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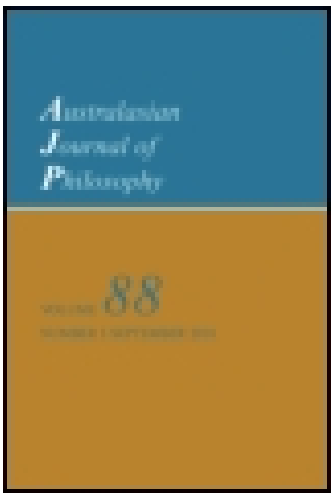

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I Think, Therefore I Persist

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I THINK, THEREFORE I PERSIST

Matt Duncan

Suppose that you're lying in bed. You just woke up. But you're alert. Your mind is clear and you have no distractions. As you lie there, you think to yourself, '2 + 2 = 4.' The thought just pops into your head. But, wanting to be sure of your mathematical insight, you once again think '2 + 2 = 4', this time really meditating on your thought. Now suppose that you're sitting in an empty movie theatre. The lighting is normal and the screen in front of you is blank. Then at some point an image of a peach is flashed on the screen. The image isn't up there for long. In fact, it's only on the screen for what seems like an instant—*just* long enough for you to see it. These two scenarios are a bit mundane. But, as I will show, reflection on them can yield significant results concerning the nature of persons and their persistence through time. First I will show that thought and perception have temporal constraints whereby your thinking or perceiving in the above scenarios implies that you exist through a temporally extended interval. Then I will argue that this allows us to rule out several prominent theories of personal identity.

Keywords: personal persistence, personal identity, thought, perception

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1. Thought and Perception

You are lying in bed and you consciously think to yourself, '2 + 2 = 4.' You can be—and so let's suppose that you *are*—aware of your thought and of yourself as the thinker of that thought.

Now here's an observation: *thinking takes time*. I don't mean just that thinking a really long, drawn-out, thought takes time. I mean that thinking *any* thought takes time. No thought is instantaneous. Your thinking '2 + 2 = 4', for example, takes time. It may not take a lot of time to think—only a few milliseconds, perhaps—but it does take time. And it's not just that it takes time to produce or generate a thought. Thinking *itself* takes time.[1]

Thoughts are occurrent conscious events with cognitive (i.e. non-sensory) content.[2] They may include occurrent attitudes such as beliefs, desires, and intentions, as well as non-attitudes such as the mere entertaining of content. Entertaining the content, '2 + 2 = 4', is a thought. So is consciously

[1] In what follows, I will take it for granted—and as obvious—that it takes time to think thoughts like, '2 + 2 = 4.' Some philosophers (e.g. Reid [1855]) claim that the structure of experience is such that temporally extended conscious events can be broken down into experiences that are instantaneous (see Dainton [2008] for further discussion). I will return to this issue later in connection with certain epistemic issues (see section 2). But note that my claim that '2 + 2 = 4' is temporally extended does not depend on the claim that *all* experiences are temporally extended or on the claim that temporally extended experiences cannot be broken down into instantaneous parts.

[2] Some (e.g. Carruthers [2011]; Prinz [2011]) deny that thoughts are conscious. These philosophers may feel more comfortable substituting, for my talk of thoughts, talk of inner speech or some other conscious event. Doing so will not affect my point. Also, I will talk of conscious *events* rather than, say, conscious *states*. But, by doing so, I don't mean to be picking sides on any substantive issues.

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intending to write this content down. So is the conscious desire to remember it. Thoughts are not sensations, perceptions, or emotions. They are their own kind of conscious event. And thinking takes time.

Here's another observation: In order for you to think a given thought, you have to be the subject of that thought for as long as it takes to think it. To think '2 + 2 = 4', you have to think the whole thought. You could think shorter thoughts like '2' or '2 + 2'. But that doesn't count as thinking '2 + 2 = 4.' Thoughts don't finish themselves. And you don't get full credit for incomplete thoughts. So, just as you can't run a mile without taking the time to run it, you can't think a thought without taking the time to think it.

Thus, here's what I will call 'The Thought Claim':

> *The Thought Claim*: In order for you to think '2 + 2 = 4', you must be the continuous subject of the thought, '2 + 2 = 4', for some temporally extended duration, t' to t, where t' is some time before t, and the difference between t' and t is equivalent to the length of time it takes you to think '2 + 2 = 4' on a given occasion.

The Thought Claim combines each of the above two observations. First, it says that your thought is temporally extended. Second, it says that, when you think your thought, you are the continuous subject of that thought for as long as it takes to think it. So, if you think '2 + 2 = 4' from t' to t, you exist as the subject of that thought from t' to t.[3]

I am tempted to say that the Thought Claim is a necessary truth. But I won't say it here. For some may think that it's at least *possible* for you to think '2 + 2 = 4' instantaneously. And I don't want to fight about it. In fact, I don't even want to fight about my earlier claim that all actual thoughts are temporally extended. So, the Thought Claim is just that it actually takes time for you to think the thought, '2 + 2 = 4.'

Let's move on to the second scenario. You are in an empty theatre and you see an image of a peach on a screen. Your perception is not a mere appearance. It isn't a case where it *seems* to you as if some object is before you when it's really not. You aren't hallucinating, for example. Here you actually *perceive* an image of a peach on a screen. So the image exists, it's there, and you see the image because it's there.[4]

Perception, like thinking, takes time. That is to say, actual perceptual experiences—i.e. the introspectively accessible conscious events—are temporally extended. So, all of the lessons from the first scenario apply here. But I want to talk about a *further* temporal constraint that is unique to visual perception. This constraint would be in effect, even if perceptual experiences

[3] When I say that 'you exist as the subject of that thought', I do not mean to suggest anything metaphysically loaded—anything that would suggest that in order to think a thought you are or have to be a Cartesian ego, for instance, or some other particular kind of psychological substance. Throughout this paper, when I call you a 'subject of thought' I only mean to suggest that, regardless of whatever kind of entity you (and other people) are, you *have* or *undergo* or *think* some thoughts.

