Persistence as a Four-Dimensionalist: Perdurantism vs. Exdurantism

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ABSTRACT: The debate over persistence currently involves three competing theories—one three-dimensionalist theory called "endurantism" and two four-dimensionalist theories called "perdurantism" and "exdurantism." This inner debate between the latter two persistence theories is what I aim to clarify, and ultimately, I argue that perdurantism is superior to exdurantism because exdurantism is too extravagant in counting ordinary objects in the world.

Perdurantism

With a presumed ontology of eternalism and concomitant mereology of temporal parthood, perdurantists formulate that any object—and by "object" I mean any material object *simpliciter*, not an immaterial object—at a specific time slice t is not at that time slice t a complete object; rather, an object is the amalgamation of all its parts extended throughout its spacetime career. The object that retains its identity—all while persisting within time even though its states and relations change—is called a four-dimensional *worm*, *continuant*, or *perdurant*.

Two four-dimensionalist persistence theories—perdurantism/worm theory and exdurantism/stage theory—do not disagree that there are temporal parts or that there are such things as continuants, but the question is this: Which do we identify as the object—the stage or the continuant? As we will see below, for the stage theorist, an ordinary object like an apple is an instantaneous stage (which makes up an aggregate continuant), but for the worm theorist, the apple is the actual continuant (which is made up from the sum of its temporally extended parts). As a perdurantist, all objects are considered to be four-dimensional worms and they make up the different regions of spacetime. Each object is a fusion of all the perdurant's instantaneous time slices compiled and blended into a complete mereological whole. Conservative philosophers note that one cannot perceive temporal exten-sion like we can perceive spatially extended objects, but perdurantists hold that the composite of all the time slices and their regions of space spread out from the first moment of a continuant's existence until its last creates the four-dimensional spacetime worm.

What Parts Change and Are They Indeterminate?

Perdurantism posits that temporal parts alone are what ultimately change. David Lewis in *On The Plurality of World* states that change is "the possession of different properties by different temporal parts of an object" (12). As your life proceeds, you become more temporally spread out through the four-dimensional manifold with every moment accumulating in the form of successive time slices that overlap each other. Just as there is spatial overlap (e.g., the Atlantic Ocean and the Pacific Ocean both overlap at their boundaries at the horn of South America), so too is there temporal overlap (viz., the time slices t_1 and t_2 both overlap during a continuant's spacetime career).

Take any perdurant and isolate a part of its spatial region. That isolated spatial part has a corresponding temporal part to match it. We can imagine an object, or four-dimensional worm: an apple. This object is not just spatially extended but also temporally extended. The complete view of the apple includes its coming to be

from the blossom, its development, and its final decay. Each of these stages is a temporal time slice of the apple, but by viewing an object as temporally extended, perdurantism views the object in its entirety. A perduring object extends through space through the function of pertension. Josh Parsons defined "pertension" as the act of an object "filling space by having distinct parts in distinct places," which means that "space-time, if it exists, extends by *pertending*, and persists by *perduring*" (italics added, 404, 405). Contrast this view of spacetime extension to a duo of diametrically opposed positions, endurantism and exdurantism, which consider an object to have absolutely no extension through time because any object is already wholly present at each slice of its spacetime career.

Both being four-dimensionalist theories, perdurantism and exdurantism confront the problem of ontic vagueness differently. Indeterminacy for perdurantism stems from the beginning and end of a continuant's existence, namely, when is the moment of fission or fusion, i.e., when do the various time slices that make up an object split (fission) or join (fusion)? These blurry boundaries, or gray areas, suggest that it is not possible to pin down precisely the spacetime career of four-dimensional objects during fission or fusion. Are we referring to a single object twice or to two numerically distinct objects?

