Four-Dimensionalism: A Defense of Time not Being Made Up

*“Some have argued that worm theory entails that it makes an individual’s lifespan essential. Explain this argument, making explicit its premises. Evaluate counterpart theory as a possible response to this argument. (Note: van Inwagen develops a version of this objection in “Four Dimensional Objects” by van Inwagen”*

This paper considers the philosophy of how objects and their identities relate to the temporal-dimension (time). We commence by investigation of the argument that worm theory entails “that an individual's lifespan is essential” and expands to consider other competing theories and more general cases of object identity across time, concluding this is fundamentally a question of identity and time itself reducible to Physics.

Worm theory is an instantiation of its parent theory perdurantism, commonly and henceforth referred to as “four-dimensionalism” for its benefits of self-description. This is a philosophical theory of persistence claiming that objects ‘persist’ by existing across time as a whole and having instantaneous temporal-parts at each moment they exist, in much the same way that a film reel has many individual image frames.

Worm theory is a prevalent flavour of perdurantism, defining a person, say actor Leonardo DiCaprio's as a four-dimensional space-time worm with time indexed properties, say in this case having the property of playing Jack Dawson in the film “Titanic” in some subset of temporal parts clustering around 1997, and simultaneously, (in the four-dimensional view) the property of him playing Jordan Belford in “The Wolf of Wall Street” in some temporally distinct ‘slice’ of his worm approximately 15 years later. A critical point to note in this framework is that the sentence “the actor who played Jack Dawson at t1 = the actor who played Jordan Belford at t2” evaluates to true, intuitively comprehensible in the same way any projected image of a film could be pointed to “look it’s film X” while also retaining that identity for the film as a whole, with the whole arguably being the most complete sense.

The metaphysical arch enemy of perdurantism is endurantism, helpfully by analogy “three-dimensionalism”. Put most simply is the denial of perdurantism and explained in the view that various stages of an object or person are all distinct. Consequently, the sentence “the actor who played Jack Dawson at t1 = the actor who played Jordan Belford at t2” is clearly false. If how exactly this can be the case seems confusing, it is. But in the kindest interpretation it seems to suggest that time is unlike space in some essential way as to mean that no three-dimensional objects no-matter how similar and temporally close to another can truly share the same identity.

It would seem to me that this debate can encapsulated by our question “is the actor who played Jack Dawson at t1 = the actor who played Jordan Belford at t1”, more generally “can object/person at t1 = object/person at t2”. I make the case that to find a satisfactory answer this this question will solve the wider metaphysical problem. We shall return to it after considering the commitments of worm theory.

Briefly, as a related aside on the question of whether worm theory entails that an individual's life is essential, I make the case quite simply that it necessitates it by definition. We shall define ‘essential’ in this case as an individual not being able to be sensibly conceived without it (a lifespan). Firstly, it is literally an axiom of the coordinate system that every event in the defined space-time has a time dimension. Secondly, it’s clear, given the foundational spacetime of worm theory that every ‘individual’ at every time bears some relationship to the predicate ‘is alive’. For example, our good friend Leonardo tests ‘is alive’=False for the majority of the 13.7 billion years of our universe. Lifespan can be defined for our purposes as a summation of all times at which an individual ‘is alive’. Hence, we can conclude that in worm theory every individual necessitates having a lifespan, just as every coordinate on the earth's surface necessitates having a latitude[[1]](#footnote-0)

Returning to our wider topic of persistence of identity over time. I think there are two levels at which the conclusions to our question “can object/person at t1 = object/person at t2”. Firstly, 1) in the stronger case; is this a ground truth we can discernibly prove about the metaphysics of our universe, and 2) in the weaker case; is this a linguistic narrative we have reasons to preserve or otherwise. We will leave 1) for the rest of this essay and make a short case here for 2), that viewing humans as four-dimensional beings is fundamental to human life, language and civilisation. We clearly speak about people and objects in such ways, every second we assume mount Everest is plausibly roughly what it was yesterday or suggest someone in the present did something in the past or we sacrifice our time for reward in the future. At the very least three-dimensionalism violently violates most people's intuition about identity and time and arguably has far more devastating conclusions[[2]](#footnote-1). I make the point that we would want at least some ‘metaphysics’ to account for a four-dimensional view of individuals conceptually at the human level even if it wasn't the underlying physical truth purely for its utility in human being.

An endurantist might object in the following way. Firstly they might bite the bullet of linguistic vagueness and suggest that if common understanding in language appears to suggest that individuals at two different times can be the same person, then this is as failing of language to represent wholly the relationship between the two non-identical individuals and actually this relationship is something other than a true shared identity.

In response I think this is a case of Linguistic gerrymandering, claiming that this is not ‘identity’ but something that share all the same measurable relationships does nothing positive to say whit this is if not identity. This leads us to a point echoed in the later sections; denying you have any pervasive identity makes it very difficult to talk about time at all. I’m not convinced it makes any more sence to claim that objects are three-dimensional that the world is three dimensional[[3]](#footnote-2).

