieved, since they are not even determined by the physical facts.

The Conceivability Argument asks us to conceive a world w_{Zom} that is physically exactly like ours, but differs with respect to facts involving phenomenal consciousness. In particular, I have a so-called “Zombie twin” in w_{Zom} , a molecule-for-molecule duplicate who does not feel an itch in his right foot.⁶ It seems that I can easily conceive w_{Zom} ; and most likely you can easily conceive a world where your physical duplicate lacks an aspect of your phenomenal experience. From the conceivability of w_{Zom} , the anti-physicalist infers its possibility. Hence there is a possible world w_{Zom} that differs phenomenally, but not physically from the actual world. From this, it follows that SP and NP are false.

Physicalist folklore has two answers. The first is that our judgments about what we can conceive are not to be trusted. We may seem to be able to conceive zombies, but still fail to do so. The second answer is that conceivability does not entail possibility. Even if we conceive zombies, for all we know they are impossible. Both these responses are at least *prima facie* unsatisfactory.

A *ceteris absentibus* physicalist does not need to resort to either of these unattractive moves. Her answer to the Conceivability Argument is that physi-

⁶Usually the term ‘Zombie’ is reserved for creatures that lack phenomenal consciousness altogether. In this example, I use the term more liberally, for a creature who merely lacks a particular phenomenal experience.

calism is not committed to the claim that *Itch* is true in every physical duplicate of our world, for *ceteris absentibus* sufficiency is not necessitation.

However, an anti-physicalist can claim that in the conceived world w_{Zom} , there are no blockers present, and that CAP thus stands refuted as well. However, it is by no means clear that we can conceive Φ and $\neg Itch$ and that there are no blockers present. In section 4 I will argue that we cannot. The upshot is that CAP can be defended against the Conceivability Argument.

In anticipation, my response to the Conceivability Argument can be summarized as follows. There is a possible world that is a physical duplicate of ours where nobody is conscious. But our conceiving does not show that there is a possible world that is a physical duplicate of ours where nobody is conscious, and where there is no blocking fact. The blocking fact prevents consciousness from arising; without it, the physical properties would be sufficient to give rise to consciousness. Thus the conceivability of zombies is compatible with *ceteris absentibus* physicalism.

In summary, this article makes two main claims. First, that physicalism is compatible with the possibility of blockers for actual positive facts. Secondly, that it cannot be positively conceived that there are no blockers. These two claims are independent of each other. Together, they entail that the Conceivability Argument fails.

The plan of the paper is as follows: In section 2, I introduce the relation of *ceteris absentibus* sufficiency. In section 3, I defend the adequacy of CAP as a formulation of physicalism. Finally, section 4 defends CAP against the Conceivability Argument.

I end this introduction with flagging a few pertinent issues that I cannot address in this paper. Claiming that physicalism ought to be compatible with the possibility of blocker falls short of showing that CAP ought to be accepted as a formulation of physicalism. Some other proposed definitions also are compatible with the possibility of blockers.⁷ However, I do not have the space here to discuss in detail what these rival definitions are, what problems they face, and why I take CAP to be preferable to them.

Moreover, I remain uncommitted in this paper on a number of questions concerning physicalism and *ceteris absentibus* sufficiency. First, on whether physical-

⁷An example is the definition proposed by David Lewis, as noted by Hawthorne.

ism is actually true. While I am sympathetic to the view and think that science has accumulated a great deal of evidence for it, I acknowledge that rebutting arguments against it falls well short of establishing physicalism. Secondly, on whether only phenomenal facts could possibly be blocked. It is a widely shared view that the actual microphysical facts are enough to give rise to the actual macrophysical, chemical, and biological facts. For all I claim here, the actual physical facts might merely be *ceteris absentibus* sufficient for those facts, or they might necessitate them. Thirdly, on what sort of epistemic access we have to the relation of *ceteris absentibus* sufficiency. I do want to claim that it counts as evidence for the physical facts being *ceteris absentibus* sufficient for A if science offers a reductive explanation of A in terms of physical facts. Beyond that, I remain uncommitted. Physicalists are sometimes classified according to whether they think it is *a priori* or at best *a posteriori* that the actual physical facts necessitate the actual biological or mental facts. We can likewise distinguish between a view on which the relation of *ceteris absentibus* sufficiency is *a priori* from one on which it is only *a posteriori* accessible. What I say here ought to be neutral between these views.

2 The Relation of *Ceteris Absentibus* Sufficiency

I claim that even if some facts actually give rise to me feeling an itch, they need not do so unimpeachably. Other facts could interfere and block what would otherwise have been given rise to. I then say that the former set of facts is *ceteris absentibus* sufficient for me feeling an itch. For brevity, I introduce another, synonymous technical term ‘afford’ for ‘is *ceteris absentibus* sufficient. The notion of a blocker is then defined in terms of *ceteris absentibus* sufficiency, or affording: B is a blocker of A relative to Φ if Φ affords A , but $\Phi \cup \{B\}$ does not.⁸

In this paper, I do not offer a theory of the relation of *ceteris absentibus* sufficiency. In particular, I do not deal with three important questions about it. First, what formal conditions it satisfies. It is non-monotonic, unlike necessitation; but are there any interesting weaker conditions that it satisfies? Secondly, how it relates to possibility and necessity. Affording is not definable in terms of them; but are they definable in terms of affording? Thirdly, whether affording can be analysed in other terms. It might appear promising to specify a “totality function”

⁸This is a technical term, and does not capture all connotations of ‘blocker’ in ordinary language. A stronger notion of a blocker would require that $\Phi \cup \{B\}$ affords $\neg B$.