[4] These are conditions on perception. We might say that perception is *factive*. Or we might say that, when it comes to perception, there is a certain *relationship* between a perceiver and an object of perception. Or we might follow Chisholm [1957: 149] in saying that, in perception, an object *appears* to a perceiver, where, in the context of visual perception, 'S appears to x' means that 'as a consequence of x being a proper visual stimulus of S, S senses in a way that is functionally dependent upon the stimulus energy produced in S by x.'

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themselves were instantaneous (which, again, they're not). So, to simplify matters, I'll set aside the fact that your perceptual experience is temporally extended.

The temporal constraint that I want to talk about now is this. Given the actual laws of nature and the actual facts about human perception, your ability to perceive consciously a peach image on a screen requires that it be presented continuously to you for some minimum duration. This minimum duration is sometimes called a person's 'visual duration threshold' (VDT), which Dent et al. [2007: 304] define as 'the minimum exposure duration required before an individual can correctly identify a briefly presented picture'. A person's VDT is not very long, and its length is determined by several factors, including the size and brightness of the stimulus. In normal lighting conditions, a visual stimulus must be continuously presented to a person for about 10 milliseconds (ms) in order for that person to *detect* the stimulus, and for about 40 ms in order for the person to correctly *identify* the stimulus (e.g. identify it *as a peach*).[5]

Here I do not make any substantive assumptions about the specific processes (neural or otherwise) implicated in visual perception, including any assumptions about how to characterize the causal processes responsible for the fact that a visual stimulus must be presented to a person for a certain amount of time in order for her to perceive it. Also, for my purposes, it doesn't matter what the precise duration of your VDT is at any given time. What matters for my purposes is just this claim: In order for you to see a peach image on a screen at time t, it must be presented continuously to you for some minimum duration leading up to t; otherwise, you won't see the image. So let's call this 'The Perceptual Claim':

> *The Perceptual Claim*: In order for you to visually perceive an image of a peach on a screen at time t, it must be presented to you continuously from t' to t, where t' is some time before t, and the difference between t' and t is equivalent to your visual duration threshold.

The Perceptual Claim is a claim about *perception*. This is important to keep in mind because otherwise it might be tempting to object to the Perceptual Claim by describing a counterexample like the following. At time t, you have a visual experience of a peach image; however, the image isn't presented to you on the screen from t' to t. What happens is that, prior to t, a computer receives and processes information about the image, and then the computer stimulates your visual cortex so that you experience a peach image at t.

It might be tempting to think that this case is a counterexample to the Perceptual Claim. For it might be tempting to think that it is a case whereby you perceive the image even though it is not presented to you on the screen from t' to t. But remember that, in order for you to *perceive* something visually—an image on a screen, say—you must actually see *it*: that is, the image

[5] See Efron [1970], Legge [1978], Warren and Morton [1982], and Dent et al. [2007]. For research on factors that influence a person's VDT, see Keesey [1972], Kulikowski and Tolhurst [1973], and King-Smith and Kulikowski [1975]. For a description of the physical mechanisms that determine visual threshold, see Rudd [1996].

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on the screen must be what causes you to see the image.[6] If a computer causes you to have a visual experience as of a peach image on a screen in virtue of some process carried out independently of you, then that experience is not a perception. We might call it a mere *seeming*. It *seems* to you as if you see an image on a screen. But you don't actually *perceive* the image.[7]

What this brings to light is that The Perceptual Claim has both a necessary conceptual element and a contingent empirical element. It's a necessary conceptual fact about perception that you have to bear a particular kind of relation to an entity in order to perceive it. It's a contingent empirical fact about humans that establishing this relation takes time. But a fact is a fact. And the fact is that you have to be exposed to something for a temporally extended duration in order to perceive it.

Thus, in order for you to visually perceive the peach image on the screen at t, you have to be the continuous subject of that peach image for some interval (i.e. from t' to t). Now, of course, if you are a continuous subject throughout some interval, then you *exist* throughout that interval. So, the Perceptual Claim implies that if you perceive the image on the screen at t, then you existed from t' to t. We can put the point more generally: In order for a person to visually perceive something at a particular time, that person must exist for a minimum duration prior to that time. Thus, if a person *does* visually perceive something at some time, then she existed continuously for some minimum duration prior to that time. In other words, a perceiving person is a temporally extended person.

This result is different in kind from what we get from the Thought Claim. The Thought Claim says that in order to think throughout some interval you must exist during that interval. The Perceptual Claim goes further and says that in order for you to visually perceive *anything at all*, at any time, you have to exist throughout some extended interval. With thinking, you may be in some state of thinking at t without having existed prior to t. Hence, from the fact that you are in some such state at t, you cannot infer

[6] And it must cause your experience *in the right way*. A deviant causal chain could go from the image on the screen to your experience of a peach without you actually perceiving the peach. Spelling out what it means to be caused *in the right way* is a notoriously tricky task for any account of any causal process. And I'll leave that task to others. For my discussion of perception—of VDTs in particular—and the argument to follow do not depend on any particular account of the causal component of perception. So I remain neutral regarding the differences between such accounts. This includes issues about how to characterize what it means for a perception to be caused in the right way, as well as various issues concerning the nature of the causation involved in perception (e.g. whether it involves a single temporally extended cause versus one or more instantaneous causes occurring at some point during the temporally extended period of your exposure to the image, whether your resultant perceptual experience occurs simultaneously with this or that particular neural event, whether the causal relation establishes a direct versus indirect connection between you and the image, etc.). Thanks to an anonymous referee for pushing me on this point.

