Logique & Analyse **222** (2013), 129–148

THREE-DIMENSIONALISM, "ENTIRE PRESENCE" AND THE LAW OF NONCONTRADICTION*

EDWARD FRIED

I.

It is well-known that the application of Leibniz's Law ("LL") cross-temporally poses certain conceptual difficulties. The very concept of persistence over time seems to entail change, and change certainly entails persistence over time. Yet how can both of these conditions be met by entities which are necessarily self-identical, when we interpret "self-identical" as requiring that all properties be retained at all times?

Two major schools of thought exist on the topic. One of these, the Four-Dimensionalist ("4Dist," etc.) school, holds that entities persist by being relations of successive temporal parts.[1] (This manner of persistence is often called "perdurance.") The other school, Three-Dimensionalism ("3Dism," etc.), insists that the persisting entities are entirely present at every moment they exist; they are not temporally divisible. (This manner of persistence is often called "endurance;" I will use the terms "endurance" and "entire presence" interchangeably.) 3Dists complain that 4Dism is counterintuitive; but more importantly, they complain that it is not, and cannot be, a solution to the problem as posed. Construal of entities as being composed of temporal parts cannot be a way of reconciling change with LL because either (i) we must take the difference between parts to be change, but in that case we note that no two such parts are identical to each other under LL; or (ii) in the alternative, we can take temporal parts to be self-identical, but they themselves do not undergo change. This gives rise to complaints that 4Dism is a "static" conception of change or that it treats persisting entities as successive "moving picture frames."[2]

*Gracious thanks are due the Journal's anonymous referee for helpful comments and suggestions and to Angela Fried for preparing the Figures.

[1] There are two major variants of this view, the "stage" version, in which such parts are all momentary, and the predicative or "worm" view, on which the parts have finite temporal extension. (See Sider (2003), 60–61.)

[2] Lombard (1986), 109; McCall and Lowe (2009), 279.

For their part, 4Dists complain that 3Dism resists rigorous formulation. The point has been pressed by Lewis (2002) (as well as Sider (2003)) and no adequate response has as yet been made to it. Moreover, what is less frequently observed is that 3Dism, just as 4Dism, can be charged with failing to reconcile change with LL, since persisting entities as temporal wholes under the standard interpretations of "entire presence" cannot be said to change either.

This article offers a suggestion which may be seen as ameliorating these two failings of 3Dism. (We will ignore for now the 3Dist complaints about 4Dism; for responses thereto, see Sider (2003) Chapter 6.) The suggestion is that instead of making the schematic predicate letters in LL's first order formulation range over time-indexed properties, we allow them to range over both properties and their complements without further qualification. Although admittedly this suggestion has a drawback from the 3Dist point of view, it also displays attributes which the 3Dist should find attractive. Not only does it give a formally adequate elucidation of what a 3Dist might mean by "entire presence," it avoids the need for construing entities as being made of temporal parts.

II.

Before describing the suggestion further, I would like to "motivate" it by making a *prima facie* case that 3Dists should be worried both about the theory's inability to settle on a canonical formalization, and also that it fails to solve the problem of change. This latter point is important, since it has been largely overlooked by 3Dism's opponents.

(A) *Formalization*

4Dists often complain that 3Dists have been evasive in the face of requests that they present a formal version of their theory. As *prima facie* evidence for the charge, I ask you to consider the following definition of "endurance" offered by McCall and Lowe (2009):

> "[E]ndurance can be defined as precisely and rigorously for 3D objects as perdurance can be defined for 4D objects [as follows]:

> An object endures iff (i) it lacks temporal parts, and (ii) it exists at more than one time." (279; 278.)[3]

It will be observed that this "precise and rigorous" definition of "endurance" (the distinctive concept of 3Dism) tells us no more than seemed appropriate to say in the introductory paragraph of this article. Perhaps, however, it may be thought that if the concept of "temporal part" can be given a precise definition, then the concept of the absence of such things is necessarily equally precise and rigorous. This conjecture is false. Although there are two methods of describing temporal parts in logical notation that are well-known and known to be consistent (Quine (1960), 173; Lewis (2002), 5), there are over a dozen different ways of reducing "endurance" to logical form, none of which has been demonstrated adequately to solve the problems with which 3Dism has been taxed. (See my "Property-Based, Relational and Mereological Approaches to Defining 'Entire Presence"' (unpublished manuscript).) Moreover, the definition is consistent with the 4Dist view that there are no enduring entities.[4] To paraphrase Thomson,

> "The definition does not tell us that there is such an [object]. The friends of [endurance] think there is; but telling us there is is the job, not of any definition, but of a metaphysical thesis . . . ." ((1983), 207.)[5]

McCall and Lowe do not explicitly enunciate such a thesis. The closest they come to doing so is when they assert that "the natural, philosophical way of describing [changing shape] is to say that people have 3D bodies that endure, *i.e.*, exist at different times and change their spatial shape from one moment to another." ((2009), 279.) This claim requires some unpacking properly to be understood. Once that is done, we will see that legitimate concerns can be raised as to whether it is disingenuous or evasive.

[3] In the same style we find Haslanger: "The notion of being 'wholly present' may become clearer by contrast with the perdurantist's notion of being 'partly present."' ((2003), 318.) This is Haslanger's last word on the topic, and it hardly need be added that we are no clearer on the notion of 'wholly present' after the discussion than before.

[4] Barker makes a similar point about named individual entities:

> "Confusion can be caused by a stipulative definition if a word or symbol that purports to name some individual thing . . . . is introduced even though it is not known that there is any such thing . . . . A definition cannot create a number or any other object." ((1974), 211–212.)