Total on sets of facts such that Γ affords A if and only if $Total(\Gamma)$ necessitates A . However, it turns out to be very difficult to implement this proposal, and I thus prefer to take the concept of affording as primitive.

While I gloss over these theoretical questions, I want to quell some preliminary doubts. *Ceteris absentibus* sufficiency is supposed to be a genuine relation of sufficiency. A *ceteris absentibus* physicalist is committed to the claim that Φ is sufficient for *Itch*, even though it does not necessitate it.⁹ Somebody might be skeptical about whether anything short of necessitation deserves to be called a relation of “sufficiency.”

Against this objection, I want to appeal to paradigm cases: intuitively negative and universally quantified facts. Suppose F is an alien property. Then no actual positive facts entail that I do not have F . Yet there is a sense in which the totality of actual positive facts is sufficient for that negative fact. Likewise, if ϕ applies to all actual, but not to all possible individuals, then $\{\phi x : x \text{ is an actual individual}\}$ does not necessitate $\forall x\phi(x)$. Nonetheless, there is a sense in which it is sufficient for $\forall x\phi(x)$.¹⁰

Another sort of skeptic may grant that sufficiency does not entail necessitation, but object that only negative facts can be afforded but not necessitated. What I call the “unblockability objection” appeals to what is alleged to be an obvious truth about positive facts such as itches and pains: that they are not blockable, unlike negative facts. This is not an objection against the claim that there is such a relation as *ceteris absentibus* sufficiency, but against its relevance for the debate about physicalism.

My own view is only committed to facts such as *Ectoplasm* and *Algoplasm* being positive. Thus it is open to me either to deny that *Itch* is positive, or that positive facts are unblockable. If the objector stipulates that only unblockable facts are positive, she may do so; but then I would deny that *Itch* is positive. If it is not supposed to be true merely by stipulation that positive facts cannot be blocked, then I challenge the objector to argue for it. As long as no such argument is

⁹*Algoplasm*, the fact that there is algoplasm in my right foot, is just one of the many possible blockers of *Itch*. Moreover, for every actual phenomenal fact Q , there are possible blockers of Q relative to Φ . If B is such a blocker, then Q does not hold in physical duplicates of our world where B holds. According to *ceteris absentibus* physicalism, Φ is sufficient for Q , but not for any of these blockers.

¹⁰Russell [1956] points out that general facts are not entailed by particular facts. Bricker [2006] and McLaughlin and Bennett [2006] note that although general facts are not entailed by particular facts, they supervene on them.

forthcoming, I respond by soliciting intuitions against the principle invoked, using examples outside the disputed terrain of conscious experience.

Prima facie, constituting a statue is a positive property.¹¹ Consider the piece of marble that constitutes Michelangelo's *David* in the actual world. In a different world, it is an interior part of a marble cylinder. The presence of the mereological difference between that cylinder and the piece serves as a blocker for the positive fact that the piece constitutes a statue.¹²

Being red is a positive property. Imagine that according to the color physics of world w , basic color-making properties superpose to produce different colors. In w , object o has property ρ , which makes it red. In w' , with the same color physics, o has ν in addition to ρ , making o orange. Thus the presence of ν blocks the positive fact that o is red.¹³

Being disposed to reflect photons is a positive property. Suppose that in the actual world, o has that disposition, but is never reached by a photon. In a physical duplicate of the actual world, o is infused by photon-absorbing gunk. The fact that there is gunk blocks the positive fact that o is disposed to reflect photons.¹⁴

No doubt there are disanalogies between these examples and the case of conscious experience. But it seems to me that the burden of proof is on those putting forward an impossibility claim. So far, I have not seen an argument against the possibility that non-negative facts are blocked.

3 Capturing Physicalism

Suppose that I am right that there is conceptual space for a *bona fide* sufficiency relation weaker than necessitation, and that *ceteris absentibus* physicalism is actually true. Can we conclude that *physicalism* is true? There might still be a worry

¹¹Here and in the following examples, I try to get the hypothetical objector to admit that a given property is positive by her own light. To repeat, this is not a commitment of my own view.

¹²Since this example is meant to serve merely as an intuition pump, I have taken the liberty to ride roughshod over subtle issues about material constitution.

¹³This example suggests the intriguing possibility that blockers may themselves be physical. To simplify things, I will ignore this in the rest of the paper. When I talk about the totality of physical facts Φ holding at w , this is meant to include all facts, positive and negative, that involve possible physical properties and relations.

¹⁴An example of that kind is suggested in Prior et al. [1982, p. 253]. On some views, the disposition is still present in this scenario, and merely masked by the presence of the gunk. For my purposes, it is not crucial whether what I describe really counts as having a disposition, as long as it counts as a positive fact.

that my proposal fails to capture the real content of that notion. My elaboration of the creation metaphor in the beginning of the paper was intended to allay such suspicions in a preliminary way. Here I address them again.

It is hardly controversial that the term ‘physicalism’ has different uses among philosophers, and that the question what physicalism is has a terminological component. However, philosophers do not typically vie for the best account of the meaning of a word. Rather, they look for an interesting and fruitful articulation of the ideas associated with it. The concern is that my notion leaves too far behind what philosophers typically have in mind when they use the term ‘physicalism’. In this section I discuss objections to the effect that CAP is inadequate because it does not entail certain claims about modality and about explanation.¹⁵ Then I defend the most prominent feature of CAP, its compatibility with the possibility of blockers, by pointing out that it is also a feature of other, independently motivated definitions of physicalism.¹⁶

The strength or weakness of claims is often assessed by their inferential role. Typically, only deductive inferences are considered. *Ceteris absentibus* physicalism is deemed weak because it does not imply certain modal claims. However, it is a rather strong claim if we also consider its role in non-deductive inferences, or even more generally what I call its “doxastic role.” I briefly sketch important aspects of the doxastic role of physicalism, and then argue that they are captured by CAP.