[7] Perhaps the case can be adjusted, though. Suppose that you are exposed to an image of a peach for part of the time between t' and t, but computers do the rest. So you experience the peach at t partly in virtue of your exposure to it, and partly in virtue of a computer's antecedent processing. Perhaps now you actually *perceive* the image. I don't know whether this case counts as perception. But suppose that it does. This just shows that in some non-normal cases you can perceive an image while being exposed to it for only part of the time that it normally takes you to perceive an image. In other words, the above case shows (at most) that a computer can make your VDT shorter than normal. But it's still true that you must be exposed to the peach for a temporally extended duration—for the length of your VDT—in order to perceive it. Another way to adjust the above case is to suppose that your visual system is replaced with an artificial apparatus that receives information from the environment and then stimulates your visual cortex in accordance with that information. Again, I don't know whether this would count as perception or how it might affect your VDT. But, at any rate, we can set such cases aside. For the discussion and arguments to follow will be limited to cases where your normal visual system remains intact.

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that you existed prior to t. Perception is different. Since you can't visually perceive something at t unless you existed prior to t, you *can* infer that you existed prior to t from the fact that you have a perceptual experience at t.

So here's what we've learned so far. Thinking is temporally extended. And you have to think a whole thought in order to think it. Thus, the Thought Claim is true. Perceiving is also temporally extended. And even if we assume that it's not, it remains true that, in order to perceive something visually, you have to be exposed to that thing for an extended period of time. Thus, the Perceptual Claim is also true.

2. Personal Persistence

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The claims of the previous section may seem modest. However, in this section I'll argue that they imply the falsity of several prominent theories of personal identity through time (a.k.a. theories of personal persistence). So, modest or not, the Thought Claim and the Perceptual Claim have big philosophical payoffs.

A theory of personal persistence aims to describe what it takes for a person who exists at one time to be identical to a person who exists at some later time. It does this by giving a *criterion*—i.e. metaphysically necessary and sufficient conditions—for personal identity through time.[8] There are many different theories of personal persistence. A lot of philosophers claim that some sort of *psychological* continuity is necessary and sufficient for personal persistence. On this view, a person S persists from time t to time t^*—that is, S at t is identical to S^* at t^*—if and only if S at t has the relevant psychological connections with S^* at t^*. Other philosophers claim that people persist in virtue of some sort of *physical* or *biological* continuity. These philosophers maintain that S persists from t to t^* if and only if S at t is physically or biologically continuous (in the relevant way) with S^* at t^*. Other philosophers endorse hybrid theories.

The Thought Claim and the Perceptual Claim aren't theories of personal persistence. But they do imply the falsity of several theories of personal persistence. Specifically, they imply the falsity of theories which suggest that there are (or could be) circumstances in which a person thinks or perceives something and yet does *not* persist (i.e. exist continuously) through the time it takes her to think or perceive, or through the aforementioned interval prior to her perception. I now turn to some of those theories.

I'll start with a relatively simple theory. It's not a very popular theory, but its simplicity makes it a good one with which to start. So, consider the combination of *physicalism* and *mereological essentialism*. Physicalism is the view that persons are wholly physical. Mereological essentialism is the

[8] Philosophers talk about persons and personal identity (and selves and selfhood) in a variety of different (and sometimes incompatible) ways. And some philosophers who discuss personal identity are more concerned than I am here with certain practical, moral, or legal questions (see, e.g., Williams [1973], Parfit [1984], and Schechtman [1996]). I recognize that these various discussions are connected. But, in this paper, I (as well as those with whom I interact in what follows) am concerned with the conditions that are necessary and sufficient for the persistence of you and me and people like us, regardless of what our moral or legal status might be at any given time.

view that all of an object's parts are essential to it. If mereological essentialism is true, then objects do not, and indeed *cannot*, survive any change in parts.[9] So if *both* physicalism and mereological essentialism are true, then we have (1):

(1) Necessarily, if a person S at time t is identical to a person S^* at time t^*, then S has the exact same physical parts as S^*.

The Thought Claim can be used to demonstrate the falsity of (1), and thus the falsity of physicalism plus mereological essentialism. To see this, suppose that you are back in bed and you think '$2+2=4$.' This thought is temporally extended. Let's say that it takes you from t to t^* to think it. Now suppose that you lose a physical part—an atom on the tip your nose—sometime between t and t^*. For the sake of simplicity, let's just suppose that this atom on the tip of your nose is completely annihilated sometime between t and t^*.

If the Thought Claim is true and you do in fact think '$2+2=4$' in the above case, then you persist from t to t^*. For the Thought Claim says that your thinking '$2+2=4$' from t to t^* implies that you persist from t to t^*. But if (1) is true, you *don't* persist from t to t^*, for you don't have the exact same physical parts at t^* that you had at t. So, if the above case as I have described it is possible, then either (1) is false or the Thought Claim is false. The above case is surely possible. And the Thought Claim is true. So, (1) is false. Therefore, the combination of physicalism and mereological essentialism is false.

Let's consider our options in a little more detail. They are as follows: (a) deny the Thought Claim by denying that it takes time to think '$2+2=4$' or that you have to exist for as long as it takes to think '$2+2=4$' in order to think it; (b) deny that the above case is possible by denying that you could succeed in thinking '$2+2=4$' in such a case; (c) deny that the case is possible for some other reason; (d) deny (1). I've endorsed (d). But what about the other options? Well, the Thought Claim is unimpeachable, as far as I can tell. So, (a) is out. And, aside from the question of whether you think '$2+2=4$', the above case is clearly possible. So, (c) is out as well. Thus, we are left with (b). What a defender of physicalism and mereological essentialism has to say, it seems, is that since it takes from t to t^* to think '$2+2=4$', and since you don't exist from t to t^*, it's not really *you* who thinks '$2+2=4$.' She has to say that although in the above case it *seems* to you (both phenomenologically and epistemically) as if you are thinking '$2+2=4$', in fact you aren't.