Perdurantism retorts that these blurry areas are from imprecise definitions of what the identity of an object is. As long as we continue to have unclear semantic content pertaining to the reference of a word, which regularly happens in any sorites paradox, then there will be, at least for those words, vagueness. According to Lewis, ontic vagueness does not come from the object itself but from our own "semantic indecision" (212–3). This ubiquitous decision of turning the vague to something that is determinate happens so often in everyday life that it is unavoidable to try to live any differently. To demonstrate how an object has a determinate identity, imagine the following example. Hollywood Freeway and Freeway 101 overlap in front of Universal Studios Hollywood (USH) but

split just north of it. Question: How many freeways are there in front of USH? A perdurantist would answer, "Two. One of them (Freeway 101) goes west and gets to be called 'Ventura Freeway,' and the other one (Hollywood Freeway) goes north and gets to be called '170.'"

This area of overlap is not indeterminate because we have made a semantic decision regarding where each freeway begins and ends. Therefore, when our language is precise, definitive, and decisive about vague concepts, we can have statements that have determinate truth-values that reference exact identity.

Identity also cannot be vague because vague identity is logically impossible. Nathan Salmon, in *Reference and Essence*, explicates this with the following sound argument:

> Suppose there is a pair of entities x and y [...] such that it is vague [...] whether they are one and the very same thing. Then the pair <x,y> is quite definitely not the same pair as <x,x>, since it is determinately true that x is one and the very same thing as itself. It follows that x and y must be distinct. But then it is not vague whether they are identical or distinct. [243]

Therefore, as long as we are precise about defining what is "x" and what is "y," we can have determinate truth-value statements that reference identity.

What Is a Whole Object and How Many Objects Are There?

A single ordinary object is the collection of all its temporal parts from its entire spacetime career. There is only one partially present object that perdures with time. An object is partially spread out with time, meaning that any object from only one moment is not that object *in its entirety*. Employing an atemporal perspective is exercised by four-dimensionalism to contemplate the whole of time and to characterize temporal parthood under such a notion (Sider, 57). An entire object (i.e., a mereological whole) is the sum of all its

temporal parts; e.g., an apple as a whole is really an aggregate of its temporal parts starting with the first time slice of its existence to its final time slice. If we picture all the time slices together, we might imagine something like a segmented worm, which is often used as a representation of how objects can be viewed as worms: once they come into existence, their temporal range extends a certain distance along the time axis then peters out of existence.

Naturally, when we see an object, we want to say that it is only one object. For something to persist is for it as a continuant to be around for more than one moment. While an object might only be partially whole from each moment to the next, it is still a single object. The line in the sand between perdurantism and exdurantism revolves around the degree to which a single temporal part constitutes an object, either partially throughout the entire breadth of all its temporally extended points, or with no parts being left from each individually unextended object-stage. This vision for persistence comes in two strains: one from Theodore Sider and another from Katherine Hawley. While Hawley posits that there is nothing that is over and above the stages themselves, Sider argues that there are additional supervenient objects that supervene without any restriction on their stages. These additional objects are four-dimensional object-stages, or as he sees it, continuants.

Exdurantism

Exdurantism, like perdurantism, presumes the temporal ontology of eternalism. With this alternative four-dimensionalist persistence theory, however, ordinary objects are no longer perduring worms but, rather, are wholly present instantaneous stages. Moreover, things also do not gain or lose properties/parts because each distinct stage has all these properties/parts in their entirety from one counterpart stage to the next. With endurantism's and perdurantism's being the original duo in the persistence debate, exdurantism came to the scene as a slight combination of the two.

Yuri Balashov recognized this when stating, "Like perdurantism, stage theory [exdurantism] endorses the existence of temporal parts, or stages. But like endurantism (and contrary to perdurantism), stage theory typically identifies ordinary objects with 3D entities that are wholly located at momentary regions that lack temporal extension" ("Persistence," 14). Two varieties of stage theory incorporate unrestricted composition and counterparts theory. Unrestricted composition, also known as universalism, holds "that necessarily for any ys those ys compose a further object" (Effingham, 241). Such a composition could be any sum of spatio-temporal parts, regardless of how disconnected and gerrymandered the object is.