Physicalism is a claim that is mind-boggling for the scientific neophyte. On the one hand, there is the world of microphysics. It is just a bunch of particles aimlessly swirling around, of only very few different types. There is hardly any diversity, and there are no colors on that scale. On the other hand, the macroworld is motley, rich in variation, and seemingly organized. How could the microworld be enough to give rise to the macroworld? Is there not some extra ingredient needed? Even when we take into account that modern physics posits more than just particles, physicalism may initially be little more plausible than pre-socratic hypotheses to the effect that everything is at bottom just water, air, or fire. *Ceteris absentibus* physicalism is designed to encapsulate exactly that initially astonishing claim: the microphysical facts are enough for the world to be as it is.

¹⁵I am fairly loose with my use of the terms ‘definition’, ‘formulation’, and ‘explication’; they are mostly interchangeable.

¹⁶I am concerned with physicalism as a claim about the nature of a world. Sometimes, restricted versions of physicalism are discussed, most prominently physicalism about the mental. Analysing such restricted claims raises further issues, which I cannot discuss in this paper.

Another aspect of the doxastic role of a claim concerns the degree of conceptual sophistication required to understand it. It seems to me that physicalism is meant to be a surprising answer to a fairly unsophisticated question. CAP is a simple claim about the actual microphysical facts and other actual facts, and a non-accidental relation between them. NP is less simple, once it is parceled out. It implies that whatever else there could be besides microphysical facts, none of the actual positive facts could fail to obtain given the actual microphysical facts. This stronger claim implicitly quantifies over all possible facts, and rules out that any of them could be a blocker. Intuitively, physicalism is not a claim about such merely possible facts. It seems to me that on that score, *ceteris absentibus* physicalism is more adequate than a formulation which requires necessitation.

A further crucial feature of the doxastic role of physicalism is that it is made more and more likely by the accumulation of scientific knowledge. CAP shares this feature. It has the form of a universal generalization: all actual facts are afforded by the actual physical facts. Whatever is the right story about how universal generalizations are confirmed by their instances should apply to it. Any time science reductively explains a fact A , this is evidence that Φ affords A , and hence the credibility of *ceteris absentibus* physicalism rises incrementally.¹⁷ Thus in this respect, too, my proposed formulation does a good job at capturing the doxastic role of physicalism.

It seems to me that the considerations about its doxastic role make a good case for *ceteris absentibus* physicalism being an adequate explication of the pre-theoretical notion. However, it is not my main concern whether it deserves to be called ‘physicalism’. Some philosophers will find that it fails to capture an essential aspect of what they understand that word to mean. What I do want to insist on, though, is that *ceteris absentibus* physicalism is a claim about the relation between physical and non-physical facts that is strong and ambitious, and that has a fighting chance of being true. To be sure, claims that are stronger than CAP are certainly interesting and worth investigating. But if somebody is inclined towards physicalism, but persuaded by the Conceivability Argument that NP is untenable, then CAP ought to be particularly attractive.

¹⁷I neglect the complication that science also discovers new non-microphysical facts for which it does not immediately have a reductive explanation. In such a case, the credibility of *ceteris absentibus* physicalism arguably decreases. Since it is plausible that the credibility of physicalism decreases, too, this does not count against the adequacy of my proposed explication.

I have defended CAP against the objection that it does not honor all the modal commitments of physicalism. I briefly want to address what I call the “objection from explanation,” according to which my definition fails to ensure that physicalism meets its explanatory commitments. John Hawthorne describes scenarios where consciousness is blocked, and argues that their possibility is incompatible with physicalism:

What spells trouble for materialism is the following circumstance: Some negative fact having to do with immaterial beings [i.e. that no blocking property is present] explains some fact about our world that is itself a positive fact [i.e. a phenomenal fact]. Insofar as a putative definition of materialism is consistent with there being positive facts of this latter variety, it will not do justice to the materialist’s commitments. (Hawthorne, p.108)

Presumably, what is meant to be incompatible with physicalism is not just that a non-physical fact would figure in an explanation of some positive fact. Physicalism can allow that actual mental facts are cited in explanations of macrophysical facts, as long as those mental facts supervene. Rather, Hawthorne can be read as relying on the premise that if physicalism is true, then no non-physical fact is indispensable for explaining some positive fact about our world.¹⁸

In response, we can accept that it is a commitment of physicalism that non-physical facts are dispensable in explanations, but deny that the absence of blockers needs to be part of an explanation of a positive fact about our world. There is a complete explanation of the positive facts that does not invoke the negative fact about blockers. To argue for this, I want to set up a dilemma. There are two ways in which we can take the demand for explanation, which I label “epistemic” and “metaphysical.”

In the epistemic sense, an explanation of a fact is a story that allows us to understand why it obtains. Scientific explanations in that sense routinely rely on implicit background assumptions, which would clutter our minds and hinder understanding if they were made explicit. In particular, they rely on *ceteris paribus* assumptions. *Ceteris paribus* assumptions take many different forms, and one special case is a *ceteris absentibus* assumption. To be sure, I have not presented

¹⁸It is clear why this assumption is restricted to positive explananda: even if physicalism is true, the negative fact that there is no ectoplasm does not need to have a physical explanation.

an analysis of such a *ceteris absentibus* clause, or totality clause that could be appended to an explanation, and I am skeptical about the possibility of such an analysis. But philosophers of science have not managed to satisfactorily spell out other versions of *ceteris paribus* clauses either, and this failure has not cast any doubt on whether a story relying on such a clause may count as an explanation.