This is a very bad option with which to be left. First of all, it smacks of a dubious distinction between your thinking '$2+2=4$' and it merely *seeming* to you as if you are thinking '$2+2=4$.' There is no such distinction. If it

[9] I am specifically concerned with *three-dimensionalist* versions of mereological essentialism. A four-dimensionalist version of mereological essentialism would require a different treatment. Ted Sider [2001: 180] describes three-dimensionalist mereological essentialism as the view that, '(necessarily:) if x is ever part of y, then x is always part of y (provided y exists).' Roderick Chisholm [1973, 1976], James van Cleve [1986], and Dean Zimmerman [1995] defend this view. Also, Joseph Butler and Thomas Reid arguably hold this view. However, all of these philosophers are *non*-physicalists. Indeed, I'm not sure that anyone holds the combination of mereological essentialism and physicalism. I consider this combination here largely because it helps to illustrate the argumentative strategy that I will proceed to apply to more prominent theories of personal persistence.

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seems to you that you're thinking '2 + 2 = 4', then you *are* thinking '2 + 2 = 4.'[10] This is how it is with conscious events in general. Take *pain*, for instance. At least in clear cases of pain, your seeming to be in pain *just is* your being in pain. And the same goes for thinking simple thoughts like '2 + 2 = 4.' There is nothing more to your thinking '2 + 2 = 4' than its *appearing* in your conscious experience.

This point gains even more force when we consider the *specific kind* of mistake that you would have to be making here. You wouldn't necessarily be wrong to believe that '2 + 2 = 4' was thought. It was. Or, at least, each part of it was. If physicalism and mereological essentialism are true, then you thought part of '2 + 2 = 4', and the person you replaced—the one with the slightly bigger nose—thought the other part of it. So your mistake wouldn't be in believing that '2 + 2 = 4' was thought. Rather, it would be in believing that *you* thought it.[11] But this is not a mistake that you can make. You are, as they (i.e. philosophers) say, *immune* from such errors.[12] If you know that a thought is thought, and you judge on the basis of the way things seem to you that *you* are thinking it, then you are right: you *are* thinking it. So, the notion that you are wrong to believe that you are thinking '2 + 2 = 4' simply doesn't gain any traction. There's just no denying that you think '2 + 2 = 4' in the above case. So, (b) is false. The defender of physicalism and mereological essentialism simply doesn't have a leg on which to stand.

These considerations should also relieve any initial temptation for a defender of (b) to save face by saying that, although you are wrong to believe that it is *you* who thinks '2 + 2 = 4' in the above scenario, at least you are right to believe that *something*—perhaps a distinct subject of experience, transcendental ego, or some other kind of entity—thinks '2 + 2 = 4.' For, again, if you know that a thought is thought, and you judge on the basis of the way things seem to you that *you* (as opposed to some distinct subject or ego) are thinking it, then you are thinking it. Hence, there's no denying that you think '2 + 2 = 4' in the above case. Again, (b) is false.

We can see just how compelling this argument is by comparing it to two less compelling arguments. Here's the first argument: You've been digesting your lunch for the last two hours; which implies that you've existed for the last two hours; yet you've lost several atoms since then; so physicalism plus mereological essentialism is false. This argument may be sound. But it's not very compelling. A defender of physicalism and mereological essentialism will simply deny that it was really *you* who digested food for the past two hours. And what can you say in response? It's not as if you have any special evidence that it was *you*, as opposed to a series of people continuous with

[10] As suggested above, I assume that it seems to you that you are thinking '2 + 2 = 4' in both an *epistemic* sense (i.e. you are inclined to judge that you thought, '2 + 2 = 4') and in a *phenomenal* sense (i.e. your experiences appear to you as if you thought '2 + 2 = 4'). Since this is the case, and since '2 + 2 = 4' is such a simple thought, everyone should agree that if it seems to you (in both senses) that you think '2 + 2 = 4' then you do think it.

[11] One might characterize the situation as one in which you and a series of other people just like you combined to think '2 + 2 = 4' in virtue of each of you thinking part of that thought. The fact remains: *you* did not think the thought. At most, you thought part of it. And, again, you don't get full credit for partial thoughts.

[12] See, for example, Shoemaker [1968], McGinn [1983], Cassam [1994], Evans [2001], Howell [2006], O'Brien [2007], and Gertler [2011: 215–17]. I take the claim that we are immune to the sort of errors mentioned above to be uncontroversial. It is controversial which cases are to count. But the case that I have described should be safe by anyone's standards.

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you, who digested the food. For all you know, given the way that things seem to you, you might not have done any digesting. Thus, the assumption that you digested your lunch is not, by itself, a compelling reason to reject physicalism and mereological essentialism. If you have a good reason to accept physicalism and mereological essentialism, then the rational course may very well be to revise your beliefs about your past digestion.

Here is a somewhat better argument: You've lost several atoms in the last day or so; yet you *remember* existing yesterday; thus, physicalism plus mereological essentialism is false. This argument is better than the previous argument because memory is a pretty reliable source of evidence about the past. Still, the argument is hardly conclusive. For a defender of physicalism and mereological essentialism can, without too much embarrassment, just say that your memory is mistaken. She can even grant that your memory is of a person who really did exist yesterday, who is connected to you in various important ways, and who for all practical purposes we can think of as you. But then she can say that, *strictly speaking*, you are not identical to this person: while it may *seem* to you as if the person in your memory is you, in fact it isn't you. This might be surprising, but it isn't incoherent or even particularly absurd. Memory isn't perfect, after all.[13] The defender of physicalism and mereological essentialism can therefore resist this argument by simply denying the apparent deliverances of your memory. And so, while this argument is better than the first, it's not at all conclusive.

