

# Experience and Time: A Metaphysical Approach

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[Forthcoming in *Analytic Philosophy*]

## Abstract

What is the temporal structure of conscious experience? While it is popular to think that our most basic conscious experiences are temporally extended, we will be arguing against this view, on the grounds that it makes our conscious experiences depend on the future in an implausible way. We then defend an alternative view of the temporal structure of experience from a variety of different objections. Along the way, we hope to illustrate the wider philosophical ramifications of the relationship between experience and time. What one thinks about the temporal structure of experience is, we believe, deeply interconnected with issues concerning whether consciousness is vague or precise, whether conscious states can be reduced to physical states, whether phenomenal properties are intrinsic properties, and whether phenomenal consciousness can “overflow” access consciousness. As we will see, even seemingly unrelated metaphysical questions, such as the debate between Humean and Non-Humean accounts of natural necessity, bear on questions about the relationship between experience and time.

## 1. Introduction

Consider the experience of listening to your favorite song. This is a temporally extended experience, which is composed of more specific, shorter-lived experiences. Reflecting on this kind of example naturally leads one to draw a distinction between *basic* and *non-basic* experiences (or phenomenal properties). You have non-basic experiences, like the experience of listening to your favorite song, in virtue of having other, more specific experiences, such as the auditory experience of a specific chord in that song. Basic experiences are ones that you do not have in virtue of having any other experiences.<sup>1</sup>

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<sup>1</sup> This basic/non-basic distinction is closely related to the fundamental/non-fundamental distinction, but Physicalists will not think that any experience is absolutely fundamental. For Dualists, the distinction between basic and non-basic experiences coincides with the distinction between fundamental and non-fundamental experiences. For more on “in virtue of” explanations, see Rosen (2010), Audi (2012), and Dasgupta (2017).

How short-lived are your basic experiences? A popular view is that such experiences cannot be instantiated over durationless instants, but rather that they must have some minimal positive temporal extension. However, because we can still intelligibly consider the question of whether or not a person is conscious at some particular time (e.g. we can ask whether you were conscious at midnight last night), we will formulate such a view as follows:

**Minimal Positive Duration:** There is some positive minimum length of time  $L$  such that, if you are conscious at time  $t$  in virtue of instantiating a basic phenomenal property  $P$ , then  $P$  is instantiated during some temporal interval  $T$  with length at least  $L$ , where  $t \in T$ .

We will be arguing against Minimal Positive Duration. After briefly introducing some of the main considerations in favor of Minimal Positive Duration (section 2), we develop an argument against Minimal Positive Duration (sections 3-5), and then defend an alternative account of the temporal structure of experience that is responsive to some of the main motivations for Minimal Positive Duration (sections 6-10).

Beyond the debate about Minimal Positive Duration, however, our broader goal is to illustrate the wider philosophical ramifications of the relationship between experience and time. What one thinks about the temporal structure of experience is, we believe, deeply interconnected with issues concerning whether “consciousness” is a vague or precise notion, whether conscious states can be reduced to physical states, whether phenomenal properties are intrinsic properties, and whether phenomenal consciousness can “overflow” access consciousness. As we will see, even seemingly unrelated metaphysical questions, such as the debate between Humean and Non-Humean accounts of natural necessity, bear on questions about the relationship between experience and time.

## 2. Minimal Positive Duration

Why believe Minimal Positive Duration? We will briefly go over three such reasons here.

First, we seem to be directly aware of change and duration in experience. Consider, for example, the experience of seeing a moving object: we’re not merely aware of the object being at different positions at different times; rather, we also seem to be aware of the motion itself. Prima facie, the phenomenology of such experiences can’t be reduced to instantaneous experiences (even supplemented with, say, *memories* of previous experiences: the experience of seeing a moving object is quite different from that of seeing an object at a certain location while remembering it was a different location). In slogan form: in these cases, we have an *experience of succession*,

and not merely a *succession of experiences*. To properly account for experiences of change and duration, many have thought that our experiences themselves must be spread out in time.<sup>2</sup>

A second consideration is that many philosophers have found it difficult to even *conceive* of durationless experiences. It is easy to conceive of a very short pain, or a very short musical note, but we arguably cannot conceive of a durationless pain, or a durationless note. Try to imagine, for example, a possible person who exists for just one instant, an instant in which the person feels intense pain. We suspect that many philosophers will find it difficult to conceive of such a case. In order for something to be *painful*, it seems, it must be painful for some positive amount of time. Butterfield (1996: 210) appeals to a similar example involving the experience of grief, which he uses to motivate the claim that it is “undeniable and maybe even necessary” that conscious states require duration. Although it is hard to give explicit arguments for these intuitions, many philosophers have taken them to be phenomenologically obvious, as when Strawson (2009) simply writes, “One thing I take for granted is that experience takes time: it can’t exist or occur at an instant, where an instant is defined as something with no temporal duration at all” (256).

A final consideration concerns the physical correlates of conscious experience. As Lee (2014) emphasizes, the physical correlates of conscious experiences are plausibly all extended in time. Neural firings, for example, cannot take place in an instant. However, if the physical correlates of phenomenal properties are extended in time, then the phenomenal properties that they realize are also plausibly extended in time. This follows from the following principle, which Lee endorses:

**The Temporal Identity Principle:** Every phenomenal property is instantiated over the same temporal interval as its corresponding physical correlate.<sup>3</sup>

One way to motivate The Temporal Identity Principle goes by way of certain views about the metaphysical nature of consciousness. For example, Physicalist views according to which experiences are *identical* to their physical correlates must accept The Temporal Identity Principle. Similarly, Russellian Monist views according to which experiences are identical to the intrinsic categorical basis of their physical correlates must also accept The Temporal Identity Principle.<sup>4</sup> Other formulations of Physicalism and Russellian Monism, according to which

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<sup>2</sup> This kind of argument has a long history of controversy. For an overview of this kind of argument and its potential ramifications for the temporal structure of experience, see Dainton (2008a, 2018).

<sup>3</sup> Following Shoemaker (1981), Lee (2014) distinguishes between an experience’s “total” physical correlate and its “core” physical correlate. An experience’s total physical correlate is the minimal set of physical events that metaphysically necessitate the corresponding experience (perhaps conditional on the psycho-physical laws if Dualism is true). An experience’s core physical correlate is “the part of the total [physical correlate] that differentiates the type of experience in question (e. g. the activity in V4 that determines that an experience is of blue rather than of red)” (3). Since it is plausible that contemporary accounts of the total and core physical correlates of any experience are temporally extended, our discussion in the main text can stay neutral between these two understandings of an experience’s physical correlate.