Many facts can be explained without citing some of the negative facts on which they counterfactually depend. For example, an explanation of why the planets remained in their orbits for millions of years need not mention that no evil demon came into existence and diverted them. The scope of my claim is very limited: in some explanations, not all facts to which the explanandum is counterfactually sensitive need to be invoked. This does not rule out that that some, or even all, facts can only be explained by invoking negative facts. Maybe it ought to be part of the explanation for the stability of the orbits that no bodies apart from the sun and the planets exert gravitational influence above a certain threshold. But while some negative facts may be needed, surely not all of them are.

In the metaphysical sense, an explanation of a fact is a story that tells us what makes it the case that it obtains; it does not need to make us understand why it obtains. In that sense, asking for an explanation of *A* is asking about what determines *A*, or what is sufficient for it. Taken that way, the objection from explanation is really an objection against taking affording to be a *bona fide* relation of determination, or sufficiency. This brings us back to objections addressed in section 2. Assuming that the case for affording can be made, it does not follow on either horn of the dilemma that a negative fact like $\neg Algoplasm$ is indispensable in an explanation of *Itch*.¹⁹

¹⁹In addition to those mentioned, there is a concessive response that gives up on the letter of CAP. An alternative definition restricts the range of facts that may act as blockers to (non-actual) physical ones: *ceteris physicalibus absentibus* physicalism.

CPAP The actual physical facts are *ceteris physicalibus absentibus* sufficient for all actual facts. My response to the Conceivability Argument in section 4 could arguably be made on behalf of this stronger explication as well, with some adjustments.

A defender of CPAP who rejects NP in effect claims that while there could be physical blockers, there could not be any non-physical blockers. The question arises whether this is a stable position. Is it *ad hoc* to require that any possible blockers would have to be physical? In defense of this proposal, there is a way to motivate the restriction to physical blockers. Think of the totality of actual physical facts, and that they give rise to certain non-physical facts. These non-physical facts result, in some way, from the physical facts, and may therefore in an extended sense count as physical—let us call them *physicalistic* facts for the moment. (*Being physicalistic* is a world-relative property of facts.) Then we might have the intuition that what is physicalistic can only be

My proposed definition of physicalism is by no means the only one that makes the view compatible with the possibility of blockers. While Hawthorne objects to some definitions on these grounds, I would like to turn the tables on this issue: the fact that it follows from independently motivated definitions ought to support the view that physicalism does not rule out the possibility of blockers.

When introducing definitions due to David Lewis and Frank Jackson, I will assume that there are fundamental properties and relations, and fundamental facts. Fundamental properties and relations form a minimal supervenience base for everything and obey certain recombinatorial principles. Fundamental facts are instantiations of fundamental properties and relations. Ultimately, I deny the legitimacy of the assumption that there is such a class of fundamental properties and relations, and for that reason, I prefer my own definition to Lewis's. But it would require another article to spell out my reasons for this. For the purposes of this paper, what matters is the claim that physicalism is compatible with blockers, not whether we take it to be CAP or another claim that shares this features.

Lewis [1983, pp. 364] defines physicalism as a contingent supervenience claim. A world w' is *alien* to a world w if some fundamental properties not instantiated in w is instantiated in w' .²⁰ According to Lewis, physicalism is true in world w if among worlds that are not alien to w , no two differ without differing physically. As a claim about the actual world, physicalism becomes:

CSP Among non-alien worlds, no two differ without differing physically.

Suppose that worlds where *Itch* is blocked, such as w_{Alg} , are alien to the actual world. Then even though there are physical duplicates that differ from the actual world, there are none among the non-alien worlds, and hence CSP is true. When

blocked by something physical. It is a closure principle reminiscent of one that plays a crucial role in debates about mental causation: physical effects always have physical causes. In the present context, the claim would be that physicalistic differences must have physical grounds—i.e. only differences in physical fundamental properties make for differences in physicalistic properties. The idea is that the physical cannot be interfered with by the non-physical, that it can only be impeached by other physical facts. However, I myself cannot see a reason why blockers would have to be physical, or why we ought to accept the closure principle gestured at above.

²⁰Three remarks about this: First, Lewis himself applies the term 'alien' to properties and relations, not to worlds, but nothing hangs on this. Secondly, he uses the term 'natural' where I use 'fundamental'. I think he is committed to accept the definition with 'fundamental' in its place, but I cannot argue that here. Thirdly, Lewis allows that there might be other features of a world that make a world alien [Lewis, 1994, p. 475].

Lewis motivates his definition, he does not mention the possibility of blockers. But it turns out that CSP, just like CAP, is compatible with them.

Frank Jackson's definition of physicalism in terms of minimal physical duplication is popular among philosophers. The informal remarks with which Jackson [1994, p. 28] motivates his definition are in the same spirit as those I have given. He uses the metaphor of a recipe: when God had created the physical facts and stopped there, everything fell in place. This captures the intuition behind *ceteris absentibus* physicalism nicely. Following a recipe carefully might be sufficient to produce a delicious cake; but it is only sufficient *ceteris absentibus*, since if you add a second helping of salt despite not being instructed to do so, the cake is not going to be delicious.