Now return to my argument. Here, denying the appearances—that is, denying that things are as they seem—simply doesn't work. For, in the case that I described, there is no gap between appearance and reality. If it *seems* to you that you are thinking '$2+2=4$', then you *are*. So it just isn't reasonable to say that, although it seems to you as if you are thinking '$2+2=4$', in fact you aren't. There is no epistemic wiggle room here. There is no shred of doubt that might yield the means for resistance.

Think of it this way. There are scenarios—including various skeptical scenarios—in which things seem to you exactly as they do now but in which you neither digested your lunch nor existed yesterday. Perhaps an evil demon is tricking you. Perhaps the universe popped into existence five minutes ago. Or perhaps you are just wrong about what it takes for you to persist through time. These are ways in which things could turn out to be, given the way in which things seem to you right now. So, you can doubt that you digested your lunch or that you existed yesterday. Thus, if you have a good reason to believe physicalism and mereological essentialism, then you may, without absurdity, give up your belief that you digested your lunch or that you existed yesterday. But your belief that you are thinking '$2+2=4$' is different. It isn't open to doubt. There is no sceptical scenario in which things seem to you as they do but in which you are not thinking '$2+2=4$.' Given the way things seem to you, it couldn't turn out that you are not

[13] One might suggest that the potential mistake here isn't, or isn't *just*, a mistake of memory. Perhaps it is a mistake having to do with other cognitive abilities, such as your ability to identify an object that you seem to remember. Whatever the mistake is, the point is just that there is room for the defender of physicalism and mereological essentialism to cast doubt on the basis for your belief that you existed yesterday. Another way to cast even more doubt on this belief might be to invoke the notion that we tend to make up (and in many cases fabricate) self-narratives concerning the past (see, e.g., Dennett [2014]).

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thinking '2 + 2 = 4.' But (1) implies that, in fact, you are not thinking '2 + 2 = 4.' So, it couldn't turn out that (1) is true. You can conclusively rule out (1). That's why I say that my argument against the combination of physicalism and mereological essentialism is especially compelling.[14]

Now, one might wonder why it is that you can be so sure that you are thinking '2 + 2 = 4.' I suggest that it's because you can be *directly aware* of your thought and of yourself as its subject. This is why there is no room for doubting that you exist from t to t* as the thinker of your thought. The evidence is *right there*. It's incontrovertible. There's no rational way to deny it. But, to be fair, some philosophers say that we can be directly aware only of *instantaneous* mental events. So they would say that, while you may be directly aware of instantaneous *parts* of the thought, '2 + 2 = 4', you cannot be directly aware of the whole thought at once.[15] Let me offer a couple of good reasons to reject this view. First, shorter thoughts aren't, or at least don't seem to be, made up of a series of instantaneous parts. They seem *unitary*. And, with these shorter thoughts, *the whole thought* seems to be immediately presented to consciousness. It's not as if only one instantaneous part of the thought is ever immediately experienced; the whole thing is. Now, perhaps it's only *very* short thoughts of which we can be directly aware. Some might even say that '2 + 2 = 4' is too long. If it is, then we may just pick a shorter thought to talk about. But what we need to resist is the idea that we are only directly aware of *instantaneous* mental events. It's doubtful that any such events exist. And even if they do exist, our *thoughts* of which we are directly aware are not among them. Thinking takes time; as does feeling, hearing, hurting, itching, smelling, and every other kind of conscious event. We can be, and often are, directly aware of these events. Thus, the conclusion that we are directly aware of temporally extended mental events is unavoidable.

Even so, some may still prefer a different explanation for why your belief that you are thinking '2 + 2 = 4' is immune from error.[16] The key point here is just that it *is* immune from error. Even if that's not because you can be directly aware of your thought, still, what's important is that my argument

[14] There are several different ways to express what makes my argument more compelling than the other two arguments. We might say that, whereas facts about digestion provide no non-question-begging evidence of my persistence and memories provide some fallible evidence of my persistence, my awareness of thinking '2 + 2 = 4' provides infallible evidence of my persistence from t to t*. Or we might say that, whereas one would be likely to accept the first premise of each of the first two arguments only if one already accepted the conclusion, one can be certain that one is thinking '2 + 2 = 4' without any preconceptions about what it takes to persist through time.

[15] Thomas Reid [1855], for example, defends this view. But there are a lot of problems with it (see Dainton [2008] for a helpful discussion). Another view, called 'the retentional model', says that each experience contains two components: an instantaneous present component and a component that represents the recent past. This view also has problems. One especially relevant problem is that since your seeming to think '2 + 2 = 4' *just is* your thinking '2 + 2 = 4', there doesn't seem to be any distinction between your thinking '2 + 2 = 4' and your entertaining a representation of the thought, '2 + 2 = 4.' (Or even if there is, at least these are both mental states that plausibly count as 'thoughts' in some broader sense.). So, on the retentional model, it would seem that when you think '2 + 2 = 4' you actually think *two* thoughts—one spread out in time, and one instantaneous. In fact, you think *many* thoughts, since each successive instant over a certain period of time will contain a representation of your thought which itself counts as a thought. This is a bad result (see Dainton [2008] for other problems with the retentional model).

[16] Philosophers do indeed differ on this point. See O'Brien [2007] and Gertler [2011: ch. 7] for helpful discussions of the various strategies that philosophers pursue.

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does not allow for the epistemic flexibility—the toehold in doubt—that one would need in order to resist it. Therein lies the potency of my argument.

With that said, let's set aside this talk of direct awareness of temporally extended events. Indeed, let's forget for a moment that thoughts and other mental events are temporally extended. There is a way to make my case without dealing with these issues. It requires turning to the Perceptual Claim. So let's do that now.

Like the Thought Claim, the Perceptual Claim can be used to demonstrate the falsity of (1), and thus the falsity of physicalism plus mereological essentialism. To see this, suppose that you are back in the empty theatre, and at time t^* you see a peach image on the screen. Next, suppose that your VDT is equivalent to the time between t and t^*. Finally, suppose that you lose an atom on the tip your nose sometime between t and t^*.