<sup>4</sup> For defenses of Russellian Monism, see Strawson (2003), Chalmers (2013), and Goff (2017).

experiences are *grounded* in (the intrinsic nature of) their physical correlates, are not logically committed to The Temporal Identity Principle, but the principle still remains very natural. After all, standard examples of grounding all involve a *synchronic* relationship between the grounding facts and the grounded facts, in which the grounding facts obtain at the very same time(s) as the grounded facts. For example, if the existence of a party is grounded in certain facts about the activity of various people, the temporal duration of such a party will exactly match the temporal duration of those corresponding activities. Similarly, if the mass of a mereologically complex object is grounded in the individual masses of its parts, then this will also be a synchronic relation. In these and many other canonical examples, there is no temporal discrepancy between the obtaining of the grounding facts and the grounded facts.<sup>5,6</sup>

One could also motivate a weaker version of The Temporal Identity Principle that would serve our purposes equally well:

**The Temporal Inclusion Principle:** If a phenomenal property is instantiated over a temporal interval  $T_1$ , then its corresponding physical correlate must be instantiated over some interval  $T_2$ , where  $T_2$  is a subset of  $T_1$  ( $T_2 \subseteq T_1$ ).<sup>7</sup>

Since The Temporal Inclusion Principle implies that the temporal extent of a phenomenal property is *at least* as long as the the temporal extent of its corresponding physical correlate, it can also be used to argue that phenomenal properties are temporally extended. The Temporal Inclusion Principle can be motivated by the following natural principle (which is conditional on the psycho-physical laws to be amenable to Dualists):

**Phenomenal Internalism:** *Given the psycho-physical laws* (if there are any), if  $x$  and  $y$  are physical duplicates throughout some temporal interval  $T$ , then  $x$  instantiates

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<sup>5</sup> In fact, in his introductory treatment of grounding, Rosen (2010) explicitly says that “the grounding relation is a *synchronic* relation” (218). However, Rosen (2017: 280) later expresses skepticism that the synchronicity condition holds in complete generality (e.g. he considers the example of the semantic content of a word at some time being grounded in temporally extended facts about patterns of usage in the wider linguistic community). For our purposes, we only want to claim that there is *prima facie* reason to endorse The Temporal Identity Principle given grounding formulations of Physicalism and Russellian Monism.

<sup>6</sup> Perhaps the most plausible way to resist The Temporal Identity Principle goes by way of Dualism, according to which experiences are merely nomologically connected to their physical correlates. While Dualism is certainly compatible with The Temporal Identity Principle, it is also compatible with the claim that experiences occur at the “end” of (or even strictly after) their corresponding physical correlates. One could even independently motivate this kind of Dualism by considering a version of Interactionist Dualism where physical correlates are the *cause* of phenomenal properties. Given the premise that causes must precede their effects, the physical correlate of an experience would then have to precede the experience it causes. We ourselves are somewhat skeptical of this motivation even granting Interactionist Dualism, due to the possibility of simultaneous causation. See Huemer and Kovitz (2003) and Mumford and Anjum (2011) for arguments that causation is always simultaneous.

<sup>7</sup> Since we intend The Temporal Inclusion Principle to be weaker than The Temporal Identity Principle,  $T_1$  can be be a “subset” of  $T_2$  if  $T_1 = T_2$  (i.e.  $T_2$  need not be a proper subset of  $T_1$ ).

phenomenal property P during T if and only if y instantiates phenomenal property P during T.<sup>8</sup>

Phenomenal Internalism states that perfect physical duplicates throughout some interval must also be phenomenal duplicates throughout that interval. It is therefore closely related to the plausible claim that phenomenal properties are *intrinsic* properties. In fact, one popular way of defining intrinsicity goes by way of properties that are always shared among perfect duplicates.<sup>9</sup> To see why Phenomenal Internalism supports The Temporal Inclusion Principle, suppose for reductio that there could be a physical correlate P of an experience E that violated The Temporal Inclusion Principle. So, consider some x that instantiates E during  $T_1$  and P during  $T_2$ , where  $T_2$  is not included in  $T_1$ . Then, there could be some y that is a perfect physical duplicate of x during the interval  $T_1$ , yet y does *not* instantiate E during  $T_1$  because y does not have the required physical correlate for E (because y can be physically very different from x during the times inside  $T_2$  and outside  $T_1$ ).

So, we think there are at least three good reasons for thinking that our experiences are temporally extended. However, one might worry whether these three considerations only motivate the following claim, which is weaker than Minimal Positive Duration:

**Positive Duration:** If you are conscious at time t in virtue of instantiating a phenomenal property P, then P must be instantiated during some temporally extended interval T, where  $t \in T$ .

It is compatible with Positive Duration, but not Minimal Positive Duration, that (basic) phenomenal properties can be arbitrarily short-lived. However, the main motivations for Positive Duration also motivate Minimal Positive Duration. For example, whatever the physical correlates of conscious experiences are, it is natural to think that they will have some positive minimal temporal extension. The temporal grain of biologically relevant processes in the brain, for example, is certainly not below half of the Planck time. Moreover, insofar as one believes that our experiences of change and duration must be accommodated by temporally extended experiences, one ought to think that these experiences have some minimal temporal length. After all, hearing a note of C flow into a note of D is a change that occurs on the order of milliseconds rather than picoseconds. For these reasons, there doesn't seem to us to be a theoretically natural and principled position that endorses the motivations behind Positive Duration, while at the same time rejecting Minimal Positive Duration.<sup>10</sup>

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<sup>8</sup> x instantiates a phenomenal property P “during” T just in case P is instantiated over some temporal interval that is a subset of T.

<sup>9</sup> See Marshall and Weatherston (2018) for an overview of different ways of analyzing the notion of an intrinsic property.

<sup>10</sup> One potential exception to this can be found in Dainton (2014), where Dainton argues that a ‘gunky’ view of conscious experience (according to which phenomenal properties are infinitely divisible) can respond to some arguments raised by Pelczar (2010b).

Lastly, it is worth emphasizing that Minimal Positive Duration is weaker than other natural nearby principles. Minimal Positive Duration only makes a claim about the experiences that *you*, a particular human organism, will *in fact* have. It makes no claims about what experiences are possible for you to have, and it makes no claims about what experiences are possibly had by other possible creatures.<sup>11</sup>

So, in sum, we think that Minimal Positive Duration enjoys a great deal of plausibility. Nonetheless, we will be arguing against Minimal Positive Duration. Our strategy will be to argue that, when conjoined with another plausible principle about consciousness, Minimal Positive Duration implies the absurd conclusion that you have been conscious for an infinite amount of time in the past.

