

CAN SCIENCE CHANGE OUR NOTION OF EXISTENCE?

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Abstract

I explore the question of whether scientific changes can induce mutations in our ordinary notion of existence. I conclude that they can't, partially on the grounds that some of the proposed alternative-notions of existence are only terminologically-distinct from our ordinary notion, and so don't provide genuine metaphysical alternatives, and partially on the grounds that the ordinary notion of existence is criterion-transcendent.

1. It's a truism that science discovers things about the world we live in that we didn't expect (that we didn't even see coming). Certainly the science of the early modern period did just that: that our sun is only one among the stars, that other planets have moons, that there are micro-organisms too small for the naked eye to see; and science was both acclaimed and reviled as a result. Nearly as much of a truism, as the one about science discovering new things, is that science transforms the inherited concepts of ordinary life. We have ordinary ideas about motion, roughly encapsulated in Aristotelian physics, perhaps belonging to a folk-physics that's conceptually innate (in some sense of "conceptually innate").¹ These concepts were drastically transformed by Newton. More recently, most of the popular literature of physics has been motivated by attempts to communicate to ordinary people drastically-changed notions of space and time, shape and velocity, as much perhaps as it has been motivated by the desire to present what the world we live in is actually like. Philosophers, of course, worry about whether basic notions of causality and identity scale down to the quantum level; and many argue that they don't.

Are *all* of our concepts open to mutation from empirical pressure? Quine thought that this was even true of the concept of existence. Having attached our concept of existence to the first-order quantifier, he serenely contemplated the possibility of a future shift in logic accompanied by a shift in quantifier-apparatus, or even a replacement of the quantifiers altogether with something else far too alien to allow ontology to survive. Logic for Quine was open to mutation; so, therefore, he thought, are all the concepts dependent on its structure.

1 Pylyshyn (2003, 282, footnote 1) notes then unpublished work of Ian Howard that seems to show "that people's naïve physics, as measured by their predictions of falling objects, conformed to Aristotelian rather than Newtonian or Galilean principles."

2. What about those of us who reject attaching our fundamental notion of existence to a technical formalism in this way? I've argued (2010a, forthcoming) that there is an ordinary notion of existence, antecedent to formalization. We believe things that exist have their properties independently of us in the sense that to attribute a property Q to an object o truly is to do so *because* o is Q, and we have discovered this fact. It's not that o has the property Q by virtue of our determination (in some way) of the truth value of the sentence "*o is Q.*" (So, in particular, o doesn't have the property Q because we've stipulated it to have Q or because our senses project Q onto it, and so on.) This, however, isn't a *requirement* on our notion of existence (it isn't an analytic entailment of our notion of existence). We could discover that everything that exists is dependent for its existence on the mind of God. That discovery wouldn't force a change in our notion of existence; it would just be a surprising discovery of a property of all existing things (except God, presumably).

There *are*, I think, constraints on our ordinary notion of existence. Things either exist or they don't; existence doesn't come in degrees or in different qualities (heavyweight, welterweight, lightweight; mathematical existence, physical existence, fictional existence, etc.); nothing, in any case, *partially* exists. It's also a condition of our ordinary notion that existence isn't one member of a family of ontological notions; there are no differences between existence, being, and being real (for example). Finally, things either are, or they aren't; if they exist, they have properties; if they don't exist, they don't have properties because they aren't at all, and nothing that isn't can have properties.

Someone who points out these aspects of our ordinary notion of existence, and insists on taking that notion seriously, has to explain why the ordinary notion doesn't conflict with our practice of uttering truths and falsehoods about things that don't exist: "Mickey Mouse was invented by Walt Disney," is true; "Mickey Mouse was invented by Cardinal Richelieu" is false. There is no Mickey Mouse, however, to ground these truth-values; we have to explain, nevertheless, how there seem to be truths and falsehoods *about him*. I've told a story elsewhere (2010b) that preserves the truths and falsehoods we need, but doesn't preserve the ontological force of "about him" that we don't need. I'm not going to talk about that now.

3. Tampering with the notion of existence dates back to Plato, at least; so it may seem that there would be nothing unusual if science did something similar. Indeed, contemporary (analytic) metaphysicians are currently contemplating characterizations of existence on which it comes in many shades (different kinds of beings have different kinds of existence) or on which only

fundamental things exist in the heavyweight sense, but composite things (like armies) exist in a more lightweight sense. Many think our ordinary notion of existence is already this way (on the basis of how we ordinarily use the word “exist” and the phrase “there is”) or they think that there are arguments—that can establish these claims. I’ve argued (2010a, forthcoming) that these views get our ordinary words “exist” and “there is” wrong; but that such alternative notions of existence can be *invented* seems to raise the issue of whether scientific results would force an alternative notion of existence the way that scientific results have compelled a change in the geometry we apply in our (fundamental) physics.