If the Perceptual Claim is true and you perceive the peach image on the screen at t^*, then you persist from t to t^*. For the Perceptual Claim says that your seeing the peach image on the screen at t^* implies that you persist from t to t^*. But if (1) is true, you *don't* persist from t to t^*, for you don't have the exact same physical parts at t^* that you had at t. So, if the above case as I described it is possible, then either (1) is false or the Perceptual Claim is false. Again, the above case is possible, and the Perceptual Claim is true. So, (1) is false. Thus, the combination of physicalism and mereological essentialism is false.

Much like the previous scenario, a defender of physicalism and mereological essentialism has to deny that you perceive the image on the screen at t^*. She could deny the Perceptual Claim or say that the above scenario is impossible for reasons I've overlooked. But these don't really seem like live options.[17] According to physicalism plus mereological essentialism, no single person is exposed to the image of the peach from t to t^*. Thus, given the Perceptual Claim, a defender of this view has to say that no one perceives the image on the screen.

This is implausible, though. First of all, it *seems* to you as if you perceive the peach image on the screen. And, in fact, it *really is* there. It's not as if computers are stimulating your brain and giving you a false impression of what's in front of you. It's not as if you are hallucinating. The peach image is on the screen in front of you and is actually what causes your experience of it. Thus, not only do you have the right kind of experience—i.e. the experience *as of* a peach image on a screen—but all of the relevant spatial and causal connections to your environment are there as well. So, the obvious conclusion is that you perceive the image on the screen and you therefore persist from t to t^*; which means that (1) is false.

A defender of physicalism and mereological essentialism might respond by saying that, although there are no *computers* there stimulating your brain,

[17] One might be tempted to say that what we have here is a case where your VDT is shorter than normal—that for some reason you have a special ability to see the peach despite only being there in front of the screen for part of the time between t and t^*. But this is highly implausible. You wouldn't normally be able to see the peach if you were exposed to it for less than the time between t and t^*. And you don't have any special powers in the present case. The displacement of one atom certainly doesn't help. So the obvious conclusion is that your VDT is normal.

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there is another *person* there—the one that exists prior to losing an atom on her nose—that receives and passes on information to you about what's in front of you. Thus, she might deny that you perceive the image on the screen. But, again, this is an implausible way to construe what's going on. For, again, not only do you have the right kind of experience—i.e. the experience as of a peach image on a screen—but all of the relevant connections to your environment are (or at least seem to be) there as well. Furthermore, if one denies that you perceive the image, then one must deny that *anyone* does, since no one else even has a visual experience of the image. And this result is quite implausible. So although one may, if one wishes, deny that you or anyone else perceives the image, the obvious conclusion is rather that you perceive the image on the screen and that you therefore persist from t to t^*; which means that (1) is false.

This argument does not invoke the claim that you can be directly aware of temporally extended events. This might make it a bit less forceful than my previous argument. However, it still possesses much of the same force. For, at t^*, you can be directly aware of your perceptual experience. And, in the present scenario, your having this experience implies that you persist from t to t^*. So it implies the falsity of (1). There really is no remotely plausible way for a defender of physicalism and mereological essentialism to elude the refutation brought on by the Thought Claim and the Perceptual Claim. The view is simply false.

Now, maybe you knew this already. As I've said, the combination of physicalism and mereological essentialism is not a popular view. I've discussed it here mainly as a way of greasing the wheels. It's a relatively simple view. So it's a good one on which to introduce my argument. However, now that the argument is on the table, we can move on. Let's turn to some more prominent theories of personal persistence.

Consider *animalism*, for instance.[18] Animalism is the view that a person is a certain kind of living organism—namely, a human animal.[19] According to animalism, a person who exists at one time is identical to a person who exists at some later time if and only if she is the same human animal. So if animalism is true, then (2) is, too:

(2) Necessarily, if a person S at time t is identical to a person S^* at time t^*, then S and S^* are the same human animal.

Now return to the scenario where you think '$2 + 2 = 4$' from t to t^*. Imagine the following. While you are lying there thinking, aliens destroy most of

[18] There are various biological theories of personal persistence that *might* be called 'animalism'. Here I consider the view that Eric Olson [2007] defends and specifically refers to as 'animalism'. Other defenders of biological views that are more or less like Olson's view are Bernard Williams [1973], Mark Johnston [1987], Peter van Inwagen [1990], and Judith Jarvis Thompson [1997].

[19] Olson might prefer to say that *you* are a living organism (rather than this or that *person* is a living organism), since, given how he understands 'person' [2007], Olson does not wish to assume that you or I are essentially persons. However, like many of my interlocutors, I am using 'person' to just mean 'you' (whatever you are essentially). So my inquiry into your *personal* persistence is nothing more or less than an inquiry into your persistence *tout court*. Still, Olson and anyone sympathetic to Olson's position here may simply plug in 'you' wherever I refer to persons. My arguments against animalism will be unaffected.

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your body. They do this sometime between t and t*, and the only part of you that they *don't* destroy is your cerebrum. In fact, the aliens manage to sustain the normal functioning of your cerebrum. So, while you lose most of your body sometime between t and t*, you still think '2 + 2 = 4.'

Since you think '2 + 2 = 4' and it takes from t to t* to do that, the Thought Claim implies that you persisted from t to t*. But (2) implies the opposite. The person lying in bed at t is not the same human animal as the cerebrum at t*. Cerebra aren't animals, after all.[20] Thus, if (2) is true, you don't persist from t to t*. So, if the above case is possible, then either (2) is false or the Thought Claim is false. This case may seem outlandish, but it *is* possible.[21] And the Thought Claim is true. Thus, (2) is false, and so is animalism.