### 3. Your Experiences Do Not Wholly Depend on the Future

It is natural to think that whether you are conscious here and now should not crucially depend on what may or may not happen later. We think this intuition can be made precise with the following thesis:

**Not Wholly Future Dependent:** If you are conscious at time  $t$ , then there must be some phenomenal property  $P$  that you instantiate over some temporal interval  $T$ , where no time *strictly later* than  $t$  is a member of  $T$ , such that you are conscious at time  $t$  in virtue of instantiating  $P$ .<sup>12</sup>

Before we turn to defending Not Wholly Future Dependent (and explaining why it captures the intuitions that it is meant to capture), a couple of clarificatory points. First, Not Wholly Future Dependent is logically independent of both Positive Duration and Minimal Positive Duration. For example, the relevant phenomenal property in Not Wholly Future Dependent may be instantiated in an instant (e.g. over the “interval”  $[t,t]$ ) or over an arbitrarily short interval, contrary to (Minimal) Positive Duration. Conversely, it might be that, whenever you are conscious at time  $t$ , you instantiate a temporally extended phenomenal property over the interval  $[t - L/2, t + L/2]$ , which satisfies (Minimal) Positive Duration but not Not Wholly Future Dependent. Perhaps more importantly, Not Wholly Future Dependent is perfectly compatible with your present consciousness being future dependent. It is only meant to be incompatible with your present consciousness being *wholly* future dependent. Here is a toy example to illustrate this point. Consider some time interval  $[0,2]$ , and suppose you instantiate multiple *overlapping*

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<sup>11</sup> In fact, if you will only ever have finitely many basic experiences throughout your life, each of which is instantiated over a positive interval of time, then  $L$  in Minimal Positive Duration can simply be the minimal length of those positive intervals of time. So, there would be no room for the possibility that Positive Duration might be true without Minimal Positive Duration.

<sup>12</sup> See Phillips (2011, 2014) and Soteriou (2013) for defenses of certain ‘holistic’ views about the temporal structure of conscious experience that are in tension with Not Wholly Future Dependent.

temporally extended phenomenal properties at time  $t = 1$ .<sup>13</sup> For example, perhaps you instantiate one temporally extended phenomenal property  $P_1$  over the interval  $[0,1]$  and you instantiate another phenomenal property  $P_2$  over the interval  $[0.5, 1.5]$ . Both of these phenomenal properties might be sufficient for your consciousness at time  $t = 1$ . So, it might be that you are conscious at time  $t = 1$  in virtue of instantiating  $P_1$  *and* you are conscious at time  $t = 1$  in virtue of instantiating  $P_2$ . This is a case of harmless overdetermination, such as a case where a disjunctive truth “P or Q” holds both in virtue of “P” being true and in virtue of “Q” being true. In our toy example, there is a sense in which the fact that you are conscious at time  $t = 1$  is future dependent. After all, the fact that you are conscious at that time holds in virtue of (but not only in virtue of) the fact that you are instantiating  $P_2$ , which is a fact (partly) concerning your phenomenology at future times. However, the fact that you are conscious at time  $t = 1$  is not *wholly* future dependent, since it also holds in virtue of the fact that you are instantiating  $P_1$ , which only concerns the past and present.

In order to bring out the intuition that Not Wholly Future Dependent is supposed to capture, consider the following case:

Two Rooms: Suppose you are in a closed room, and you are staring at a bright red wall. In another exactly similar room, there is a perfect duplicate of you staring at an exactly similar bright red wall. Everything goes normally in your room. Everything goes normally in your duplicate’s room, until noon. However, directly *after* noon, your duplicate will cease to exist (perhaps, for example, a bomb will explode and destroy their room).<sup>14</sup> Question: is your perfect duplicate conscious at noon?

It seems to us that the answer is clearly “yes”. Of course, *you* will be conscious at noon, because nothing strange is going on in your room. However, nothing strange is happening in your duplicate’s room at any time up to and including noon. If you were conscious at noon but your duplicate wasn’t, this would mean that your consciousness is *wholly future dependent*. Whether or not you are conscious at noon will crucially turn on what may or may not happen *after* noon. The implausibility of this case seems to us akin to the implausibility of backwards causation.

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<sup>13</sup> Many philosophers who believe that experience is temporally extended also believe that experiences overlap in this way. See, for example, Foster (1991) and Dainton (2008b).

<sup>14</sup> Strictly speaking, because of the continuous structure of time, there is no time “directly after” any other time. However, for the purposes of our overall argument, we really only need to consider a variant of Two Rooms where your duplicate will be destroyed  $L/2$  units of time after noon (where  $L$  is the value in Minimal Positive Duration). Then, answering “yes” to this variant of Two Rooms would support a modified version of Not Wholly Future Dependent, which would read “For any time  $t$ , if you are conscious at time  $t$ , then there must be some phenomenal property  $P$  that you instantiate over some temporal interval  $T$ , where no time *strictly later* that  $t + L/2$  is a member of  $T$ , such that you are conscious at time  $t$  in virtue of instantiating  $P$ ”. This modified version of Not Wholly Future Dependent could then be used to derive a modified version of The Inductive Premise below, which would read “If you are conscious at  $t$ , then you are conscious during the interval  $[t-L/2,t]$ ”. This modified version of The Inductive Premise leads to the very same absurd conclusion. For the sake of simplicity, however, we will stick to the simplified version of Two Rooms in the main text.

To bring out the counterintuitiveness of this case, suppose that whether or not your duplicate will continue to exist after noon crucially turns on some indeterministic quantum event. For example, suppose that, at noon, there is an objective chance of  $1/2$  that a bomb will go off after noon. If your duplicate is conscious at noon if and only if the bomb fails to go off after noon, then *at noon*, there is an objective chance of  $1/2$  that your duplicate is *currently* conscious! But we do not think that it can be an objectively chancy matter whether someone is presently conscious.

If you agree with us about how to answer Two Rooms, then we think you should endorse Not Wholly Future Dependent. For suppose, as a reductio, that Not Wholly Future Dependent was false. So, as an example, suppose in Two Rooms that you are conscious at noon only in virtue of phenomenal properties that partly extend to times strictly after noon. By hypothesis, your perfect duplicate does not instantiate *any* of these phenomenal properties, since they do not even exist after noon. So, if none of the grounds for your being conscious at noon are had by your perfect duplicate, then it seems like your duplicate would not be conscious at noon. After all, they would not instantiate any phenomenal property that would make them phenomenally conscious at noon. In response, one could try to resist this argument by claiming that your duplicate is conscious at noon in virtue of having *different* temporally extended phenomenal properties than the ones responsible for your own consciousness at noon. In particular, one could think that your duplicate is conscious at noon in virtue of instantiating a phenomenal property that does not extend past noon (e.g. that is instantiated for some interval  $[t_1, t_2]$ , where  $t_2$  is the time at noon), even though you (by assumption) do not instantiate any such property.