Jackson proposes the following definition: physicalism is true in w if every minimal physical duplicate is a duplicate *simpliciter* (Jackson [1994, p. 28]) Accordingly, minimal duplicate physicalism is the following claim:

MDP Every minimal physical duplicate of the actual world is a duplicate *simpliciter*.

MDP raises the question what it is for a physical duplicate to be *minimal*. Jackson's definition presupposes that there is a partial ordering among the members of the equivalence class $E_{@}$ of physical duplicates of our world, i.e. a relation \leq that is reflexive, antisymmetric (i.e. $x \leq y$ and $y \leq x$ imply $x = y$), and transitive. A world w is then minimal in $E_{@}$ if there is no $w' \neq w$ such that $w' \leq w$. To understand MDP, we need to know what this ordering relation is. Jackson does not tell us much in that respect. Perhaps \leq could be taken as a primitive concept, but if so, we would need to be told much more about it. Alternatively, the relation could be defined. I will consider two approaches below.

Whether MDP is compatible with the possibility of blockers depends on whether $@ \leq w_{Alg}$ holds, where w_{Alg} is the physical duplicate of @ where *Algoplasm* blocks *Itch*. If indeed $@ \leq w_{Alg}$, then w_{Alg} is not minimal among the physical duplicates of @, and we have no reason to think that the possibility of w_{Alg} is incompatible with MDP. Otherwise, we can argue that MDP is false.

How do we assess whether $@ \leq w_{Alg}$? Intuitively, it says that everything that is true at @ is true at w_{Alg} as well. This only defines a non-trivial relation if the universal quantifier is restricted to a privileged class of facts. The question whether $@ \leq w_{Alg}$ then boils down to the question whether *Itch*, which is false

in w_{Alg} , belongs to the privileged class. There are two obvious candidates for delineating this class, and accordingly two definitions of the relation \leq .

$\leq_F w \leq w' =_{df}$ every fundamental fact of w holds in w' .²¹

$\leq_P w \leq w' =_{df}$ every positive fact (whether fundamental or not) of w holds in w' .²²

If the relevant ordering relation is defined by \leq_F , then MDP is compatible with the possibility of blockers.²³ For every fundamental fact of @ holds in w_{Alg} , and therefore @ $\leq_F w_{Alg}$. Thus for the purpose of this paper, I can accept MDP, supplemented by \leq_F , as a definition of physicalism.²⁴

Is MDP supplemented with \leq_P also compatible with the possibility of blockers? Given \leq_P , it is not the case that @ $\leq_F w_{Alg}$, since *Itch* does not hold in w_{Alg} .²⁵ Since *Algoplasm* is arguably a positive fact, it is likewise not the case that $w_{Alg} \leq$ @. Hence the worlds @ and w_{Alg} are incomparable with respect to \leq . We may assume that for every physical duplicate w of the actual world, there exists a minimal world w' such that $w' \leq w$.²⁶ Hence there is a minimal physical duplicate w of @ such that $w \leq w_{Alg}$. Since *Itch* is a positive fact, it does not hold in w , and hence w is not a duplicate *simpliciter* of @. Hence if blocker-scenarios are possible, MDP and \leq_P together yield the verdict that physicalism is false.

4 Conceivability, Possibility, and Zombies

We should understand physicalism as the claim that the actual physical facts afford all actual facts. But ought we to believe that it is true? In this section, I

²¹This is obviously reflexive and transitive. It is also anti-symmetric given that any two distinct worlds differ in fundamental facts, i.e. that the fundamental facts are a supervenience base for everything.

²²This is anti-symmetric given that any two distinct worlds differ in their positive facts.

²³Hawthorne, p. 105 also claims that MDP is compatible with blocker-scenarios. When he argues for this, he does not use the official formulation, however, but rather the informal gloss that Jackson provides.

²⁴As noted in section 1, I prefer CAP because it does not carry a commitment to the existence of properties that are fundamental in the sense explained above.

²⁵If \leq is defined by \leq_P , NP and MDP turn out to be equivalent.

²⁶Unless this condition is fulfilled, Jackson's proposal may well give the wrong verdicts. If there is an infinitely descending chain of physical duplicates of @ that is not bounded below, then MDP comes out as true, regardless of whether there are immaterial spirits or not in @.

argue that it can be defended against the Conceivability Argument, or Zombie Argument, according to which conscious experience cannot be accounted for by physical facts.²⁷

In section 1, I briefly sketched the Conceivability Argument. It relies on the two premises that we can conceive a world w_{Zom} where I have a Zombie-twin, and that conceivability implies possibility. Rejecting either premise seems unattractive.

Prima facie, it seems that we can conceive that some physical duplicate of us lacks one or all of our phenomenal properties. It is true that although we have privileged access to what is in our minds, we are not infallible in that respect. We are sometimes wrong about what we believe or desire, and presumably also about what we can conceive. But exceptions to the default principle that we know our own minds require an explanation. Kripke [1980] provides examples of how we can go wrong about what we can conceive. As argued by many philosophers, including Kripke himself, those examples do not provide a model for how we could go wrong in the particular case relevant to the Conceivability Argument. The first response is thus undermotivated.

Admittedly, the implication from conceivability to possibility is non-trivial. Conceivability comes in different varieties, and some fail to imply possibility. But zombies seem to be conceivable in pretty much every sense, and hence to resist the argument one would have to deny the implication for conceivability in pretty much every sense. However, a blanket rejection of the implication tends to lead to skepticism about our judgments of possibility.²⁸

An adequate response would not just show where the argument goes wrong. In addition, it would account for its seductive potential. It is a striking feature of the Conceivability Argument that it seems to us that we will always find its premises compelling. Indeed, they would arguably remain compelling even under the supposition that we had an explanation of the phenomenal in terms of the physical. I here try to offer a response that accounts for this. It relies crucially on my claim that physicalism is compatible with the possibility that phenomenal facts are blocked.