[5] Which Thomson goes on to provide for the 4Dist.

Let us begin by noting that the thesis has three clauses or parts. (1) is the claim that the description to come has a certain appealing quality; it is the "natural, philosophical way" of describing persistence. But "natural" ordinarily means "untutored"; and if we read the comma between "natural" and "philosophical" as meaning that the two adjectives are in apposition, then this clause (1) becomes an oxymoron. Let us interpret "natural" most charitably, then, as adverbial, meaning the "ordinary" or "usual" "philosophical" way.

The following description has itself two parts, (2) a clause referring to the term "endure" and another clause (3), in apposition to this one, which provides a further elucidation of the term in clause (2). The understanding of clause (3) is key. What does "exist at different times and change their spatial shape from one moment to another" mean? For on a superficial reading, the claim is patently false: entities do not change their shapes from one moment to another at all; and what is false might be "natural," but hopefully it is not "philosophical," and certainly not "natural philosophical." If there were a "natural philosophical" way of expressing what happens to persisting entities that undergo change of shape (not "spatial shape," a redundancy), it would be "change their shape whenever the orientation of their parts changes." That a "spatial shape" changes from moment to moment is a decidedly *unnatural* way of expressing the fact that an event of change has occurred.

Might it nevertheless be a *philosophical* way of describing an event of change?

Properly to answer this question, we need first to observe that according to the most common formalization of 3Dism, all properties are actually properties-at-times. Let Simons's system CT (continuants at times) be an exemplar of the type:

> "We shall assume that the variables t, t', t'', ... range over temporal instants, which we think of as ordered by a dense linear ordering. ... We introduce a predicate modifier taking these instant variables as arguments, corresponding to the temporal preposition 'at'. Modification of a simple predicate by the modifier 'at t' is signified by subscripting the variable to the predicate sign." (Simons (1987), 177–178.)

Now as is regularly observed in the literature (see, *e.g.*, Johnston (1987), 113; Oaklander (2004), 314) this formalization has an unfortunate consequence: it entails that all properties change from moment-to-moment. Given these facts, it seems likely that what McCall and Lowe are referring to by the clause "change their spatial shape from one moment to another" is the formalization that requires that entities have properties-indexed-to-times. If,

however, this conjecture is correct, the description is neither natural nor philosophical (and, *a fortiori*, not natural philosophical). It is not *natural* because, in fact, entities do not change their shapes at moments, but only when the orientation of their parts changes; it is not *philosophical* for, to be philosophically precise, what changes from "one moment to another" is the structured property of "shape-at-a-time," not "spatial shape." This replacement of simple properties with structured ones gives rise to the well-known "problem of temporary intrinsics." (Lewis (2002), 5 ff.)

On the other hand, the 4Dist can safely claim to offer a theory of how entities exist at different times and change their *shapes*; they "perdure," that is, they exist at different times and change their shape whenever the orientation of their parts changes. Each such change is reflected in the positing of a temporal part, all of which are in a special relation to each other.[6] Some of these parts are in one shape, others in another. This elucidation should qualify as natural; and since it can indeed be expressed in a precise manner, it is both the natural *and* the philosophical way of describing the event.

The existence of one (let us say) slightly disingenouous formulation of a thesis does not, of course, constitute a proof that no better explication of that thesis will be available (or even that none has been made available). But it is already over 20 years since the debate over persistence came to be framed in these terms. We are fairly entitled to assume that if a more perspicuous way of rendering the "endurance" theory had been uncovered, philosophers as good as McCall and Lowe would have availed themselves of it.[7]

(B) *Change*

3Dism's inability to account for change is a direct result of its reliance on the above-mentioned amendment of LL to allow the variables in the first order axiom schema to range over time-indexed properties. On the one hand, this

[6] This relation is found under a wide variety of names in the literature, and some of the variations are significant. There is, however, no need to enter into the details of the topic here.

[7] Some authors have recently attempted to define entire presence in mereological (as opposed to property-based) terms. (See, e.g., Eagle (2010), 57.) Donnelly and Bittner are 3Dists who have attempted a mereological definition of "entire presence," although just for mereological invariants (aggregates). Their axiom system MTM contains the definition "FP A$t \equiv x \in$ A $\Rightarrow$ PR xt." (Collection A is fully present at t just when if x is a member of A then x is present at t.) ((2007), 176.) It is highly doubtful that this formalization captures "entire presence" as ordinarily used, since it allows for entities to be entirely present at some times but not others. Moreover, it is noteworthy that Donnelly and Bittner do *not* include an axiom guaranteeing the existence of anything that is fully present at any time, let alone at all times it exists. If the members of a collection come into and go out of existence (as, e.g., molecules of water do by ionization) then that collection (if construed as a continuant) would never be "FP".

amendment does allow the 3Dist properly to claim that continuants are entirely present (and thus "endure") whenever they exist, for as Chisholm put it,

> "*Nothing* can truly be said of the Johnson of five years ago that cannot be truly said of the Johnson of now. The Johnson of now, like the Johnson of five years ago, was President five years ago, and the Johnson of five years ago, like the Johnson of now, is *not* President now." ((1971), 16–17; his emphasis.)

But, if nothing can truly be said of the Johnson of 1966 that could not have been said of the Johnson of 1971, in what sense did Johnson change? As McTaggart noted, in an oft-cited passage,

> "It will be noticed that Mr. Russell looks for change, not in the events in the time-series, but in the entity to which those events happen, or of which they are states. If my poker, for example, is hot on a particular Monday, and never before or since, the event of the poker being hot does not change. But the poker changes, because there is a time when this event is happening to it, and a time when it is not happening to it.
>
> But this makes no change in the qualities of the poker. It is always a quality of that poker that it is one which is hot on that particular Monday. . . . And therefore it seems to be erroneous to say that there is any change in the poker. The fact that it is hot at one point in a series and cold at other points cannot give change, if neither of these facts change — and neither of them does." ((1998), Section 315; 70–71.)