Our first response to this objection is that it violates the very intuition that it is meant to be defending. The reason why it is plausible to think that your duplicate is conscious at noon is because it seems that whether or not someone is conscious at some time can't crucially depend on what may or may not happen after that time. However, what could explain why you and your duplicate do not instantiate the same phenomenal properties until noon? Given that the only difference between you and your duplicate concerns what happens strictly after noon, the only possible explanation for why there would be this phenomenal difference *before* noon must be because of the physical difference between you and your duplicate *after* noon. So, while this view might avoid having to say that whether or not someone is conscious at a time depends on what happens after that time, this view *does* have to say that which (basic) phenomenal properties someone instantiates over some interval depends on what happens to them *strictly after* that interval. In other words, this view doesn't end up avoiding the future dependence of conscious experience after all.

Our second response to this objection is that it violates Phenomenal Internalism. Given Phenomenal Internalism, if your duplicate is conscious at noon in virtue of instantiating a phenomenal property that does not extend past noon, then you must *also* instantiate this property, on the grounds that you both are physical duplicates up to noon. However, this contradicts our



assumption that you do not instantiate any such property. Although it is of course debatable whether phenomenal properties are really intrinsic, we think it is at least a heavy cost of this objection that it must reject Phenomenal Internalism.<sup>15</sup>

In sum, we think that anyone who maintains that you and your duplicate would both be conscious at noon in Two Rooms should endorse Not Wholly Future Dependent.

#### 4. Have You Existed Forever?

Unfortunately, Minimal Positive Duration and Not Wholly Future Dependent imply something absurd, namely that you have an infinite past. Let “L” name a lower bound for the shortest duration that a phenomenal property might have (as discussed in Minimal Positive Duration). The crucial step is the following:

**The Inductive Premise:** If you are conscious at  $t$ , then you are conscious during the interval  $[t-L, t]$ .

The Inductive Premise is a straightforward consequence of Minimal Positive Duration and Not Wholly Future Dependent. Suppose you are conscious at  $t$ . Then, by Not Wholly Future Dependent, you must instantiate some phenomenal property  $P$  that does not extend past  $t$ , in virtue of which you are conscious at  $t$ . By Minimal Positive Duration, that phenomenal property must be instantiated over a temporal interval of at least length  $L$ . Therefore, you must instantiate a phenomenal property, at least, over the interval  $[t-L, t]$ , establishing The Inductive Premise. It should be noted that the full strength of Minimal Positive Duration and Not Wholly Future Dependent are needed to derive The Inductive Premise. For example, if we weaken Minimal Positive Duration to Positive Duration and maintain Not Wholly Future Dependent, then if you are conscious at  $t$ , it is consistent that you are only conscious throughout some arbitrarily short interval  $(t^*, t]$ , where, for any time in that interval, you are conscious in virtue of instantiating a temporally extended experience that only extends into the past and present without including any time at or before  $t^*$ .<sup>16</sup> On the other hand, if we retain Minimal Positive Duration and drop Not Wholly Future Dependent, then if you are conscious at time  $t$ , it may be that you are conscious at  $t$  wholly in virtue of instantiating phenomenal properties that are extended over the present and future, which has no consequences about your past experiences.<sup>17</sup>

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<sup>15</sup> One prominent way to motivate the claim that phenomenal properties are *not* intrinsic properties goes by way of “Externalist Intentionalism”, according to which phenomenal properties constitutively depend on representational properties, and representational properties constitutively depend on features of the external environment (e.g. see Dretske (1995), Armstrong (1999), and Hill (2009)). For an empirical defense of an internal, brain based account of consciousness, see Pautz (2021).

<sup>16</sup> A half open interval  $(x, y]$  includes all times  $t$  such that  $t > x$  and  $t \leq y$ .

<sup>17</sup> It is also worth noting that dropping Not Wholly Future Dependent and maintaining Minimal Positive Duration does not entail the ‘reverse’ conclusion that you will exist forever *into the future*. On its own, Minimal Positive Duration is perfectly compatible with conscious beings living normal, finitely long lives. For example, there could

With The Inductive Premise in hand, we now only need to repeatedly apply it. If you are conscious at  $t$ , then you are conscious at  $t - L$ , so then you are conscious at  $t - 2L$ , so then you are conscious at  $t - 3L$ , etc. By applying The Inductive Premise repeatedly, we can prove that if you are conscious at  $t$ , then you are conscious at  $t - NL$ , for any positive integer  $N$ . Since we can make  $N$  arbitrarily large, it follows that if you are conscious at time  $t$ , then you have been conscious for an infinite amount of time prior to  $t$ .

In effect, the argument shows that your consciousness can't have a beginning. For the sake of a *reductio*, suppose that your first moment of consciousness was at time  $F$  (presumably, time  $F$  may have occurred when you were at a certain late stage of being a fetus). You couldn't have been conscious at that time in virtue of having an instantaneous, durationless experience, or in virtue of having an experience of length shorter than  $L$ . Furthermore, we don't want to say that your being conscious at that time is wholly future dependent (for that would entail that you wouldn't have been conscious had you been destroyed directly *after*  $F$ ). So, you must have been conscious at time  $F-L$  all along, contrary to our assumption.<sup>18</sup>

### 5. Is The Argument Soritical?

One may be tempted to think that this argument is merely a version of the notorious sorites paradox. We have The Inductive Premise, which is used repeatedly to carry us from an obvious truth (you are conscious at some time or other) to an obvious falsehood (you have been conscious for an infinite amount of time). This looks suspiciously similar to the structure of an argument that would have us conclude that a single grain of sand counts as a "heap" on the basis of an analogous inductive premise. If one suspected that the concepts used to formulate and argue for The Inductive Premise were infected by vagueness, then one might naturally conclude that the argument in the previous section must fail in the same way that other soritical arguments fail (whatever that way might be).

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be a conscious being that only exists throughout the interval  $[t - L/2, t + L/2]$ , where for any time during that interval, the conscious being is conscious in virtue of instantiating a phenomenal property over the temporal interval  $[t - L/2, t + L/2]$ .

<sup>18</sup> The intuitive idea behind this kind of argument - that there is a tension between the claim that our experiences are temporally extended and the claim that our experiences do not depend on the future - has been stated before. For example, Dainton (2018) mentions this tension in his survey of the literature on the experience of time. However, to our knowledge, this tension has not been formulated precisely. Moreover, once one formulates this tension precisely, a number of subtleties emerge. First, it is important to distinguish between our experiences being future-dependent and our experiences being *wholly* future-dependent. The mere claim that our experiences are future-dependent does not generate the kind of worries behind Two Rooms. Second, there is no inconsistency in holding that our experiences are both temporally extended and not wholly future dependent. There is only the threat of the (logically consistent) absurd conclusion that we have an infinite past. Third, in order to derive this absurdity, more is needed than the mere claim of Positive Duration. One also needs a principle like Minimal Positive Duration. Finally, as we will discuss in the next section, a full discussion of this kind of tension should also be supplemented with a discussion about the potential soritical nature of the argument. For all these reasons, we believe that this kind of tension deserves a more precise formulation than it has previously been given.