Some scientific discoveries don’t change the concepts involved in those discoveries. It’s this that the old Putnam/Kripke thought experiments about blue gold and robot cats seems to illustrate. And, indeed, the surprising things we discovered about gold (that it’s an element with atomic number 79, that it can be a gas), and that we continue to discover about so many other things, suggests that “natural kind” terms are ones designed (as it were) to handle unexpected discoveries about the things they apply to. Other notions, as I’ve indicated, don’t seem as flexible. *Space*, for example. It’s not so much that the ordinary notion of space is implicitly Euclidean; it’s rather that our ordinary notion of space is geometrically unstructured. Our notion of empty space, I surmise, is that it’s nothing at all; we don’t think of *empty space* as placing structural constraints on anything that’s in it. So it’s already a shift in our *concept* of space to even think of it as Euclidean-structured (as opposed to the various curved alternatives). For reasons, perhaps rooted in certain confusions in the notion, *space* is a concept that’s much less flexible than the concepts corresponding to the “natural-kind terms.”

A little bit more about our ordinary notion of space and how puzzling it is. One can claim that it *tacitly* possesses a Euclidean structure. After all, the way we expect to be able to move through space (and not, after a while, end up back where we started despite moving in a straight line), the way we expect rulers to work (once we know what they are), and so on, all suggests our notion of space is more than compatible with Euclidean structure: it rules out (or seems to) otherwise empirical alternatives. Maybe so, but that’s entirely compatible with the thought that this, after all, is what *empty space* is like, where *empty space* isn’t seen as Euclidean-structured.

An analogy. B is blind, and has never seen colors; B has never seen *anything*. A post-operative B sees all the colors—including black. It wouldn’t be correct to say that, back when B was blind, B had the *concept* of the color black all along (because B *now* says, looking at black: “That’s what *everything* used to

look like”); it would be wrong to say that B was missing the concepts of all the *other* colors, except for the concept of black. Consider a variation where it’s not the color black that B says he saw before he gained sight—with “hindsight,” as it were—but red. (B says, looking at something red: “That’s what everything used to look like.”) We wouldn’t want to say, in this case either, that B had the *concept* of the color red all along.

4. To return to the main thread, whether a concept can accommodate a discovery without the concept changing as a result is perhaps a sticky business, based as it is on sheer intuitions. Nevertheless, there seem to be clear cases where almost all of us are shocked by a scientific result: it seems that our concepts are being unduly tampered with because of it or even discarded; and there are other cases where we’re surprised (as we’re surprised by carbon ash and diamonds turning out to be the same element in different crystal forms); but we don’t think of our concepts as having mutated as a result. I’ll try to stick to the clear cases.

One point seems clear: that philosophers *can argue* (without appearing to contradict themselves) that everything is in space and time, or is material, or is abstract or is dependent on God’s mind, and so on, shows that our notion of existence is more like “gold” than it’s like “space” or “time”: the concept can handle surprising discoveries. I call notions like this “criterion-transcendent” (Azzouni 2000, 2010a)—they don’t come with criteria that *entail* that the items that fall under them have such and so properties (and not other properties). *We believe* (I think) that everything (that exists) is mind-independent; but the claim that the things around us nevertheless exist wouldn’t be disturbed by the discovery that Bishop Berkeley was right, that everything in fact is dependent on the mind of God.

This is also worth saying a word or two more about. I claim that, currently, we (collectively) take mind- and language-independence to be a condition on what exists. When we discover that something is mind-dependent (when we discover that something we thought was in front of us is instead an hallucination), we withdraw the claim that it exists. Were we to discover that everything—ourselves included—is dependent on the mind of God in the same way that we understand (the contents of) an hallucination to be dependent on us (were we to discover that “esse is percipi”), we could keep our condition for existence, and deny that anything other than God existed. But the word “exist”—as we already use it—allows another possibility. We could desert our current condition for existence for a different one, *dependence on God in such and such ways* (and not in other ways—so that we could still distinguish be-

tween chairs and our own hallucinations of chairs). Because our conception of existence is criterion-transcendent, either possibility is allowed. Therefore, our conception of existence allows at least two positions for philosophers to adopt, neither of which they can show is right. First, that in Berkeleyan circumstances only God exists. Second, that in those same circumstances, everything (other than God) that exists is dependent on God in such and such ways.