3Dists uniformly reject the 4Dist response to McTaggart's challenge — that of positing distinct temporal parts of the poker — the poker-Monday and the poker-Tuesday, which bear the properties of being hot and cold, respectively — as abandoning change. But McTaggart's argument is not against temporal parts *per se*, it is against eternal properties: and all 3Dists (except Presentists) commit themselves to timeless property possession as a result of the above-mentioned penchant for time-indexing.[8] And, although they can observe the mote in their neighbor's eye, the log in their own eludes them. For example, while critiquing Heller's argument for the 4Dist conception of change (Heller (1992), 698–99), Lombard unwittingly incriminates the 3Dist as well: "[I]t is also correct to say that Heller [as a whole] *never* differs in the

[8] Haslanger observes, "The 'no change' objection (in somewhat different forms) is one that arises not only for eternalist perdurantism, but for any eternalist view." ((2003), 332, fn. 22.) For Presentism, *see* Craig (1997).

properties that he himself has." ((1994), 368; his emphasis.) How exactly is an entity supposed to change if it "never differs in" its properties?[9]

However sympathetic we may be to the 3Dist project, it is clear there is much room for improvement. Below is a suggestion which is worth considering, insofar as it preserves *both* entire presence *and* change. It would, indeed, allow 3Dists securely to claim that continuant entities persist by enduring.

III.

The instant proposal was inspired by a comment by van Inwagen. It is not that van Inwagen provides any technical or conceptual elucidation of "endurance" which goes beyond the standard view as I have briefly outlined it after Simons, Lombard and Chisholm. What he does do is present what he calls an "appealing picture." It can be found in Figure 1.

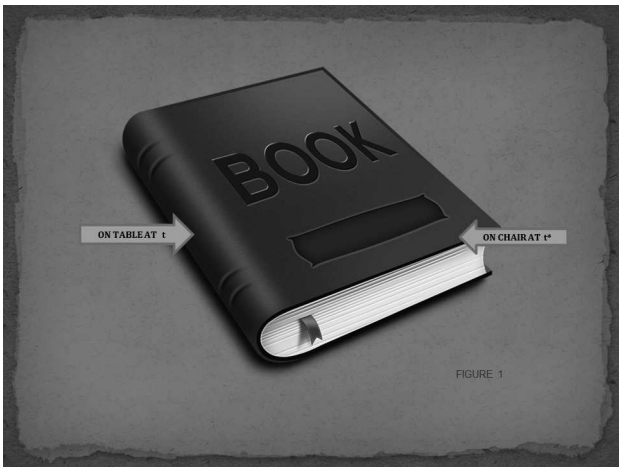


Figure 1 presents the picture of a book twice tagged; it is tagged once as "on table at t" and tagged also as "on chair at t^*." van Inwagen describes the nature and significance of pictures in this style as follows:

[9] In his (1976), Chisholm takes the view that entities that are self-identical can change in only a "loose and popular" sense of identity; strictly speaking, self-identity implies lack of change in any respect. "[W]hen, as we commonly say, something loses a part, then that thing strictly and philosophically ceases to be .... [F]amiliar physical things such as trees, ships, bodies and houses persist only in a loose and popular sense." ((1976), 96–97; footnote omitted.) But few 3Dists are as forthcoming as Chisholm about the conflict inherent in their theory between identity, persistence and change.

> "They do not, by themselves, teach us anything about the facts of temporal identity. Their whole point is supplied by their rivals. ... No attempt to refute a view that rests on powerful and appealing pictures can hope to succeed unless it supplies a rival picture of its own. And that is my only reason for asking you to consider Figure [1]." ((2002), 407–08.)

Thus, van Inwagen does not intend his "simple-minded" picture to be taken as a formal proposal for understanding the nature of endurance. Nevertheless, it has the kernel of such a proposal hidden within it. Not that it is satisfactory as it stands; it needs amendment, not because it is too simple-minded, but because it is not simple-minded enough. Simplifying it still further may solve at least some of the problems that dog 3Dism in connection with the unholy triad of Leibniz's law, persistence and change.

In my view, where all the ways of understanding property possession in terms of "entire presence" — technically adept and simple-mindedly illustrative alike — have gone wrong is that they have tried to take account of time. I would like now to suggest that this is the wrong way to solve the problem of defining endurance. Rather, we should allow possession of properties to remain *entirely timeless*. "This apple is red" and "This (same) apple is nonred" understood as predicating distinct properties of the same referent are not contradictory sentences; the sentences are both fine as they stand, but they must be understood as spoken in a quantificational idiom. In such an idiom, "is" does not provide temporal locative information, and no contradiction arises.

A word of explanation before the objections come. The basic reasoning behind the suggestion is as follows. In its original (natural language) form, the Law of Noncontradiction ("LNC") reads: "For the same thing to belong and not to belong to the same thing at the same time and in the same way is impossible." (Aristotle (1957), 1005b19–20; my translation.) If we read "place" for "way" in the LNC, we may say that it takes account of both time and space as parameters; nothing can both have and not have the same property in the same place at the same time. On the other hand, there is no contradiction in an entity both having and not having the same property in different places or times. Although the law itself is spatiotemporally qualified, we express it in a logic which is nonspatiotemporal. So, for example, Shalkowski (2005) can write,

> "[The idea that exactly one of a truth bearer and its negation is true] is encoded by, though not strictly equivalent to, the laws of excluded middle, $P \vee -P$, and noncontradiction, $-(P \ \& \ -P)$. ... Each thing either has or lacks a given attribute and neither both has and

> lacks the same attribute, formally represented as $\forall x(Fx \vee -Fx)$ and $\forall x-(Fx \,\&\, -Fx)$." ((2005), 280.)