We have two responses to this *prima facie* worry, one more general and one more specific. The first general response is that there are good theoretical reasons for believing that claims about the metaphysical structure of conscious experience, unlike claims about heaps, are not vague. Many philosophers have argued that conscious experience is fundamental and irreducible. Dualists, Panpsychists, and Idealists all agree on this point.<sup>19</sup> However, if any of these views are true, then attributing vagueness to the metaphysical structure of conscious experience is tantamount to attributing fundamental, metaphysical indeterminacy into the *world*. This kind of fundamental worldly indeterminacy, as opposed to the usual linguistic indeterminacy associated with words like “heap”, is highly controversial.<sup>20</sup> More importantly, many philosophers, physicalists and non-physicalists alike, have felt that conscious experience isn’t the kind of thing that *could* be vague. If consciousness were vague, there could be borderline cases of consciousness; but as many philosophers have acknowledged, it is difficult to make sense of a borderline state of consciousness. Jonathan Simon (2017) gives a helpful analogy:

Intuitively, asking whether someone is phenomenally conscious is like asking whether the light is on. The light may be brighter or dimmer, but if there is any luminescence at all, then it is on. Experience may be more or less intense, more or less attentive, closer to waking or closer to dreaming, but if at some specific moment it is not completely, totally, absolutely dark inside, then at that moment there is some phenomenal consciousness. (2105-2106).<sup>21</sup>

Our second main response is that, *even if* our two claims regarding consciousness are ultimately vague, the main problematic sources of vagueness can be alleviated. Perhaps the most worrying case of vagueness is the vagueness associated with picking a value for “L” in Minimal Positive Duration. If the exact endpoints of temporally extended phenomenal properties are indeterminate (so that phenomenal properties are “fuzzy” at their borders), some choices of L might not make Minimal Positive Duration into a *determinate* truth. However, it seems to us that anyone who is sympathetic with Minimal Positive Duration will grant that there is *some* L such that it’s perfectly determinate that all temporally extended phenomenal properties have length at least L (e.g. L might be half of the Planck time). With respect to Not Wholly Future Dependent, it seems to us that it’s problematic to think that in Two Rooms your perfect duplicate’s conscious state at noon even *indeterminately* depends on what may go on in the future. It should be a perfectly

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<sup>19</sup> For classic defenses of dualism, see Jackson (1982) and Chalmers (1996). For defenses of panpsychism, see Strawson (2003), Chalmers (2013), and Goff (2017). For defenses of idealism, see Kastrup (2018) and Chalmers (2019).

<sup>20</sup> See Barnes (2010) for an overview of the arguments against metaphysical indeterminacy.

<sup>21</sup> See also Searle (1992: 3), Strawson (1994: 153), Chalmers (1996: 106), and McGinn (1996: 14). Antony (2006, 2008) and Tye (2021) also defend the claim that consciousness is sharp rather than vague, while Hall (Forthcoming) defends the view that there could be borderline states of phenomenal consciousness. See Lee (2020) for a disambiguation of different questions that often get associated with vagueness and consciousness.

determinate matter that your duplicate's conscious state at noon is fully determined by the state of the world up to and including noon.

Let us consider the argument again. Suppose it's a *perfectly determinate* fact that you are conscious at time  $t$  (presumably now is such a time). Then, you must instantiate *some* temporally extended phenomenal property such that it's *perfectly determinate* that that phenomenal property is *at least* length  $L$  (by our choice of  $L$  above), and it must be *perfectly determinate* that that phenomenal property does not extend into the future (otherwise, it would be indeterminate whether we have violations of Not Wholly Future Dependent). Consequently, it will be a perfectly determinate matter that you must be conscious at time  $t-L$ , which supports the (perfectly determinate) truth of The Inductive Premise.

## 6. Time-Slice Internalism

Presumably those who accept Minimal Positive Duration will want to deny that we have all lived forever. Some of us have lived 80 years, and some have lived even 100 years or more; but certainly none of us have lived before the Big Bang! Unfortunately, the only way to avoid this absurdity is to deny Not Wholly Future Dependent.

In light of the fact that Minimal Positive Duration leads to rejecting Not Wholly Future Dependent, is the appropriate response to reject Minimal Positive Duration, or is it to simply bite the bullet and deny Not Wholly Future Dependent? The right answer to this question will depend on how (im)plausible the alternatives are to Minimal Positive Duration. Insofar as there are plausible alternative accounts of the temporal structure of experience, there is more reason to reject Minimal Positive Duration in favor of one of these alternative accounts, and insofar as there are no plausible alternatives, there is more reason to bite the bullet and reject Not Wholly Future Dependent.

In order to bolster our argument against Minimal Positive Duration, we will therefore turn to arguing for the plausibility of an alternative account of the temporal structure of experience, which is centrally committed to the following thesis:

**Time-Slice Internalism:** If  $x$  is conscious at time  $t$  in virtue of instantiating a phenomenal property  $P$ , then  $P$  must be instantiated at the instant of time  $t$  (rather than over a temporally extended interval). Moreover, given the psycho-physical laws (if there

are any), the phenomenal properties had by *x* at time *t* supervene on the intrinsic physical properties of *x* at time *t*.<sup>22,23</sup>

In short, on this view basic phenomenal properties are both *instantaneous* and *intrinsic*.

We will start by canvassing some preliminary motivations for finding Time-Slice Internalism attractive (section 7), after which we'll respond to some of the main criticisms that it faces (sections 8-10).

## 7. Preliminary Motivations

The first and most obvious reason to accept Time-Slice Internalism is that it implies Not Wholly Future Dependent. We think this feature of Time-Slice Internalism should be especially powerful to those who believe that phenomenal properties are fundamental, such as Dualists, Panpsychists and Idealists. It is easy to think of examples of *non*-fundamental properties that are dependent on the future. For example, whether a plane has the property of *being five minutes from take-off* obviously depends on the future. However, other examples of fundamental properties, such as mass, charge, or spin, are all plausibly not dependent on the future. Whether (say) a fundamental particle has a particular mass or electric charge at a particular time does not depend on what may or may not happen to that particle *after* the relevant time.<sup>24</sup> Although it is consistent to think that fundamental phenomenal properties differ from all other fundamental properties in this respect, we think it is much more natural to treat fundamental properties similarly in this respect.