The rest of the story is the same. The same considerations that applied above apply here. The animalist has to deny that *you* thought '2 + 2 = 4.' But, again, this is unbelievable. In my view, this is because you can be directly aware of your thought and of yourself as its thinker. But even if this is denied, what's important here is just that your belief that it was you who thought '2 + 2 = 4' is undeniable.[22]

Plus, there's the case of perception. Return to the theatre scenario. At time t* you see a peach image on a screen, and your VDT is equivalent to the time between t and t*. Sometime between t and t*, the aliens destroy all of your body except for your cerebrum, eyes, and the rest of your visual system. The aliens manage to sustain the normal functioning of your cerebrum and visual system throughout the procedure. So you still perceive the image on the screen at t*.

The Perceptual Claim implies that you persist from t to t*. But, again, if (2) is true, you don't persist from t to t*. So if the above case is possible, then either (2) is false, or the Perceptual Claim is false. This case is possible, and the Perceptual Claim is true. Thus, again, (2) is false, and so is animalism. And we don't need to assume that you can be directly aware of temporally extended events. So animalism cannot escape refutation.

At this point, it may seem like my arguments favour *psychological* theories of personal persistence. But this is not necessarily the case. For the Thought Claim and Perceptual Claim rule out various psychological theories. Consider the *memory view*, for instance. The memory view says that a person who exists at one time is identical to a person who exists at some later time if

[20] Olson [2007: 41] says that detached cerebra aren't even *organisms*, let alone animals. He writes, 'A detached cerebrum is no more an organism than a detached arm is an organism.' However, some philosophers who *might* be called animalists say that cerebra are (or at least can be) organisms if they are separated from the body (see van Inwagen [1990]). These philosophers might say that you *do* persist from t to t*. So the present argument does not apply to those versions of animalism. However, we might amend the above case so that your biological cerebrum and visual system are replaced with an *inorganic* cerebrum and visual system sometime between t and t*. Of course, it's open to animalists to deny that this is possible. But if it is possible, then the present argument can be applied to *any* version of animalism.

[21] If this scenario seems too outlandish, consider this: Apparently there have been cases in which someone remained conscious for a short period of time after being decapitated (at least that's what the evidence suggests). I don't know if anyone ever spent her last moments thinking '2 + 2 = 4.' But these cases should lend some credibility to the claim that a scenario like the one I've described is possible.

[22] In fact, Olson [2007: 79] himself explicitly accepts that when it comes to thoughts like '2 + 2 = 4' you can be certain that it is *you* who exists and thinks the thought.

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and only if the later person has *first-personal memories* of events occurring to the earlier person.[23] If the memory view is true, then we have (3):

(3) Necessarily, if a person S at time t is identical to a person S^* at time t^*, then S^* has at least some first-personal memories of events occurring to S.

Now return to our two scenarios. This time around, suppose that mad neuroscientists erase all of your first-personal memories, including both your explicit and your tacit first-personal memories, sometime between t and t^*. In the first scenario, you think '$2 + 2 = 4$.' In the second scenario, you see a peach image on a screen at t^*. And in both scenarios you don't remember anything occurring to anyone at t.

If either the Thought Claim or the Perceptual Claim is true, you persist from t to t^*. But if (3) is true, you don't persist from t to t^*. So if the case I described is possible, then either (3) is false or both the Thought Claim and the Perceptual Claim are false. Surely this case is at least possible. And both the Thought Claim and the Perceptual Claim are true. So, (3) is false. Thus, the memory view is false.

The memory view is one prominent psychological theory of personal persistence. There are other actual and potential psychological theories of personal persistence. One might say that people persist in virtue of continuity in other, non-memorial, psychological states or processes, such as certain beliefs, dispositions, personality traits, or character traits. However, the Thought Claim and Perceptual Claim also rule out many of these views. For, as you may now realize, these claims imply that you can survive the loss of *any* part, state, or process that is inessential to conscious thought or perception.[24] This includes a wide variety of psychological states and processes. You can lose various beliefs, dispositions, personality and character traits, etc., without thereby losing your ability to think or perceive. So the Thought Claim and Perceptual Claim rule out other psychological theories as well.

Indeed, the Thought Claim and Perceptual Claim rule out a *wide variety* of actual and potential theories of personal persistence. I have only discussed a few of those theories here. There may be (and no doubt are) other theories

[23] John Locke [1975] defends this view. H.P. Grice [1941], Anthony Quinton [1962], Sydney Shoemaker [1970], and John Perry [1976, 2008] defend more sophisticated versions of it—versions that appeal to continuous chains of explicit and/or tacit memory-connectedness, or the ancestral of the memory relation, for example—that are nonetheless sufficiently similar to what I am calling 'the memory view' for the purposes of my arguments.

[24] What psychological processes are essential to conscious thought and perception? That's an interesting question. But I think the real question is more general: What processes are essential to *consciousness*? For, although I am focusing in this paper on conscious thought and perception, these arguments could be applied to *any conscious experience*. So there is no *particular* psychological process that is essentially implicated in my argument here. If you experience something, then you persist through some interval. Hence, the question is this: What is essential to having conscious experiences? I don't have an answer to that question.

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of personal persistence that conflict with these claims. Those theories are also false.

Here I am speaking rather pointedly about the falsity of some of the most prominent (both currently and historically prominent) theories of personal persistence. This may seem immodest. After all, defenders of the above theories have their own arguments. They have given reasons to prefer their respective theories. So, perhaps a better way to describe the state of play is just to say that I have given *some* evidence against various theories of personal identity—evidence that is to be considered equally alongside the other evidence.