So natural to us is this manner of speaking that we ordinarily overlook the fact that something "has been lost in translation": the spatiotemporal qualifications. But here is a place where our logic seems to have failed us; it does not properly reflect the essential meaning of the LNC. As Kearns noted,

> "Since the symbolism of the predicate calculus was designed for making statements that have no temporal content, it is not surprising if this symbolism fails to represent changeable individuals in a perspicuous manner." ((1970), 281; footnote omitted.)

Notwithstanding, according to the suggestion I am proposing there is no need to improve the sentences of the predicate calculus by, *e.g.*, prepending a sentence-forming functor which adds temporal content to a nontemporally delimited protosentence. (Myro (1986).) Let us, rather, take the lead from our logic and imagine that all unqualified natural language property attribution is in fact gnomic: it does not provide temporal locative information. This is reasonable, for we do often impute contrasting properties to entities nonlocatively, without hint of contradiction. "Iceland is a land of fire and ice" (in different places); "It was the best of times, it was the worst of times" (for different people); "He is a charmer and a cad" (at different times). For the F's in Shalkowski's axiom schemata — the attributes — we allow not only properties but complements of properties as substituents.[10] In this way we can affirm and uphold the (qualified) natural language LNC without needing to make any changes to the semantics of the truth functions.

Indeed, the suggestion requires no alteration to our surface logical grammar at all. The real work is done invisibly, in the definition of the properties. Although the properties and complements of properties are set theoretic insofar as they specify sets, we are not to think of them purely extensionally. Rather, they are intensional entities of some unspecified kind. They are part of the metalanguage of our set theory, and could be realist, conceptualist or nominalist (predicates).[11] We want the sets of F's and $\overline{F}$'s to be able to overlap: The apple is both green *and* nongreen. But if the F's and $\overline{F}$'s are

[10] Examples of the use of property complementation for different purposes can be found in Kearns (1970) and Zemach (1991).

[11] The lack of specificity here should be considered an advantage, insofar as each 3Dist will probably have their own preference. There is also a 4Dist version of the suggestion, according to which the *F*'s are extensionally specified, and the entities which are members of the sets are temporal parts.

identified with their extensions, we will not be able to call them "complements"; since complementary *sets* are a pairwise disjoint partition of their universe of discourse. Thus we get,

For all F, $I = \{x \in \text{Spacetime} \mid F(x) \vee \overline{F}(x)\}$

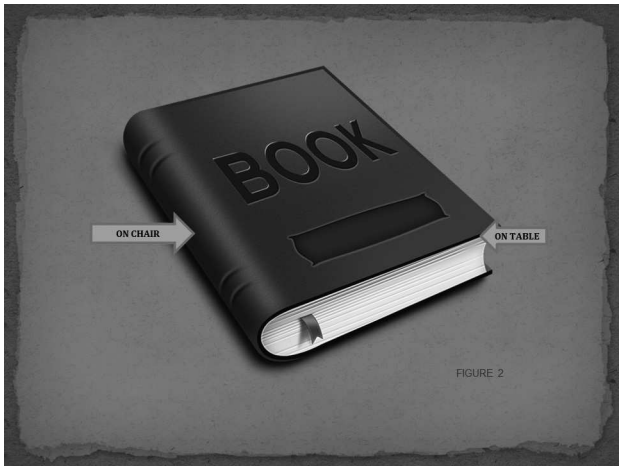
which allows us to formulate the LNC as follows:

LNC, Set-Theoretic Formulation:
$(\forall xy)(x = y \equiv -(\exists z)((x \in z \;\&\; -y \in z) \vee (-x \in z \;\&\; y \in z)))$

This can be seen as being in the spirit of Aristotle's original, natural language version of the law: "It is impossible for the self-same entity both to belong and not to belong to the same thing, etc." as "thing" here for us is "set." True, we don't have the parameters any more, but they are unnecessary; every distinct spatiotemporal entity is uniquely determined by the collection of sets in which it can be found:

LL, Set-Theoretic Formulation:
$(\forall xy)(x = y \equiv (\forall z)(x \in z \equiv y \in z))$[12]

Although the supporting apparatus utilizes set theory, the picture it leaves us with (Figure 2) is the acme of simplicity:



"BOOK" image courtesy of www.creattor.com

[12] Note that the set-theoretic versions of LNC and LL are interderivable. For a deeper examination of this relation, see Berto (2005). The first order LL schema is derivable from this version. (Yatabe and Inaoka (2006), 425.)

The book is on the table and on the chair; there is no need for a time stamp. Time drops out of the picture completely. Since there is no time limitation on the properties (read: properties and complements of properties) an entity bears, we should say it bears all such properties at all times it exists; or, put another way, it is "entirely present."

IV.

We will explicate the proposal further by means of responses to objections.

Objection 1. Everything bears either a property *or* its complement. So how does the suggestion distinguish anything from anything else?

Reply. Of course, everything bears a property or its complement. But not everything bears both a property *and* its complement.