A second reason to accept Time-Slice Internalism is structurally similar to the first. When one considers other plausible examples of fundamental properties, such as mass, charge, or spin, none of these properties are temporally extended properties. Basic units of (say) mass are had at particular times, rather than over (say) hundreds of milliseconds. In fact, it would seem objectionably arbitrary if fundamental properties were instantiated over some temporally extended length (e.g. 173 milliseconds). Why *that* temporally extended length rather than some

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<sup>22</sup> Although a view like Time-Slice Internalism has been historically defended by, for example, St. Augustine and Thomas Reid, nowadays it is much less popular. However, for contemporary discussion and defense of this kind of view, see Chuard (2011, 2019, 2020). It should be noted however that Chuard only defends the view that basic experiences are “*very short*, perhaps even instantaneous” (2020: 621).

<sup>23</sup> There is certainly logical space to hold views that are distinct from both Time-Slice Internalism and Minimal Positive Duration. For example, one could adopt “**Time-Slice Externalism**”, which accepts the first sentence of Time-Slice Internalism and rejects the second sentence. However, because we think there are strong reasons for endorsing Phenomenal Internalism, we won't further pursue this view here. One could also adopt Positive Duration and reject Minimal Positive Duration, but because we think most of the motivations for Positive Duration support Minimal Positive Duration (as we argued in section 2), we also won't explore this option further.

<sup>24</sup> A possible exception to the general rule that fundamental properties are not future-dependent are certain interpretations of quantum mechanics that involve “backwards causation”, but such interpretations are highly controversial. For an overview of such interpretations, see Friederich and Evans (2019).

other temporally extended length?<sup>25</sup> Again, while it is consistent to think that fundamental phenomenal properties are unlike every other fundamental property in this respect, it seems to us to be more natural to treat fundamental properties similarly in this respect.

A third reason is that Time-Slice Internalism is neutral on broader questions about the metaphysics of time. Many philosophers have argued that *Presentism*, the view that only present things exist, entails that our (basic) experiences must be instantiated at particular times, rather than over extended temporal intervals. As Dainton (2018) writes, “If reality is confined to a momentary present in the way that Presentists maintain, then it is difficult to see how [Positive Duration] can be true. Our immediate experience cannot extend through time if time itself has no extension.<sup>26</sup> Time-Slice Internalism is therefore *neutral* on broader metaphysical questions about the nature of time, whereas a view like Minimal Positive Duration is not.<sup>27</sup>

Apart from these more metaphysical concerns, one could also motivate Time-Slice Internalism on more intuitive grounds. For example, insofar as one finds it natural to think of persisting physical objects (such as brains) as being ultimately composed of successive time-slices, perhaps it is similarly natural to think of persisting streams of consciousness as being ultimately

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<sup>25</sup> There’s an interesting question of how Time-Slice Internalism might relate to approaches to quantum gravity in which time and space are discrete, in which case fundamental physical properties would be instantiated over finite, discrete “units” of time rather than “instants” of time. While our formulation of Time-Slice Internalism does presuppose that time is continuous, it turns out that the very same arguments in favor of Time-Slice Internalism can also be run in a setting where time is fundamentally discrete. Those arguments would then support (say) **Time-Unit Internalism**, where Time-Unit Internalism is the view that phenomenal properties are instantiated at a single minimal “unit” of time, which (by The Temporal Inclusion Principle) would have physical correlates present at the very same unit of time. Here is how the argument would go. Let **Extended Duration** (analogous to Minimal Positive Duration), say that phenomenal properties must be instantiated over at least two units of time. Let **Not Wholly Future Dependent\*** be the thesis that if someone is conscious at a unit of time, they must be conscious at that unit of time in virtue of instantiating a phenomenal property that does not extend into any times that are strictly later than that time (which is supported in the same way by the Two Rooms thought experiment). Then, Extended Duration and Not Wholly Future Dependent\* would imply the **Inductive Premise\***, which says that if someone is conscious at some unit of time, then they are conscious at the immediately prior unit of time. This then implies that we have all lived forever as conscious beings. Just as we rejected Minimal Positive Duration in favor of Time-Slice Internalism, we can then reject Extended Duration in favor of Time-Unit Internalism. So, the arguments in this paper really support the disjunction of Time-Slice Internalism or Time-Unit Internalism, depending on whether time is continuous or discrete.

<sup>26</sup> Dainton (2018) further supports this conclusion by the particular “Extensionalist” model of Positive Duration that he supports, in saying that “[I]f earlier and later stream-phases are experienced *together*, in the way that Extensional models require, then it seems very plausible to suppose that these phases must both exist. (Or to put it another way: an experience which no longer figures in the sum total of reality is not in a position to be part of the same unified state of consciousness as an experience which *does* so figure, any more than a non-existent brick can help hold up a wall.)” Frischhut (2017) similarly argues that Presentism is incompatible with Positive Duration.

<sup>27</sup> See Markosian (2004), Bourne (2006), Zimmerman (2011), Ingram (2019), Emery (2019, 2020) and Builes and Impagnatiello (forthcoming) for defenses of Presentism. Perhaps the strongest objection to Presentism is due to the absence of absolute simultaneity in modern physics, but see Monton (2006), Barbour (2012), and Maudlin (2018) for different ways that absolute simultaneity might be supported by modern physics. Also see Builes and Teitel (2022) for a recent philosophical argument in favor of absolute simultaneity. If there turns out not to be a relation of absolute simultaneity in physics, then debates about the “temporal” structure of conscious experience will have to be significantly reconceived (e.g. see Lee 2007).

composed of successive time-slices. One might also have phenomenological intuitions that support Time-Slice Internalism. For example, suppose your visual experience was gradually changing its phenomenal color between two times. It is natural to think that, for any time within that period, your visual experience would have some particular phenomenal color purely in virtue of how your visual experience is at that very time. At least in our more naïve moments, many of us are inclined to think of our conscious experiences as some kind of “internal movie”, playing directly before us. Just as ordinary movies have intrinsic states at particular times (just hit pause!), it is natural to think that our conscious experiences do as well.

For all these reasons, we think Time-Slice Internalism is worth taking seriously. However, let us now turn to consider some of the major objections that it faces.

### **8. Time-Slice Internalism and the Experience of Change**

One major objection to Time-Slice Internalism is that (i) our most basic experiences have temporally extended contents (e.g. they represent positive temporal durations) and (ii) no instantaneous experience can have a temporally extended content.