The prompt also suggests that we should evaluate some opposing theories to worm theory recommending van Inwagen’s account. Van Inwagen suggest some kind of ‘third way’ between four and three dimensionalism, where he suggests all temporal slices of an individual “are occupied by the same (three) dimensional object”, and proclaims that the proponent of his theory agrees with the proponent of four-dimensionalism, that identity can extend over time while simultaneously claiming he agrees with the proponent of three-dimensionalism that an utterance calling out an individual refer to a three dimensional object (Inwagen, Four-Dimensional Objects, 1990).

I am highly suspicious of the legitimacy of his third way viewpoint, critically under an account of mischaracterising the commitments of the original theories. He claims under four-dimensionalism “when you use the name Descartes (for example) you always refer to the (four-dimensional) whole that occupies (this space-time)”. However, maybe you don’t always refer to anything. If i was to pause the film “The Revenant” at exactly the point Leonardo DiCaprio first gets throttled by a bear, and exclaim “look at ‘him’ there” It would be fair to say that at least in one sense, I am referring to the three dimensional temporal slice of Leo.

More generally, many four-dimensionalists (including myself) would propose a more fleshed out theory of Universalism or ‘unrestricted mereology’ to explain this case. This is the commitment that that the boundaries between what can and can be an object/individual are far more dynamic than we usually assume, and everything is/can be an object. With reference to our Revenant film this would suggest that every possible subset of frames could be considered an object and the decision about which object to pay attention to and consider ‘real’ is a matter of choice/utility. In conclusion the fact that you *can* have an object extended in 4D space does not mean that you cannot have the kind of instantaneous quasi three-dimensional objects that van Inwagen thinks is unique to his theory.

Now covering the strong cause of whether “can object/person at t1 = object/person at t2” is objectively provable. In the case of objects, as we have already shown this view to be pervasive at the level of human heuristics, I see no reason why this is not just essentially reducible to a question of modern physics, and whether such structures are kosher. In the human can you have the additional complexity of defining identity, and then deciding whether its nature can persist across time. I think anyone who wishes to divided objects and humans this way has essentially already conceded the point and generally is getting confused, conflating the very real but separate question of psychological nature to exaggerate their ego and identify their thoughts with their sense of continuing self, with whether its possible for identity to exist at all, irrespective of the rate of flux.

Our question to the physicists seems as follows. Assuming objects uncontroversially extended in space to constitute object identity, does time retain this space-like property? Luckily for us a man named Albert Einstein developed a little something called relativity, which turned out to be one of the most robust and complete theories of known physics, to model precisely how time and space interact. Before that however think we can make some good progress with more classical intuitions.

If you consider what physical properties allow objects to extend in space it would seem to be an emergent property of their coordinate system. Time seems to have a comparable coordinate system in the relevant properties, with the qualities of being able to traverse through it; flowing from past to present to future with a highly degree of similarity/determinism between temporal parts.

There are those, known as presentists, who object to all this by denying time flows in this way, and that only the present exits. I think this is an excellent time to introduce some relativistic thinking as it provides a pretty precise model of why distant times exist in the same way as distant space. In fact, one of the key ground-breaking conclusion of Relativity is just how similar time and space are. Einstein's theory postulates that space and time are woven together in a four-dimensional fabric of the universe called spacetime and share far more essential properties than was previously thought that allow space and time to be considered interchangeable under many mathematical circumstances. Firstly, I think at the minimum this heavily shifts the burden of proof to three-dimensionalists to show to why time is not space-like. Secondly, such equations lead to the unintuitive feature that for two ‘events’ in spacetime it is not always discernible which happened first. I think in itself, this strongly challenges presentism, as there is no one present in relativistic spacetime.

In totality I think we can conclude that time is space-like in all the important way

as to allow (in fact necessitate by our initial conclusion on worm theory) objects and by extension people to persist through time, settling the case to conclude four-dimensionalism/perdurantism to be true. I also can’t help but conclude in light of modern science, to be a three-dimensionalist you have to in some sense be in denial of time itself, that is to say - very confused indeed.

# References

Balashov, Y. (2011). Persistance. *The Oxford Handbook of Philosophy of Time*.

Djukic, G. (2004). Do Four-Dimensionalists Have To Be Counterpart Theorists. *Austrailian Journal of Philosophy*, vol 82 292-311.

E.J Lowe, S. M. (2006). The 3D/4D Controversy: A Storm in a Teacup. *Nous*, vol 40(3) 570-578.

Inwagen, P. v. (1990). Four-Dimensional Objects. *Nous*, 245-255.

Inwagen, P. v. (2000). Temporal Parts and Identity Across Time. *An Internatoinal Quarterly Journal of General Philosophical Insights*, vol 83(3), 437-459.

Lewis, D. (1986). *On The Plurality of Worlds.* Oxford: Blackwell.

Sider, T. (1997). Four Dimensionalism. *Philosophical Review*, 197-231.

1. this construction should also allow the limit cases for the possibility of an individual's lifespan to be infinite or instantaneous [↑](#footnote-ref-0)
2. See the following sections [↑](#footnote-ref-1)
3. Hint: it isn’t [↑](#footnote-ref-2)