5. It does seem that our concepts of weight and shape have shifted under pressure from scientific developments. The ordinary conception of weight is that it isn't a *relation* but a monadic property of the weighted object; and this is important. It's a shift in the concept of weight to treat it instead as a complicated relation between the masses of two objects and the distance between them; but it's a shift that most of us have become comfortable with (even though, it has to be said, we continue to automatically think of "weight" monadically—as something many of us have far too much of, for example). More drastic, apparently, is the shift to a relational status of the concept of shape—that it's relative to velocity. (The faster an object goes, relative to a viewer, the more its shape changes.) We didn't expect *that*, and it changes how we must think of shape; we have to stop thinking that shape is a monadic property of an object that's independent, in particular, of how fast it's moving, or in what direction.²

What's considered conceptually innovative about special relativity, often, is that the shape of an object is relative to an inertial frame; I'm not disagreeing with this, but recasting the point in terms of the striking fact that, within an inertial frame, an object changes shape if it accelerates. That wasn't expected; we didn't see that coming.

An interesting difference between scientific concepts and ordinary concepts is this: ordinary concepts don't appear to interlock together the way that scientific ones do. (Scientific concepts interlock because they're based on mathematical antecedents that similarly interlock, the way that the concepts of special

2 Some philosophers can't resist, apparently, *choosing* to continue to think otherwise—despite the emergence and even the *popularization* of the scientific facts. Lewis (1986, 204) writes: "If we know what shape is, we know that it is a property, not a relation." Notice: our concept of shape has changed under pressure from special relativity (and general relativity); it's not that the result is a *different concept*. A distinction should be drawn between changing a concept so that the same concept is different (in certain respects), as opposed to changing it so that it's now a different concept. (He has gone through so much that he's a "changed man," as opposed to; "that's not the same man, that's some *other* man.") Again, things can get sticky because, after all, these distinctions—with respect to concepts—are based on sheer intuition.

and general relativity interlock because of the mathematics they're based on.) This is another reason why it's hard to measure conceptual change: ordinary concepts seem affected in different ways by scientific theories because they (intuitively) seem to intersect with scientific notions on a one-by-one basis. The ordinary concepts of space, time, velocity, mass, etc., all seem separate in their meanings and how we apply them to the world. As a result, it's often hard to appreciate how much their successor concepts holistically interlock in scientific theories.

6. Let's consider mutating our notion of existence—shifting it from a monadically-applicable notion to a (kind of) relation. I'll start with the currently-popular suggestion that entities that exist in this world needn't exist in other possible worlds. Contemplating this idea doesn't seem to stress our ordinary notion of existence. We don't think of my *existence* (for example) as relative to a possible world; we instead think of me as *in* some possible worlds but not in other ones. Nevertheless, some philosophers have thought otherwise, distinguishing—as a result—being actual from mere relative-to-a-world-existence.

Intuitions about possible worlds are genuinely peculiar cases, surely made problematic because the ordinary person thinks that he or she could (under certain science-fiction/comic-book scenarios) meet his or her possible-world-mate. I'll come back to possible worlds and existence a little later. Let's instead consider the idea that we could relativize the existence of something to a property *within* a world—say, the velocity of an object. Imagine that items that reached certain speeds vanished. (The idea would be that objects are physically present in those inertial frames where they're traveling below a certain speed; but that they aren't physically present in inertial frames where they would have to be traveling above that speed.)

There seem to be two possible interpretations. The first is that such objects exist; but they are causally active (“causally present”) only within certain inertial frames and not others. The second is that objects only exist if they travel below a certain speed: that *existence* is relative to an inertial frame. What reasons would we have for going with this second suggestion?

None, I think. Certainly we'd need, regardless, to distinguish between cases where accelerating ourselves would “bring into existence” objects that didn't exist before and cases where doing so would produce no new objects (because there was nothing to be made to exist there no matter what speed we traveled at). That suggests instead that the things exist (although different speeds bring them out)—that they have unusual *properties* that are linked to the geometry. So, instead of characterizing existence itself as relation of some sort, or as

inertial-frame relative, we instead can characterize the objects as simply existing, but as having unusual (surprising) properties.