However, because both (i) and (ii) are very controversial philosophical assumptions, we don't think that this is an especially strong objection to Time-Slice Internalism. The most popular way to resist this argument is by resisting (ii): the mere fact that an experience itself is not temporally extended does not imply that the experience cannot *represent* a temporally extended state of affairs. This kind of response, sometimes called the “retentionalist” model of temporal experience, has been defended by many different philosophers, including Broad (1925), Horwich (1987), Tye (2003), Grush (2006), and Pelczar (2010a). For skepticism about whether our basic experiences have temporally extended contents in the first place, see Chuard (2011) and Arstila (2018). Since we don't have anything to add to the already very large literature criticizing (i) and (ii), here we will simply note that rejecting Time-Slice Internalism on the basis of (i) and (ii) is highly controversial.

### **9. Time-Slice Internalism and Possible States of Consciousness**

Another way to resist Time-Slice Internalism is to be skeptical of the possibility of a subject of experience that lasts for a single durationless instant. *Prima facie*, it is hard to make sense of someone having (say) a painful experience that doesn't last for any positive duration at all. In order to address this kind of worry, consider the following case:

Instant Twin: Suppose you are in pain during some temporal interval. Consider some time  $t$  within that time interval. Suppose further that a perfect physical duplicate of you at time

t popped into existence at t and only existed for a single instant. Was your Instant Twin in pain at t?

Of course, the assumption that you could have an “Instant Twin” like this is highly unrealistic. However, insofar as Time-Slice Internalism seems to imply that such a case is at least metaphysically possible, and that your Instant Twin *would* be in pain, this might seem like an implausible consequence of Time-Slice Internalism.

A similar seemingly implausible consequence of Time-Slice Internalism can be illustrated with the following case:

Frozen Twin: Suppose again that you are in pain during some temporal interval. Consider a time-slice physical duplicate of you at time t that is “frozen”. That is, consider a physical duplicate of you that is completely immobilized, forever (i.e., every time-slice of the duplicate is exactly similar to every other time-slice). Is your frozen twin in eternal pain?<sup>28</sup>

Prima facie, it seems like Time-Slice Internalism implies that such a case is metaphysically possible, and that your frozen twin *would* eternally be in pain (since they have the relevant physical correlate for pain at every time), which again seems implausible. After all, feelings of pain are supposed to be associated with certain corresponding mental functions and behavioral dispositions (e.g. aversive behavior), which are all absent in the case of your Frozen Twin.

In response, we do not think that Time-Slice Internalism is committed to these two implausible verdicts. To see this, we need to distinguish two different versions of Time-Slice Internalism. According to a “Humean” version, the relevant physical correlates of a phenomenal property at a time do not have any intrinsic causal powers, i.e. they do not necessitate any corresponding physical effects simply in virtue of their intrinsic properties. Instead, the relevant physical correlates can be freely modally recombined with any other physical states in their immediate past and/or future. Such a Humean version of Time-Slice Internalism *does* have the implausible consequences that your Instant Twin and Frozen Twin are (i) metaphysically possible and (ii) in pain.

However, a Non-Humean version of Time-Slice Internalism does not have this consequence. According to this version of the view, the relevant physical correlates of any given phenomenal property at a time must be Non-Humean causal powers, which necessitate their corresponding effects wholly in virtue of their intrinsic properties. According to this view, if you made a perfect

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<sup>28</sup> This case is also discussed in Builes (2020). There, Builes argues that Phenomenal Internalists can avoid Frozen Twin if they endorse intrinsic rates of change. While this is true, below we will argue that Frozen Twin can also be avoided given a Non-Humean theory of causal powers. For more on intrinsic rates of change, see Arntzenius (2000), Lange (2005), and Builes and Teitel (2020).



physical duplicate of a normal human being in pain, then that physical duplicate would have the very same Non-Humean causal powers of the original human being. These causal powers would then necessitate that the duplicate human being evolves through time in similar ways as the original human being in its immediate future, contrary both to Instant Twin and Frozen Twin.<sup>29</sup> So, on the assumption that the physical correlates of consciousness have Non-Humean causal powers, it is dubious whether Instant Twin and Frozen Twin are metaphysically possible in the first place.<sup>30</sup>

In response to this point, however, one might worry that combining Time-Slice Internalism with the relevant version of Non-Humeanism decreases the overall plausibility of Time-Slice Internalism, given that the relevant version of Non-Humeanism is controversial.<sup>31</sup> However, it turns out that there are entirely *independent* reasons why Time-Slice Internalism should not be combined with a Humean metaphysics. As has been argued by Hawthorne (2004) and Pallies (2019), anyone who accepts Phenomenal Internalism (which is implied by Time-Slice Internalism) must reject Humeanism. This is because every plausible account of the physical correlates of phenomenal properties implies that such physical correlates must have certain causal or dispositional properties associated with them, corresponding to (say) various mental

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<sup>29</sup> Because the duplicate might exist in very different environmental conditions (e.g. the duplicate might pop into existence in the empty void of space), it might be that these environmental differences make the duplicate quickly evolve in a different way than the original human being. However, because the physical effects of the environment on the duplicate will not be instantaneous (because causal signals cannot travel faster than the speed of light), the immediate evolution of the duplicate will be arbitrarily similar to the immediate evolution of the original. Consequently, because it is plausible to think that arbitrarily similar physical states correspond to arbitrarily similar phenomenal states, it is plausible that the duplicate will remain in pain for *some* non-zero interval of time.

<sup>30</sup> We should address two worries about this proposal. First, one could worry that various macro-level powers or dispositions often times do not manifest their corresponding effects for various reasons (e.g. a fragile glass may not break when struck because it is covered in bubble wrap, a poisonous drink may not kill a victim when ingested because of a later antidote, etc.). However, non-Humean dispositional essentialists such as Bird (2007: 43-65) use these possible ways in which a disposition might not manifest its corresponding effects, because of the presence of “finks” or “antidotes”, to explain *ceteris paribus* laws that admit of exceptions. In the case of strict, exceptionless physical laws, dispositional essentialists should think that there can be no finks or antidotes that block the manifestation of fundamental physical dispositions. See Bird (2007: 60-65) for independent reasons to think that finks and antidotes are not present at the level of fundamental physics. For our purposes, we do not need to worry about these complications since we are considering a perfect physical duplicate, which will precisely duplicate all of the fundamental (and exceptionless) causal powers found in the original human being. A second worry is that, if the laws of physics turn out to be indeterministic, then it might be that the relevant Non-Humean causal powers don’t necessitate any particular effect, but rather they simply necessitate different chances for different effects. Our first response to this point is to simply note that, while it is widely assumed that quantum mechanical theories are indeterministic, in fact two of the three currently most popular interpretations of quantum theory are fully deterministic. While spontaneous collapse theories are indeterministic, Bohmian (‘hidden variable’) interpretations and Everettian (‘many worlds’) interpretations are fully deterministic. Our second response is that plausible indeterministic interpretations of quantum mechanics will still entail that Instant Twin and Frozen Twin have a chance of zero of occurring. For example, the objective chances in the GRW spontaneous collapse interpretation of quantum mechanics govern the particular positions of particles, but it is still nomically impossible (and therefore metaphysically impossible given the relevant version of Non-Humeanism) on such a theory that the collection of particles that make up Instant Twin spontaneously disappear. See Lewis (2016), Norsen (2017), Maudlin (2019) for introductions to different interpretations of quantum mechanics.