Take, for example, the property "person who lived in New York." Millions of entities bear this property. A great many more entities bear the complementary property of "non[person who lived in New York]." Some smaller number than either of these bear both the property *and* the complement. Such an individual is both a "person who lived in New York" and a "non[person who lived in New York]." Both the property and the complement can be truly predicated of them. I, for example, am an entity which bears both the property "person who lived in New York" and "non[person who lived in New York]," having lived several years in Houston. Undoubtedly there are many others who can say the same (my wife, for example). Clearly, however, both of these properties can't be predicated of everything.[13] In all cases where both a property and its complement can be truly predicated of one and the same entity, this indicates the entity underwent change.

Similarly, we are required to say of my car that it was black *and* it was white: for it had a white body and a black left rear view mirror.[14]

[13] We could also translate the properties into the quantificational idiom as "person who *lives* in New York" and "non[person who *lives* in New York]." (*Cf.* Quine (1960), 170.) This use of the present tense is a gnomic use, not a token reflexive use. That is, it is meant in the same way as "The early bird catches the worm," not as "I am sitting at my typewriter." Since the token reflexive use of the present tense is so deeply ingrained in our thinking, I take the liberty of making the point using the nonspecific past tense. Indeed, any tense could be used so long as we understand it as being used to indicate aspect (simple, progressive/repeated, completed) and not to specify temporal location relative to the present.

[14] This is somewhat unfortunate, for not all 3Dists are of the opinion that it is legitimate to compare spatial variation with temporal change. But see, for example, Fine (2006), who writes, "We may even talk of a change in the composition of a thing or event from one place

It is perhaps natural to think of these variations from possession of a property to possession of its complement not only as changes, but also as constitutive of parts of some kind (temporal or spatial). But that is not obligatory, for the idiom of quantification is not spatiotemporal. There is nothing else we need to say — keeping strictly to that idiom — other than that I am a "person who lived in New York" sometime or other and I am also a "non[person who lived in New York]" sometime or other; and that my car was white somewhere (or sometime) or other and black somewhere (or sometime) or other. If indeed I am a determinate entity (as I am wont to think), the "sometimes" and "somewheres" will be different, but there is no need to specify them.

It can easily be seen that by letting the Fs in the well-known first order LL schema range over both properties and their complements we can reidentify anything in spacetime to the exclusion of anything else by its spatiotemporal location(s). After all, nothing — except me — has been none of the place-times *I've* never been.

Objection 2. How can there be a complement of the property "Person who lived in New York?"

Reply. This is actually a structured monadic property with a property, a relation, and a relatum as components. However, figuring out the complement is a simple matter of Boolean algebra. See Figure 3:

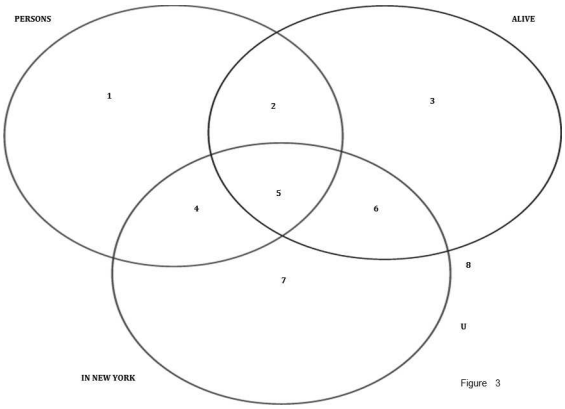


Figure 3

A "person who lived in New York" ("PLN") is any entity in the spacetime universe that belongs to all the groups indicated by the circles in the Venn diagram (resides in Section 5). An entity with the complementary property

to another. Thus we might say that my body is composed here of bone and there of flesh or that the simultaneous lightning is composed here of this streak and there of that streak." (709.)

PLN′ is anything in the spacetime universe that bears properties excluded by PLN: Either a person who was nonalive non-in New York (1); or a person who was alive non-in New York (2); or a nonperson that lived non-in New York (3); or a person, nonalive, who was in New York (perhaps U.S. Grant) (4); or a nonperson that lived in New York (6); or a nonperson nonalive that was in New York (7); or a nonperson, nonalive that was non-in New York (8). (Again, note that we are not assuming that the extensions of these categories are pairwise disjoint.)

Objection 3. If all attributions of properties are supposed to be temporally unqualified, what are we supposed to do with sentences that contain explicit temporal references? Do they correspond to nontemporally qualified propositions?

Reply. The suggestion is directed towards allowing metaphysicians to make strict diachronic identity claims without either positing temporal parts or making all properties "at times". Hence it doesn't eliminate the need for propositions which explicitly invoke temporal locative information or temporal relations. What it does eliminate is the need for "truth maker" propositions: temporally qualified propositions corresponding to every nontemporally specified property of an entity, and which LL and "entire presence" are supposed to require. Mellor asserts that the following is "clearly true": "[I]n saying that a has a changeable property F, it must be said or understood *when* a has F .... No one will deny that." (Mellor (1998), 92; his emphasis.) This is the reasoning that underlies all the various 3Dist struggles with temporal modification, and which it is the purpose of the instant proposal to rebut.

Objection 4. Your view of the LNC is not universally shared. For example, Haslanger writes: "The law of non-contradiction: Nothing can have incompatible properties; *i.e.*, nothing can be both P and not-P." ((2003), 316.) Moreover, she goes on to say: "The law of non-contradiction is considered by all parties to the debate to be non-negotiable." (Id., 328.) What do you have to say to her and others who agree with her?