Sider's stage theory emphasizes temporal counterpart relations. Such a counterparts theory posits time to be relational from one counterpart stage to the next. Exdurantists think that two stages can be temporal counterparts if they come from the same sortal; e.g., a Scottish-terrier stage can never be a temporal counterpart of a person stage but could be a temporal counterpart of another Scottish-terrier stage. Exdurantists, however, do think that despite being a stage, an object can be a counterpart stage to another object if those stages have similar historical properties (Sider, 193). An exdurantist contends that an ordinary object is numerically identical to a single stage and its temporal counterpart is numerically identical to another distinct stage, making each stage wholly present at the moment it exists, and it exists only at that moment (Kurtz, 7). Momentary object stages are entities exclusively confined to a particular stage of the object's path in a four-dimensional spacetime manifold.

What Parts Change and Are They Indeterminate?

Simply put, no parts actually change. Change is a succession of dissimilar instantaneous object-stages, which means that change, as most people know it, is illusory. An exdurantist would contend that an object and its temporal counter-

part have incompatible properties and exist at different moments in the actual world (Kurtz, 7). Perdurantists are similar in some respect. An exduring object, however, is wholly present at exactly one instant of time and then is gone the next, just to have its temporal counterpart momentarily replace it. The stage that the apple is located at is only a corresponding stage of the apple's path. When we look at another stage, which too is numerically distinct, we find an entirely new object. What is located at another stage is a numerically distinct apple stage that is also wholly present.

The problem of ontic vagueness for an exdurantist is presented in terms of how counterpart stages are in fact related. If it is indeterminate to tell whether X and Y are the same object, then it too is indeterminate whether the distinct stages X and Y stand in appropriate same-object relations. An exdurantist claims a continuant to hold the same identity simply from this stage's being *similar* to a subsequent stage, which is what makes the two stages temporal counterparts. Resemblance among momentary counterpart stages is insufficient to escape vagueness because similarity itself is vague. Similar in what way? By noting when there is a similarity among sortals and that there are adequate causal relations held between them, exdurantists avoid vagueness the best they can. Counterpart theorists follow the identity of a continuant by following the relationship among stages. The problem still lies that there is no clear cutoff point concerning what was and what was not a counterpart of the object and whether we can really attribute a causal relationship between the distinct momentary counterpart object-stages.

Perdurantists, as we know, say that this is a matter of identity, and identity cannot be vague because that is logically impossible. Therefore, ontic vagueness is not a matter of metaphysics at all but about how we talk. This semantic view held by perdurantists appears superior to the sortal/causal relations view held by exdurantists because with the semantic view, we have the possibility to have definitive boundaries around an object's coming in and out of existence, which would allow us to move past the issues of vagueness.

What Is a Whole Object and How Many Objects Are There?

For an exdurantist, there are as many objects as there are moments in a continuant's spacetime career, i.e., there are as many objects as there are stages of a continuant's existence; e.g., with a continuant like an apple, there are as many distinct objects as there are stages in the span of the apple's spacetime career, which is an enormous number. Perdurantists and endurantists both think there is only one object—one continuant—that persists, while exdurantists think that there is one continuant but a multiplicity of object-stages that *exdure*. If we are to be consistent with taking the exdurantist position, then we must concede to the following. If an object is numerically distinct from its momentary counterpart stages, then there are far more object-stages than there are ordinary objects. As we see with exdurantism, an object is, in fact, numerically distinct from its counterpart stages; so therefore, there are indeed far more object-stages than there are ordinary objects.

Contrary to perdurantism, continuants lack temporal extension because an object is wholly present at strictly one instantaneous stage, t_1, and then at t_2, a numerically distinct temporal counterpart stage containing a distinct wholly present object then momentarily exists, which is considered by the exdurantist to be the same continuant.