<sup>31</sup> However, for defenses of Non-Humean causal powers, see Shoemaker (1980), Bird (2007), Strawson (2008), Heil (2010), Jacobs (2011), Demarest (2017), and Builes (2022, forthcoming).

functions and behavioral dispositions. However, according to Humeanism, such causal properties are not intrinsic in the required way (i.e. according to Humeanism, perfect physical physical duplicates might have different causal and dispositional properties).

So, in sum, we think that certain *Non-Humean* versions of Time-Slice Internalism can avoid the implausible implications suggested by Instant Twin and Frozen Twin, and because anyone who accepts Phenomenal Internalism already has antecedent reasons to reject Humeanism, we don't think that appealing to Non-Humeanism in this way significantly reduces the plausibility of Time-Slice Internalism.

### 10. Time-Slice Internalism and Physical Correlates

The final objection to Time-Slice Internalism rests on the worry that (i) the physical correlates of conscious experience are temporally extended and (ii) due to Phenomenal Internalism (or the Temporal Identity Principle), we should think that our conscious experiences are similarly temporally extended.

By design, Time-Slice Internalism complies with Phenomenal Internalism, so this worry boils down to the empirical claim that the physical correlates of conscious experiences are temporally extended.

In responding to this objection, we want to begin by acknowledging up front that this is perhaps the strongest objection to Time-Slice Internalism. Nonetheless, we still think that there are plausible ways that this objection can be resisted.

The first point to make is that Time-Slice Internalism is only a claim about *basic* experiences, so it is perfectly compatible with there being temporally extended physical correlates of (non-basic and coarse-grained) temporally extended conscious experiences. So, Time-Slice Internalism does not necessarily imply that orthodox accounts of the physical correlates of consciousness are *false* so much as incomplete. In other words, even if our most basic conscious experiences (and their physical correlates) are more temporally fine-grained than contemporary accounts suggest, that does not mean that there aren't important approximate temporally coarse-grained physical correlates of consciousness that contemporary neuroscience is uncovering. To consider an analogy with physics, the fact that Newton's theory of gravity was superseded by General Relativity is perfectly consistent with Newton's theory being approximately accurate in a wide range of cases. Defenders of Time-Slice Internalism should think that our current understanding of the physical correlates of consciousness is in some ways analogous to Newtonian Mechanics: current empirical theories are giving us useful coarse-grained and approximate information about which physical processes go along with which conscious processes, but we do not yet have good

empirical grounds to be confident about the physical correlates of our most basic phenomenal experiences.

Second, there are principled methodological reasons for why we should expect our current science of consciousness to provide a temporally coarse-grained account of consciousness, *even if it is ultimately temporally fine-grained*. So, the fact that the current search for neural correlates of consciousness is leading to temporally coarse-grained theories shouldn't count as much evidence against Time-Slice Internalism. The main reason for this is that the primary source of experimental evidence we have for phenomenal consciousness comes by way of our *cognitive access* to those states, and it is uncontroversial that our cognitive access to our conscious states, or "access consciousness", must be temporally coarse-grained. For example, it is no surprise that we are unable to *notice* (and hence unable to make verbal reports about) features of our phenomenal consciousness that lie below certain time-scales. By itself, this empirical datum is entirely neutral on the question about the temporal grain of phenomenal consciousness. It is only when this empirical datum is combined with certain controversial *philosophical* assumptions, such as the assumption that phenomenal consciousness cannot be more rich than (or "overflow") access consciousness, that we arrive at an argument against Time-Slice Internalism.<sup>32</sup> In the absence of these philosophical assumptions, it is difficult to see how there could be any wholly empirical case against Time-Slice Internalism. Although in recent times there have been a number of methodological proposals for scientifically investigating aspects of our phenomenal consciousness that may (or may not) overflow cognitive access, these proposals remain highly controversial. As Phillips (2018) argues, "given our present data and methods, not only do we not know whether consciousness requires [cognitive access], we do not know how to find out. Until that changes, we must adopt an attitude of humility towards the phenomenal" (7).

Thirdly, there are independent reasons for thinking that current theories of the neural correlates of consciousness must be incomplete anyway, as defenders of Time-Slice Internalism should believe. Earlier, we described how many philosophers are inclined to think that phenomenal consciousness cannot be vague. However, our current best theories of the physical correlates of consciousness inevitably appeal to vague concepts, such as "global workspace", "higher-order thought", "representation", "neuron", etc. Therefore, anyone who wishes to defend the view that phenomenal consciousness is not vague *already* has to think that contemporary accounts of the physical correlates of consciousness are only coarse-grained approximations.

For all these reasons, we think there is ample reason to be skeptical that the empirical search for the physical correlates of consciousness has demonstrated that the physical correlates of our most *basic* conscious experiences are temporally extended.

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<sup>32</sup> For discussion on both sides of the debate, see Block (2011), Cohen and Dennett (2011), Brown (2012), Phillips (2016), Gross and Flombaum (2017), and Carruthers (2017).

## 11. Conclusion

Having finished arguing against Minimal Positive Duration and in favor of Time-Slice Internalism, we would like to close by highlighting an important feature of the arguments we have been defending. One can very roughly categorize approaches to the metaphysics of consciousness as “inflationary” or “deflationary”. According to inflationary views, consciousness is usually taken to be fundamental, precise, and intrinsic. Examples of inflationary views include dualist, pan(proto)psychist, and idealist approaches to the metaphysics of consciousness (and perhaps versions of physicalism on which consciousness is precise). According to deflationary views, consciousness is usually taken to be a vague, reducible, and higher-level phenomenon, much like other biological phenomena such as photosynthesis or digestion. At a number of points in our defense of Time-Slice Internalism, we have appealed to various “inflationary” views about the metaphysics of consciousness. For this reason, we think that the best way forward for those who wish to uphold Minimal Positive Duration is to adopt a deflationary view about the metaphysics of consciousness. We hope this point illustrates our broader goal of showing how questions about the relationship between experience and time are inextricably linked to a variety of other central philosophical concerns.<sup>33</sup>

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<sup>33</sup> For helpful comments and discussion, we’d like to thank Matt Duncan, Andrew Lee, and Jack Spencer.

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