Reply. Stated baldly, this "law" is simply false. For it's obvious that things can have incompatible properties, as long as they do not bear them *at the same time and in the same way*. The pool *is* deep *and* the pool is shallow; if a "law" of logic tells us it must be otherwise, so much the worse for the law. Of course, we can qualify the properties to bring the (unqualified) "law" and the facts into harmony. "The pool is shallow-at-the-near-end and deep-at-the-far-end." It cannot be both shallow *and* deep in the same place. But if we are speaking "indefinitese," *viz.*, quantificationally, the qualifications on

the properties are unnecessary; for there is no reason to assume that shallow and deep are meant to apply in the same spatiotemporal location. To get a *real* contradiction, we would have to say "The pool is shallow in the northeast corner at 8:00 a.m. and the pool is deep in the northeast corner at 8:00 a.m." In general, nonspatiotemporal possession of a property and its complement cannot violate the requirement that an entity not both belong and not belong to the same thing at the same time and in the same way.

Uncharitably, Haslanger may be trying to prejudice the reader against 4Dism; since her version sort of represents the LNC on the condition that we take all properties to be temporally limited, as 3Dists are wont to do. (See *supra*.) That is, if all properties are *eo ipso* temporally (and, of course, spatially) limited, then "nothing can be both P and not-P" does indeed follow from the LNC. But this assumption all 4Dists reject.

More charitably, it may be that Haslanger has simply overlooked or is ignorant of the importance of the qualifications on the LNC; or, she may have mistaken the conjunctive version of the Law of Excluded Middle ("LXM"), $-(\exists x)(Fx\ \&\ -Fx)$ for the LNC itself, and then made a scope error (taking the negation as of the predicate and not as of the sentence as a whole).

Objection 5. Although the LNC is spatiotemporally qualified, the LXM is not. If Fa and $-Fa$ can both be true, then that at any rate violates the quantificational version of the LNC ($-(\exists x)(Fx\ \&\ -Fx)$), to which the LXM is logically equivalent. Are you revising the LXM with the LNC?

Reply. No such gross violation of our logic and common sense as implied by Objection 5 is required by the suggestion. We are not saying that $Fa\ \&\ -Fa$ are both true. Rather, "F" in the axiom schema ranges over properties and their complements; it could take P or $\overline{P}$, R or $\overline{R}$, etc. as substituents. Hence $(\forall x)(Px \vee -Px)$; $(\forall x)(\overline{P}x \vee -\overline{P}x)$; $(\forall x)(Rx \vee -Rx)$; $(\forall x)(\overline{R}x \vee -\overline{R}x)$; etc. It follows further from this that the suggestion does not violate the quantificational verson of the LNC ($-(\exists x)(Fx\ \&\ -Fx)$) either; for again, the F's in the axiom schema range over both P and $\overline{P}$: $-(\exists x)(Px\ \&\ -Px)$; $-(\exists x)(\overline{P}x\ \&\ -\overline{P}x)$; etc.

There will be cases where an entity bears one of the property or complement and other cases where it bears both; in neither case is the LXM violated. For example, Pucci was a cat and it is not the case that Pucci was a noncat; and "Pucci was a cat or it is not the case that Pucci was a cat" is tautologically true. Pucci wore a harness and it is also the case that Pucci was a nonharness wearer; and both "Pucci wore a harness or it is not the case that Pucci wore a harness" and "Pucci was a non[harness wearer] or it

is not the case that Pucci was a non[harness wearer]" are tautologically true; etc. It is a virtue of the suggestion that it retains both the LNC and the LXM in their quantificational forms.

Objection 6. What about the paradoxes?

Reply. Nothing can be self-identical that doesn't exist. There is no Sevillian barber who shaves all and only those Sevillians who don't shave themselves. So we don't have to worry about what properties (or complements of properties) he or she or it doesn't have. This is an advantage of limiting the Universe to spatiotemporal entities.

It might be argued that the semantic paradoxes are not necessarily avoided by the limitation. Let Grelling's paradox be an example of the type. Grelling's paradox seems to invite application of the LL because there appears to be an entity (the word "heterological") as well as the corresponding property "heterologicality;" and we should be able to apply the property to the word (just as we apply it to other entities) to make a claim which is determinately true or false. (That is to say, that the word appears or does not appear in the extension of heterological entities.) But it appears this cannot be done; the sentence "The word 'heterological' is heterological" is true if it's false and false if it's true. (See Grelling's Paradox, *infra*.) So we don't know whether to include the word "heterological" among the entities in the extension of the property "heterologicality" or in its complement "autologicality." And this indeterminacy, it may be thought, perhaps vindicates Geach's objection to identity claims that have not been relativized to a language:

> "Now the types of paradox that Grelling and Richard constructed certainly seem to show that an unrestricted 'true of' is inadmissible; unless the domain of 'true of' is restricted to predicables of some specified language L, 'true of' just cannot figure safely in our semantic vocabulary. So if we say 'Whatever is true of x is true of y, and conversely' without restricting 'true of' to the predicables of some language L, it is not clear that we have managed to say anything. The absolute identity that was opposed to merely numerical difference is a chimera; absolute indiscernibility is a will-o'-the-wisp that we pursue in vain." ((1973), 298.)

Grelling's Paradox.

A: Let $h =$ the word "heterological"
B: Let $H =$ heterologicality

C: Let $\overline{H}$ = autologicality

1	$\vert \quad Hh$	Assumption
2	$\vert \quad \overline{H}h$	1, by A and B
3	$Hh \supset \overline{H}h$	1–2, CP
4	$\vert \quad \overline{H}h$	Assumption
5	$\vert \quad Hh$	4, by A and C
6	$\overline{H}h \supset Hh$	4–5, CP
7	$(Hh \supset \overline{H}h)\ \&\ (\overline{H}h \supset Hh)$	3, 6 Conjunction
8	$Hh \equiv \overline{H}h$	Biconditional introduction

Note: We cannot reproduce the paradox with a = autological.