²⁷I take it that this argument provides the most substantial challenge to physicalism, but I cannot defend that assumption here.

²⁸These last two paragraphs evidently do not constitute an adequate response to what I take to be the standard responses. There is a large and growing literature about conceivability, *a posteriori* necessities, phenomenal concepts etc. which I am not doing justice to here. I simply assume here that the standard responses are not fully satisfactory.

The dependence is not mutual: one could accept my account of what physicalism is while rejecting my answer to the Conceivability Argument, either taking that argument to be sound or diagnosing its flaw differently. Nonetheless, my explication of physicalism is more attractive in a package with the answer I offer here.

Physicalists appear to face the unappetizing choice between denying that we can conceive that *Itch* does not hold while all physical facts are as they actually are, and allowing that something impossible could be conceivable. But they ought not to resign themselves to this predicament. For the argument above does not formulate the relevant conceivability claim properly, since it says of a particular world that it is conceivable. It is not literally true that we can conceive the world w_{Zom} . However, something very much in its spirit is true: we can conceive the proposition $\Phi \wedge \neg Itch$, which is true in w_{Zom} .

It appears natural to predicate conceivability of situations, as in the passage by David Chalmers below. He distinguishes positive from negative conceivability, and explains what he takes the former to be:

Positive notions of conceivability require that one can form some sort of positive conception of a situation in which S is the case. One can place the varieties of positive conceivability under the broad rubric of *imagination*: to positively conceive of a situation is to imagine (in some sense) a specific configuration of objects and properties. It is common to imagine situations in considerable detail, and this imagination is often accompanied by interpretation and reasoning. When one imagines a situation and reasons about it, the object of one's imagination is often revealed as a situation in which S is [the] case, for some S. When this is so, we can say that the imagined situation *verifies* S, and that one has *imagined that* S. Overall, we can say that S is positively conceivable when one can imagine that S: that is, when one can imagine a situation that verifies S. (Chalmers [2002, p.150])

On this account, you are mentally latching onto a situation, as it were, when you are positively conceiving something. Positively conceiving is a relation between a thinker and a situation that is in important ways akin to the relation you bear to a scene you perceive. Such a scene is a particular, a region of spacetime, and you can presumably have a *de re* attitude toward it. There is a difference between

misperceiving it, and hallucinating another, merely possible scene. When you perceive it first with little and later with more detail, you are all the time perceiving the same scene. Chalmers’s passage suggests that you can likewise have a *de re* attitude toward a situation, that it makes sense to ask what is true in *the* situation you are imagining.

Provided that we understand it correctly, ascribing attitudes toward merely possible situations is no more problematic than ascribing attitudes toward propositions that are only possibly, but not actually true. For we can go back and forth between talk of situations and of propositions. Situations are partial worlds, where parthood is understood in a generalized sense, not just spatial or spatiotemporal. A partial world can be associated with a proposition: the class of worlds of which it is a part. Conversely, a proposition can be associated with a partial world: the greatest common part of all its members. Thus even if it takes situations as its objects, positive conceiving can be understood as a propositional attitude. But care is needed if we shift from talking about attitudes toward situations or propositions to talking about attitudes toward worlds.

It is illegitimate to move from “I am positively conceiving a situation in which *A*” to “I am positively conceiving the world completely described by *A*.” It is not part of the content of the positive conception that the imagined situation is not merely a partial, but a total world.²⁹ By imagining a situation, or a proposition, we do not latch onto one particular world among the many of which the situation is a part, or one among the many members of the proposition.³⁰

Can we understand “ w_{Zom} is positively conceivable” simply as short-hand for “ $\{w\}$ is positively conceivable,” and thus as predicating conceivability of a proposition? If the premise were true under that reading, the distinction I just made would not be relevant for the present discussion. However, I will argue that we cannot conceive such propositions with only one non-actual world as a member.

It is a well-known objection to the positive conceivability of maximally specific propositions that worlds are too complex. The relevant worlds, in the context of the Conceivability Argument, are physical duplicates of ours. It is hard to see how we could pull off the feat of conceiving $\{w\}$, if w is of as much physical complexity

²⁹Yablo [1993, p. 29] also allows that “I can imagine a world that I take to verify p ,” but as I understand him, he does not suggest that if I do, there is one fully determinate world that is the object of the imagination.

³⁰Henceforth, I omit the alternative formulations in terms of situations.

as our universe. Thus it seems that ‘conceiving a world w ’ cannot be taken to stand for ‘conceiving $\{w\}$ ’. However, I do not want to rely on the objection from complexity. I allow that in a discussion of the Conceivability Argument we can idealize away from that contingent limitation of our cognitive powers. After all, the intuition driving the argument, that given a class of microphysical facts Γ , we can conceive that Γ holds and *Itch* does not, is robust with respect to enlargement of Γ .

Nonetheless, the theory of positive conceivability to be sketched provides a diagnosis of why the Conceivability Argument fails. It is not merely due to our limited cognitive processing powers that we cannot positively conceive a maximally specific proposition $\{w\}$, for a non-actual w . Cognitively enhanced counterparts of us might have attitudes toward this proposition. They could believe or disbelieve it, perhaps. However, I claim that they could not positively conceive it.