But that's not how I see it. The evidence I have given is especially potent. It is evidence to which we all have access. It is evidence of which we can be directly aware whenever we think or perceive. And it is evidence that is absolutely foundational to how we reason about and conceptualize ourselves as people. Thus, rather than being just one consideration among many, this evidence carries special weight. It is certain. It is undeniable. We are all eyewitnesses, so to speak, to the falsity of the above theories of personal persistence. But unlike many eyewitnesses who rely on hazy memories and questionable assumptions, we have the full force of airtight evidence at the ready whenever we need it. We should therefore not hesitate to decry each of the above theories. For we know that they are false.[25]

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3. Conclusion

We want to know what makes a person the same person through time. We want to know what makes someone like you the same person now as you were yesterday, and what it will take for you to be the same person tomorrow, next year, or three decades from now. We may form an opinion as to whether you've persisted, by observing the way you look or act. However, there is a more basic, more secure, way for you to learn something about what it takes for you to persist through time. Just think to yourself, '$2 + 2 = 4$.' Then ask: What is required for my thinking this thought? You will thereby have discovered a sufficient condition for your persistence. It's not a necessary condition, since you don't *need* to think '$2 + 2 = 4$' in order to persist. But by noticing that you do in fact persist when you think '$2 + 2 = 4$', you will be able to learn that there's a lot else you don't need in order to persist through time. You don't need to keep all of the same physical parts. You don't need to be the same animal. You don't need to remember the past. You don't need to have the same personality or character traits, beliefs

[25] Some philosophers express doubts about using thought experiments to settle these issues about personal identity. They say that thought experiments rely too heavily on intuitions that are unreliable, idiosyncratic, or at the very least unsuited to deal with wild thought experiments about aliens and mad scientists. However, in appealing to the above thought experiments, I am not trying to pump your intuitions. I am not asking you to reflect on your gut instincts or to consider whether certain of your concepts apply to various cases. Rather, I am trying to draw your attention to decisive, incontrovertible, evidence about yourself—evidence you actually have directly before you.

or desires, plans or goals. Each of these things is superfluous. You can persist without them.[26]

Where does all this leave us as far as a theory of personal persistence goes? Well, with several of the most prominent theories of personal persistence now off the table, one might be tempted to just deny that there is any criterion—any informative metaphysically necessary and sufficient condition—for personal persistence (see, e.g., Merricks [1998]). But I don't think that this is a good way to go (see Duncan [2014]). Luckily, there are other options—other *prima facie* plausible theories of personal persistence that are consistent with the Thought and Perceptual Claims. Consider, for example, a version of *dualism* that says that personal persistence consists in the continuity of an immaterial mental substance. So, S at t is identical to S^* at t^* if and only if S and S^* are (or have) the same immaterial mental substance. Such a dualist can plausibly say that this immaterial mental substance is necessary for conscious thought or perception. And she can say that nothing unnecessary for conscious thought or perception is necessary for personal persistence. Thus, for all that has been said so far, dualism is still on the table.

But dualism is not the only view still on the table (which is good, since few philosophers are attracted to dualism). Another view that is, at least on the face of it, consistent with the above results might be called 'the brain view', which says that S at t is identical to S^* at t^* if and only if S and S^* have the same brain. A defender of this view might say that brains are necessary for conscious thought and perception, and that nothing unnecessary for conscious thought or perception is necessary for personal persistence.[27] So the brain view is still on the table.

Yet another view, which I happen to prefer, remains neutral on our underlying ontology. It says that we are things essentially capable of undergoing the distinctive form of conscious experience involved in human thought and perception, but remains agnostic about what's required, ontologically, for the capacity for consciousness. So, on this view, we might simply say that people are *thinkers*. And we might say that S at t is identical to S^* at t^* if and only if S and S^* have the same capacity for consciousness, where sameness of the capacity for consciousness is construed abstractly in terms of continuity in the underlying stuff (whatever it is or could be) that is directly

[26] Philosophers who talk about personal identity and are strictly concerned with certain moral, ethical, or legal issues may think that the short periods of time on which I've focused are far removed from those issues (though that's debatable), or they may think that the 'survivors' I've discussed are, at least in some cases, too impoverished to have the kind of moral, ethical, or legal standing in which they are interested. In so far as they would be right, I am inclined to say that this just shows that questions about our survival are prior to, and in some cases separable from, questions about our moral or legal standing. After all, criteria of personal persistence are fully general. They aim to say whether a person S at time t is identical to a person S^* at time t^*, where S and S^* are *any* people and t^* is *any* time after t. So, if a discussion of the identity of S at t and S^* at t^*, where t and t^* are mere milliseconds apart, is not relevant to certain moral, ethical, or legal questions, then that just shows that discussions of personal persistence are not always relevant to such questions. Now, I have no problem with theorists who wish to focus on the moral, ethical, or legal questions. But here I am interested in a question—'What does it take for you to be identical to a person who exists at some (*any*) other time?'—that may be different and in some sense more basic.

[27] There are several potential versions of the brain view. One might say brains are essentially biological entities, for example, and thus be committed to saying that a person couldn't survive (or think or perceive throughout) the gradual replacement of her brain with inorganic material (e.g. silicon chips). Or one might instead say that brains are functional entities that can persist through the gradual replacement of their parts with inorganic material. I leave it to those who are sympathetic to the brain view to decide these issues.

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responsible for consciousness. This view is consistent with the Thought Claim and the Perceptual Claim. And, since it construes personal persistence in terms of continuity in the *capacity* for consciousness rather than in terms of continuity in uninterrupted episodes of consciousness (cf. Strawson [1999]), this view also coheres with the evident fact that people can survive sleep and other periods of unconsciousness. Similar views have been proposed in various forms (e.g. Dainton and Bayne [2009]). More development is needed, of course, but that will have to wait for another day.

These are just three options. The theories mentioned above do not exhaust our options. But they do show that the results of this paper can be incorporated within various live theories of personal persistence. Thus, although we must reject several prominent theories of personal persistence, we need not despair.[28]

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