But the argument misses a critical point. The sentence "the word 'heterological' is heterological" only lacks a determinate truth value if it is read as elliptical for "The *meaning* of the word 'heterological' is heterological." That is, unlike the extensions of the entities in the extension of the properties "heterologicality" and "autologicality," what is in the extension of "heterologicality" and "autologicality" themselves are not words themselves but word *meanings*. For example, the word "long" is definitively not in the extension of (the meaning of) "long" and "polysyllabic" definitively is in the extension of (the meaning of) "polysyllabic." But it is the meanings of these words which are heterological and autological, respectively. And it is the *meaning* of heterological — not the word itself — which is in the extension of heterological just when it is in the extension of autological. When we ask ourselves whether the *word* "heterological" (*orthographically* speaking) is in the extension of the word itself, we find it isn't, since "heterological" applies in the first instance to *meanings*, not spellings. (For a careful delineation of the distinction to be made between the meaning of a word and its orthography, see Quine (1966a).) The case is thus akin to that of a sentence like "The number seven is red," which is simply false. (Quine (1960), 22; (1966b), 5.) Since our theory of property possession claims as its Universe spatiotemporal entities only, there is no reason to think Grelling's paradox (at any rate) is a problem.

However, the objector may persist in this wise. "I see that a semantic paradox like Grelling's, which requires that meanings be in the universe of discourse to be a problem, is not a problem for you since, although you specify sets with nonspatiotemporal entities, the members of those sets are all spatiotemporal (that being the point of the innovation — to avoid the need for spatiotemporal qualification of properties). Nevertheless, this seems rather parochial. Moreover, your proposal is a suggestion for the interpretation of LL, which is supposed to include everything there is, whether in the

spatiotemporal Universe or not. Are you admitting that Geach is generally correct, or do you have any suggestions for the 3Dist who wants to include meanings or other nonspatiotemporal entities in her Universe?"

Yes, there is indeed something that can be said in this regard. Let us allow meanings in as potential set members; in particular, the meaning of the word "heterological," which then must appear somewhere in the extension of heterologicality (and/or its supposed complement, autologicality). Now, note that it would not be a problem for us if the meaning of heterological appeared in *both* sets (the one specified by the property "heterologicality" and the other by the property "autologicality"), for we specifically allow for that. However, it most certainly is a problem if it appears in neither. In that case, the "sets" we might like to specify by Hx and $\overline{H}x$ are incomplete; there is something that is supposed to be in the Universe that doesn't appear in them. Since together they are supposed to make an exhaustive concept (that is our justification for calling them "complements"), this is a contradiction. As Halmos notes, "[t]o specify a set, it is not enough to pronounce some magic words (which may form a sentence such as '$-x \in x$'); it is necessary also to have at hand a set to whose elements the magic words apply." ((1974), 7.)

However, we can specify sets under the properties H and $\overline{H}$, despite that the (expanded) Universe is supposed to include the meaning of the word "heterological," "h;" because there is a property which, if added to the extensions of H and $\overline{H}$, renders both determinate. The requisite property is

$$\lambda x[Hx \equiv \overline{H}x]_h$$

which is true of exactly one entity; the meaning of the word heterological. When we add this property to the specifications of H and $\overline{H}$, we get

I. $\mathrm{A} = \{x \in \text{Spacetime or Meanings} \mid H(x) \vee \lambda(x)\}$ and
II. $\overline{\mathrm{A}} = \{x \in \text{Spacetime or Meanings} \mid \overline{H}(x) \vee \lambda(x)\}$

which are both well-formed.

Since the proof that the possession of a property leads to paradox must take the form of a double-reductio (as in the proof of Grelling's Paradox), the analysis offered here is generalizable; and this suggests that Geach's concern may be overcome under certain circumstances.[15]

[15] Specifically, it may be overcome when the Universe does not include whatever type of entity is supposed to be represented in the predicate portion of the predicables of sentences of the discourse. It may be that even this limitation might be overcome by interpolation of the antifoundation axiom in place of the foundation axiom. (Aczel (1988).) However, there is no need to pursue the matter further here.

V.

How does the suggestion impact the 3D-4D debate?

In one sense, the suggestion is friendly to 4Dism. It disconnects the concept of change from that of temporal directionality; since it dispenses with time as a parameter distinct from spacetime (which is needed for locative information). This is not an insignificant matter. But perhaps more important are the ways the suggestion strengthens the 3Dist position. On the one hand, by providing a technically satisfactory definition of "entire presence" which does not commit the 3Dist to undesirable systematic alterations (such as making all properties "properties at times" or replacing the foundation axiom with the antifoundation axiom (see my "Property-Based, Relational and Mereological Approaches to Defining 'Entire Presence'" (unpublished manuscript))), it shores up an area which has proven vulnerable to 4Dist attack. In particular, an important objection to the various 3D alternatives to simple property possession has been that they entail that temporary intrinsic properties are no longer temporary intrinsic. (Lewis (2002), 4 and *passim*.) But all intuitively temporary intrinsic properties would remain temporary intrinsic on the instant suggestion. On the other hand, by resolving difficulties related to complying with LL without requiring adoption of a concept of temporal parthood, it vitiates a motivation to be a 4Dist.