Before analyzing the Conceivability Argument in more detail, it is useful to reconstruct it formally. Throughout, I take it for granted that eliminativism about phenomenal facts is false: there actually are facts such as *Itch*. Let M be some phenomenal fact, and Φ the proposition that is true in all and only the physical duplicates of our world.³¹ The premises C (for “conceivability”) and E (for “entailment”) imply that NP is false:

C It is conceivable that $\Phi \wedge \neg M$.

E If $\Phi \wedge \neg M$ is conceivable, it is possible.³²

Most physicalists have focused on undermining one or both of these two premises. However, CAP is entirely compatible with C and E. Given that reflection on the creation metaphor gives a physicalist independent reason to commit only to CAP, but not to NP or SP, she has answered the challenge from the argument using premises C and E.

³¹I will often use the same expression to stand for a class of facts, a conjunctive fact (possibly with infinitely many conjuncts), and a proposition, when no harm can result. For example, the same symbol ‘ Γ ’ may sometimes stand for $\{Itch, Ectoplasm\}$, sometimes for $\{w: Itch \text{ and } Ectoplasm \text{ are true in } w\}$, and sometimes for $Itch \wedge Ectoplasm$. (Occasionally it also expresses rather than names that conjunction.)

³²Admittedly, this is not an entailment claim. I choose to call it “E” because that premise typically relies on the claim that for a certain class of propositions, conceivability entails possibility. My formulation as a conditional sidesteps the issue how to characterize such a class for which the entailment holds.

Unsurprisingly, though, we can construct versions of the Conceivability Argument that target CAP. Let B be the proposition that some fact obtains that blocks M relative to Φ . The following modifications of C and E imply that CAP is false:

C* It is conceivable that $\Phi \wedge \neg M \wedge \neg B$.

E* If $\Phi \wedge \neg M \wedge \neg B$ is conceivable, it is possible.

The problem with this version of the argument is that C* is far less plausible than C, as I now argue.

I have already noted that different notions go under the label “conceivability.” David Chalmers usefully classifies them in his attempt to back up the Conceivability Argument by a theory of conceivability. Here I focus on what he calls “positive conceivability.”³³ Above I quoted a passage where he introduces that notion.³⁴ How should we model the propositions that are objects of acts of conceiving? If we take them to be classes of possible worlds, we lose distinctions among impossible propositions. In a context in which it is at issue whether certain propositions are possible, it is helpful to model them simply as classes of worlds, possible or impossible. Possibility of propositions is then a derivative notion, defined in terms of possibility of worlds:

A proposition is possible if it is true in at least one possible world.

My main claim about positive conceivability is limitative: it puts a restriction on what sorts of propositions are positively conceivable. In the background, there is an “atomist” conception of positive conceivability, according to which we positively conceive complex facts only in virtue of conceiving atomic facts. A full articulation of that conception would require a paper of its own, but I hope what I say here at least makes the claim somewhat plausible.

To state my claim, I define a few technical terms, deploying the notion of a positive fact.³⁵ Say that a world w' is an *extension* of w if all the positive

³³I think that if the the Conceivability Argument is formulated using the notion of negative conceivability, it is less threatening to physicalism, although I do not have the space here to discuss the reasons for this. Likewise, I cannot discuss a different, but related influential anti-physicalist argument, the Knowledge Argument.

³⁴I often sometimes use ‘conceivable’ often as short-hand for ‘positively conceivable’.

³⁵In my elucidation of affording, the notion of a positive fact was just used heuristically. We do not need it as a primitive in an account purely about the fundamental features of the world, as opposed to an account of our epistemic access to it. I merely claim that positive facts play an ineliminable role in our theory of positive conceiving.

facts of w obtain at w' . Further, a proposition A is *closed under extension*, or *closed* for short, if whenever $w \in A$, then every extension w' of w is also in A . In logical rather than set-theoretic terms, closed propositions are conjunctions of positive and neutral facts only, not of negative facts. A provisional principle then reads as follows: only closed propositions are positively conceivable. That some positive properties or relations are absent is not part of the content of our positive conceiving.

However, the provisional principle is in need of qualification. If you form a mental image, it may be part of its content that there is no apple on the table. Thus arguably you can positively conceive that negative fact. But this seems to be the case only because you know what it would be for there to be an apple on the table. I propose the following qualification of the provisional principle: we can only positively conceive a negative fact $\neg A$ if A concerns properties of our acquaintance, such as being an apple. To put it differently, we can positively conceive negative facts involving properties and relations about which we have *de re* thought. Such properties I call *familiar*. Being an apple or feeling an itch are familiar properties, while being in a region with ectoplasm or being in a region with algoplasm are not. The distinction between familiar and unfamiliar properties induces corresponding distinctions among facts and propositions. A fact is familiar if it is the instantiation of a familiar property or relation; and a proposition is familiar if it is a Boolean combination of familiar facts. Given these definitions, we can formulate the following qualified principle INC (“inconceivability”):

INC If A is positively conceivable, there is a closed proposition A' and a familiar proposition A'' such that $A = A' \wedge A''$.