This point, I think, reveals how *existence* is disanalogous to the rest of our concepts. There isn't ever going to be a reason for our notion of existence to be modified by the press of scientific advances. This is because scientific changes, when characterized in terms of a new concept of existence, will be trivially transformable into characterizations of the discoveries in terms of the ordinary notion of existence.

7. The alternative geometry case offers instructive comparisons. One reason it might have been initially thought that the discovery of non-Euclidean geometries had no empirical implications was the existence of relative consistency proofs: the fact that models for (some) non-Euclidean geometries can be embedded in Euclidean geometries. And this could have suggested that whatever physical theory couched in whatever non-Euclidean terms could be successfully embedded into a theory that instead took the background space to be Euclidean.

To think this, however, would be to overlook how such embeddings shouldn't be solely mathematical in their implications. If, all things being equal, a physical theory functions successfully within a certain-dimensioned non-Euclidean manifold, there's no reason to embed it in a Euclidean super-space if that resulting embedding officially offers no additional empirical implications. There's no reason, that is, to say that "space" is really Euclidean, but there's no way we can ever detect that because *all* physical interactions are restricted to a surface within that space. I'm passing over a lot of complexity in saying only this much—including delicate issues about "the underdetermination of theory by data" but I hope the point is clear enough for me to apply its moral to the case of *existence* by showing that similar considerations are never relevant when it comes to *that* concept.

Leaving aside the actual usage-facts of English and treating the alternative-notions of existence as candidate-notions we might think we should adopt (say because of a discovery that objects operate in a way strangely relative to their inertial-frame velocity), we need a reason to accept that instead of thinking of objects as having such and such (complex) properties and relations, we should instead think of them as existing in these circumstances rather than in those circumstances.

For example, we can think of objects as existing relative to this world or relative to that world (that the predicate "exist" is two-placed, containing one place for a term designating an object and another one for a term designat-

ing a world), or instead we can think of them as just existing, but “present in” certain worlds and not in others. (“Present-in-a-world” is a property an object can have.) Similarly, we can think of myself as existing, but as having the properties (or relations) of being present during and in certain times and places, or instead as existing relative to those certain places and times—so that existence is existence-at-a-time-and-place. It isn’t an illusion—I submit—that this is a grammatical distinction without a metaphysical difference. It’s not like the geometry case, where an attempt to dislodge the view that space is “really” non-Euclidean fails because doing so by utilizing an embedding introduces the question of whether the Euclidean superstructure is physical or only adipose mathematical tissue. There seems to be no corresponding question that arises because of the contrast between existence-relative-to-P on the one hand, and monadic existence on the other hand, where the item instead has the property of being at (and only at) P.

8. It might be argued that our ordinary notion of existence, contrary to what I’ve been suggesting in this paper, is actually one that’s already relativized to time (if not to space). We don’t think of a person as existing relative to the space he’s in. We exist, *and* we have the property of being on Earth. It’s not that we exist-relative-to-Earth, but that we don’t exist-relative-to-Mars. However: Does Abraham Lincoln exist *and* have the property of being at such and such times and not other times? (Does Abraham Lincoln have the property of not being at the present moment?) Or is it rather that his existence is existence-at-such-and-such-times, and not existence-at-other-times? I’m not sure ordinary language actually provides an answer to this question. Part of the problem is that we don’t naturally say things like, “Abraham Lincoln doesn’t exist anymore,” or “Abraham Lincoln was real but he isn’t real any longer,” although we do say “Abraham Lincoln lived in the nineteenth century,” or “Abraham Lincoln is no longer with us,” and so on. On the other hand, it might be argued that the fact that our talk of existence is tense-laden the way that *all* our verbs are, shows—however unnatural it is to say certain things—that the ordinary talk of existence does invoke a concept of such that’s relative to times. It’s a really interesting question what ordinary usage indicates about the role of tense in ontology; but ordinary usage doesn’t always conform to our corresponding ordinary concepts.

In any case, my suggestion remains that this is a grammatical distinction without a metaphysical difference; and so the (standard) logician’s practice of treating “exist” as atemporal (as opposed to relative to time) is sustained at least insofar as it can be taken to introduce no metaphysical changes of significance.