Imagine a person at different stages of her life. A stage theorist would say that there is one continuant, but if we agree that an ordinary object like a person is a momentary stage, then really, there are many distinct people-objects. As we recall in Parsons' work, through pertension, a perduring object extends through space, but with a continuant as described by stage theorist, there is no extension through spacetime, just a succession of distinct wholly present instantaneous counterpart stages.

Balashov has recognized this by stating, "Something persists only if it exists at more than one moment, and an instantaneous object stage, strictly speaking, does not. One could, of course, choose to accept this consequence and agree that exduring objects do not persist. That, however, would undermine the claim of the advocates of stage theory that theirs is the best unified account of persistence" ("Defining," 144). Balashov and other stage theorists hold a different notion of persistence. For x to persist is for it to exdure, which is for it to have different counterparts at different temporal locations. Such entities occupy these stages only momentarily, and, as such, a continuant is not a single object, unlike in perdurantism, which, as we recall considers a continuant to be a single object. Due to this extravagant counting of ordinary objects, perdurantism is the more plausible four-dimensional persistence theory.

Conclusion

Intuitively, I am one object that changes as I progress along my temporal axis. Perdurantism keeps this intuition. Imagine we placed a few soccer balls on a table. When we ask, "How many objects are on this table?" a perdurantist will answer in accord to the normal everyday sober answer, which could be, "There are two soccer balls." Exdurantism, however, holds an ordinary object to be a momentary stage, so an endurantist would respond with a much bolder claim. For every stage of time duration on the table for the two soccer balls, meaning for every moment that occurs that they are sitting on the table, there would be a different wholly present object each moment. Objects in their entirety are bound to their momentary stages, and there is an enormous number of these stages. To respond with the answer that there is an infinite number exceeds what is reasonable.

If we consider again the soccer balls, we see two continuants but can imagine an almost infinite number of distinct object-stages from temporal span t_1 to t_n. From the temporal span t_1 to t_n, perdurantism upholds that a continuant as a whole is the sum of all its temporal parts, meaning that there are only two soccer balls on the table, while exdurantism claims that an object as a whole is a single momentary stage that changes with each stage. If the stage does not resemble the prior stage, then it is considered a new object. Nothing is different in the act of counting of ordinary objects for perdurantism because from the span of t_1 to t_n, there is only one partially present object. This simplicity in counting objects gives perdurantism an edge over the exorbitant counting done by exdurantism, and for this reason, perdurantism should be the preferred persistence theory.

Works Cited

Balashov, Yuri. "Defining 'Exdurance'." *Springer Science + Business Media*, 133 (November 8, 2006): 143–9. DOI 10.1007/s11098-006-9011-x (accessed April 19, 2019).

———. "Persistence." *The Oxford Handbook of the Philosophy of Time*, edited by Craig Callender, 13–40. Oxford: Oxford University Press, 2011.

Effingham, Nikk. "Sider, Hawley, Sider and the Vagueness Argument." *Philosophical Studies: An International Journal for Philosophy in the Analytic Tradition* 154, no. 2 (16 March 2010): 241–50.

Kurtz, Roxanne M. "Introduction to Persistence: What's the Problem?" *Persistence: Contemporary Readings*, edited by Sally Haslanger and Roxanne M. Kurtz, 1-26. Cambridge, MA: MIT Press, 2006.

Lewis, D. *On the Plurality of Worlds*. Malden, MA: Blackwell Publishing, 1986.

Parsons, Josh. "Must a Four-dimensionalist Believe in Temporal Parts?" *The Monist* 83, no. 3 (July 2000): 399–418. <https://www.jstor.org/stable/27903694>.

Salmon, Nathan U. *Reference and Essence*. Princeton, NJ: Princeton University Press, 1981.

Sider, Theodore. *Four Dimensionalism*. Oxford: Clarendon Press, 2001.

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