In effect, INC denies that we can positively conceive the absence of facts that are both positive and unfamiliar. Informally, the idea is that in imagination, whatever is not specified by you does not get specified by default. In particular, the negation of a fact or the absence of a property does not get specified by default. The limiting case is illuminating: if you do not imagine anything, you do not count as imagining that there is nothing. Unless you make the mental image very specific, what the image represents is indeterminate between many different worlds. With respect to facts that you are not acquainted with, you are not in a position to make the image specific.³⁶

³⁶Marcus [2004] argues that we cannot positively conceive negative facts about consciousness

Of course, we can accompany a mental image with a commentary, e.g. “no other positive properties are instantiated” or “no blocker of *Itch* relative to Φ holds.” This might be one way of having an attitude toward a proposition that is not a conjunction of a closed and a familiar proposition. We may call this attitude “annotatedly conceiving.” But the Conceivability Argument with “annotatedly conceive” in the place of “conceive” is not successful. Unless there are restrictions on what the commentary can be, annotated conceivability does not imply possibility. I can positively conceive that Thomas Hobbes is drawing figures and writing symbols on a piece of paper, and add the commentary “Hobbes squares the circle.” In this example, the commentary is impossible by itself. The commentary may be possible, but not compossible with what I positively conceive: I can positively conceive that a particle travels at 500 million meters per second, and add the commentary “The particle obeys the laws of Special Relativity.” Obviously, requiring that the commentary be compossible with what is conceived does not help if we want to take annotated conceiving as a guide to possibility. I cannot see what other restriction would ensure that it implies possibility.

What are the consequences of INC? Suppose that *Ectoplasm* and *Algoplasm* are positive and unfamiliar, and that *Itch* is familiar. Then INC allows that we can conceive that $\Phi \wedge \neg Itch$, that $\Phi \wedge Ectoplasm$, or that $\Phi \wedge Algoplasm \wedge \neg Itch$. But it rules out, for instance, that $\Phi \wedge \neg Algoplasm$ is conceivable.

The falsity of C^* follows from INC together with a further premise: that there is at least one possible blocker for *Itch* (relative to Φ) that is both positive and unfamiliar. Without loss of generality, we can take *Algoplasm* to be positive and unfamiliar. Let w_{Zom} be a (possible or impossible) world where $\Phi \wedge \neg M \wedge \neg B$ is true. Let w_{Alg} be a world where $\Phi \wedge \neg M$ is true, but where $\neg B$ is false because *Algoplasm* is true. These worlds do not differ from each other with respect to any familiar proposition. The argument is now this: By INC, every positively conceivable proposition that is true in w_{Zom} is also true in w_{Alg} .³⁷ However, $\Phi \wedge \neg M \wedge \neg B$ is

(for a response, see Alter [forthcoming]). Since such facts count as familiar, my account allows that their absence can be positively conceived.

³⁷As noted above, no familiar proposition is true in w_{Zom} but not in w_{Alg} . Since *Algoplasm* is positive, w_{Alg} is an extension of w_{Zom} , and thus there is no closed proposition A' that is true in w_{Zom} but not in w_{Alg} .

Thus we get the following for both positive and familiar propositions: if they are true in w_{Zom} , they are true in w_{Alg} . By INC, a positively conceivable proposition is a conjunction of a positive and a familiar one. Hence every positively conceivable proposition that is true in w_{Zom} is true in w_{Alg} as well.

true in w_{Zom} but not in w_{Alg} . Hence, $\Phi \wedge \neg M \wedge \neg B$ is not positively conceivable, i.e. C^* is false.

The assumption that at least one of the blocking facts is both positive and unfamiliar is rather weak. In fact, it would not be too implausible to claim that *all* blocking facts are positive and unfamiliar. $\neg Algoplasm$ and the like are paradigmatically negative facts of the actual world, and hence their negations are positive. Moreover, they involve properties that are alien, i.e. not instantiated in the actual world. How could we be acquainted, or have *de re* thought about, alien properties? If we cannot, facts involving them are unfamiliar.

Although there is a good *prima facie* case for it, the stronger claim that all blocking facts are positive and unfamiliar is open to challenge. To be sure, we do not stand in any causal relations to alien properties. But I do not wish to deny that there could be modes of being acquainted that do not require causal contact. After all, hallucination and certain forms of imagination might familiarize us with alien properties.³⁸ Maybe a more gifted writer than me could make *algoplasm* appear so vivid to your mind that its presence would be a familiar fact. Thus it bears emphasis that in the above argument, *Algoplasm* just functions as a placeholder for whatever blocker of M is unfamiliar. It takes just one unfamiliar B such that the argument goes through with w_B in the place of w_{Alg} . Whatever our imaginative capacities, and however frequently we hallucinate, surely we are not relevantly acquainted with *every* possible blocker. We can safely conclude from INC that no proposition with the relevant features is positively conceivable, and hence that the Conceivability Argument does not threaten *ceteris absentibus* physicalism.

I conclude by highlighting an attractive feature of my account. Not only does it appear that we are now able to positively conceive $\Phi \wedge \neg Itch$, but also that we will be able to do so in the future, independently of how science develops. Consider the following future scenario: science has finally found a reductive explanation of conscious experience. Philosophers admit that they can understand how the actual physical facts give rise to the phenomenal facts. However, they find it just as easy to conceive $\Phi \wedge \neg Itch$ as they did before they learned the new scientific theory. I am optimistic that this scenario describes our future. On my account, those philosophers need not have a false belief either about what they understand

³⁸Johnston [2004] defends the claim that in hallucination, one can perceive properties that are actually uninstantiated.

or about what they can conceive. I take this to be one of its virtues. It is not irrational to be more confident now about the claim that $\Phi \wedge \neg Itch$ will always remain conceivable than about the claim that consciousness will never be explained. If the former proposition entailed the latter, it would be irrational. It is often taken for granted that what can be positively conceived is limited by what reductive explanations there are, and *vice versa*. On my account, these things may be largely independent.

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