9. In arguing that there can be no empirical grounds for distinguishing between scientific changes affecting the notion of existence as opposed to their affecting our notions of the properties that should be attributed to those objects, have I involved myself in some sort of (illicit) verificationist maneuver? No: Some grammatical distinctions *really are* without metaphysical significance. We recognize that we can either modify the predicates that apply to an object, or we can modify claims about when *there is* an object to apply predicates to. We may think there is a robust difference here: surely (some may think) there is a difference between an object existing (but only being physically efficacious in frames where it travels at certain speeds) and its only existing at those speeds (only existing relative to a frame). Surely (some might think) there is a difference between an object's having the property of being at certain times and not other times, and that object only existing relative to those times and not existing relative to other times.

It may seem unclear where the burden of proof is here: on that philosopher who demands that more content has to be given to this purported distinction before it can be taken seriously in metaphysics, or on that philosopher who denies that any more content is required for serious metaphysics than the description of the distinction that I've just given. Not every distinction, however, that can be drawn in how we *formulate* what we say should be taken to correspond to something *metaphysically significant*; I think, therefore, the burden is on that philosopher who thinks otherwise.

10. I've suggested that, despite the existence of alternative conceptions of existence, there is no reason to think that developments in science itself can ever motivate an alternative notion of existence instead of the one we already have. In part this is because the ordinary notion is criterion-transcendent: like the concepts corresponding to natural-kind terms, it's prepared for substantial discoveries and upsets in the properties of the things that fall under it. In part it's because the distinction between treating "exists" as relational, or instead as treating the objects that exist as possessing certain correspondingly complex properties, is ultimately a mere grammatical distinction that offers no metaphysical friction to distinguish the purported alternatives.

What about the battery of alternative ontological notions that I opened this paper with: various species of being and nonbeing, for example? I claim the same is true of them. It's an illusion that we are really entertaining alternative ontological schemes using such notions. We may speak of armies as having being (or as having a lightweight form of existence) on the basis of the fact that they are composed of soldiers (that exist, or that have a heavier grade of being).

But these ways of speaking trivially translate to a way of speaking where the only ontological resource is the ordinary notion of existence. Instead, different claims are made about the properties of the purported entities; or it may be that the way of speaking (of armies, say) is one that involves ontologically-empty truths.

One question remains. Recall that at the outset of this paper, I noted that Quine contemplated the possibility that ontology could vanish as a coherent topic. From quantifiers being part of a formalism that could be superseded by technical innovations, Quine drew the surprising conclusion that ontology is a parochial topic that could fail to make sense in future conceptual contexts.

There is a settled belief I have that human imagination—no matter how talented particular individuals may be—is limited. Revolutions in thought are always possible. Thinking about previous changes in science suggests that concepts and theories, being relatively global, are especially vulnerable to change. The shift out of Newtonian science during the twentieth century shows this: massive amounts of the phenomena were preserved in this shift (e.g., the antics of objects at relatively low speeds relative to our inertial frame). Preservation of massive amounts of data is compatible, however, with enormous—even shocking—changes in theory and in the concepts that occur in those theories.

All this is by way of conceding the truism that it's hard to predict what may happen to our concepts—even our scientific concepts—as scientific change continues. Because of that I can't be said to have established, let alone even considered, the question of whether our concept of existence will be modified by *any possible* scientific development. All I've done is considered the narrower question of, given the way our science (and the language it's couched in) looks today, how our notion of existence is likely to be affected. And I've suggested there isn't much sense (against this background) to the idea of it changing at all.

So, then, what about the possibility of it ceasing to be even pertinent, of *existence* (and the concerns of ontology) being sidelined altogether by future scientific developments? There's little likelihood of this as well. We may discover that the objects out there are very strange; we may even discover (although I doubt it) that objects—all objects—are mind-dependent in some way. But we won't discover that our network of concepts has changed so much that the notion of "object" is no longer coherent or relevant.

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Bibliography

- Azzouni, Jody. 2000. *Knowledge and reference in empirical science*. London: Routledge.
- . 2010a. Ontology and the word 'exist': Uneasy relations. *Philosophia mathematica* (III) 18, 74-101.
- . 2010b. *Talking about nothing: Numbers, hallucinations, and fictions*. Oxford: Oxford University Press.
- . Forthcoming. Simple metaphysics. (Benjamin Schnieder and Fabrice Correia, ed.) *Ontological dependence*. Cambridge: Cambridge University Press.
- Lewis, David. 1986. *On the plurality of worlds*. Oxford: Blackwell.
- Pylyshyn, Zenon W. 2003. *Seeing and visualizing: It's not what you think*. Cambridge, Mass.: The MIT Press.

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