However, that will not be the end of the story. 4Dism is motivated by a variety of philosophical problems, some of which have little to do with LL. One historically important motivation was perhaps to accommodate Einsteinian spacetime. (Quine (1960), 172.) More recently, Sider ((2001), 140 ff.) has pointed out that the strongest arguments for 4Dism lie in its ability to resolve the paradoxes of coincidence. Acceptance of the proposal would thus likely result in the 3D-4D debate simply shifting to other grounds.

VI.

The modest proposal for interpretation of LL is that we understand unqualified natural language property attributions to be made in a quantificational idiom, that is, nonlocatively; and allow the attributes in our ordinary first order axiom schemata to range over properties and their complements. Such timeless bearing of complementary properties does not contradict the LNC, and allows for entities to be "entirely present" without worrying about the need to develop a technically adequate and metaphysically perspicuous method of ascribing temporal qualifications to properties. Moreover, the suggestion leaves all temporary intrinsic properties of an entity unchanged without any need to posit temporal parts. 3Dists will find these to be significant advantages. Although the solution may not be found completely satisfying to all

3Dists because of its rejection of the dependence of change on temporal directionality, this defect may yet be ameliorable. In any case, the suggestion comes closer to reconciling persistence, change and identity than does any currently available alternative.

800 Victory Boulevard #6W
Staten Island, NY 10301
U.S.A.
E-mail: edfried@juno.com

REFERENCES

Aczel, P. (1988). *Non-Well-Founded Sets.* Stanford CA: CSLI Publications.

Aristotle (1957). *The Metaphysics.* W. Jaeger, Ed. Oxford: Oxford University Press.

Barker, S.F. (1974). *The Elements of Logic.* NY: McGraw-Hill.

Berto, F. (2005). Some topics concerning identity and contradiction in philosophical logic. *Epistemologia* XXVIII, 219–238.

Chisholm, R.M. (1971). Problems of identity. In M. Munitz, Ed., *Identity and Individuation.* New York: New York University Press, 3–30.

Chisholm, R.M. (1976). *Person and Object.* London: Allen & Unwin.

Craig, W.L. (1997). Is presentness a property? *American Philosophical Quarterly* 34, 27–40.

Donnelly, M. and T. Bittner (2009). Summation relations and portions of stuff. *Philosophical Studies* 143, 167–185.

Eagle, A. (2010). Location and perdurance. In D.W. Zimmerman, Ed., *Oxford Studies in Metaphysics*, vol. 5. Oxford: Oxford University Press.

Fine, K. (2006). In defense of three-dimensionalism. *The Journal of Philosophy*, CIII, 699–714.

Geach, P.T. (1973). Ontological relativity and relative identity. In M. Munitz, Ed., *Logic and Ontology*. New York: New York University Press, 287–302.

Halmos, P.R. (1974). *Naive Set Theory.* NY: Springer-Verlag.

Haslanger, S. (2003). Persistence through time. In M.J. Loux and D.W. Zimmerman, Eds., *The Oxford Handbook of Metaphysics.* Oxford: Oxford University Press.

Heller, M. (1992). Things change. *Philosophy and Phenomenological Research*, LII.3, 695–704.

Johnston, M. (1987). Is there a problem about persistence? *Proceedings of the Aristotelian Society*, Supp. Vol. 61, 107–135.

Kearns, J. (1970). Substance and time. *The Journal of Philosophy*, LXVII.9, 277–289.

Lewis, D. (2002). Tensing the copula. *Mind* 111, 1–13.
Lombard, L.B. (1986). *Events: A Metaphysical Study*. London: Routledge and Kegan Paul.
Lombard, L.B. (1994). The doctrine of temporal parts and the 'no change' objection. *Philosophy and Phenomenological Research*, LIV.2, 365–72.
McCall, S. and E.J. Lowe (2009). The definition of endurance. *Analysis* 69.2, 277–80.
McTaggart, J. McT. E. (1998). On time. In P. van Inwagen and D.W. Zimmerman, Eds., *Metaphysics: The Big Questions*. Malden, MA: Blackwell Publishers. Excerpted from *The Nature of Existence*. Cambridge: Cambridge University Press (1927).
Mellor, D.H. (1998). *Real Time II*. London: Routledge.
Myro, G. (1986). Identity and time. In R.E. Grandy and R. Warner, Eds., *Philosophical Grounds of Rationality*. Oxford: Clarendon Press, 383–409.
Oaklander, L.N. (2004). *The Ontology of Time*. Amherst, NY: Prometheus Books.
Quine, W.V. (1960). *Word and Object*. Cambridge, MA: MIT Press.
Quine, W.V. (1966a). Three grades of modal involvement. In *The Ways of Paradox and Other Essays*. NY: Random House.
Quine, W.V. (1966b). Existence and quantification. In J. Margolis, Ed., *Fact and Existence*. Toronto: University of Toronto Press.
Shalkowski, S.A. (2005). Modality, philosophy and metaphysics of. In D.M. Borchert, Ed., *The Encyclopedia of Philosophy, 2nd Ed.*, vol. 6, New York: MacMillan Reference USA.
Sider, T. (2003). *Four-Dimensionalism*. Oxford: Clarendon Press.
Simons, P.M. (1987). *Parts*. Oxford: Clarendon Press.
Thomson, J.J. (1983). Parthood and identity across time. *The Journal of Philosophy* LXXX.4, 201–220.
van Inwagen (2002). Temporal parts and identity across time. In A. Bottani *et al.*, Eds., *Individuals, Essence and Identity*. Dordrecht: Kluwer, 387–412.
Yatabe, S. and H. Inaoka (2006). On Evans's vague object from set theoretic viewpoint. *Journal of Philosophical Logic* 35:423–434.
Zemach, E. (1991). Vague objects. *Noûs* 25.3, 323–340.