Persistence and Determination[1]

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1. Introduction

Roughly speaking, perdurantism is the view that ordinary objects persist through time by having temporal parts, whilst endurantism is the view that they persist by being wholly present at different times. (Speaking less roughly will be important later.) It is often thought that perdurantists have an advantage over endurantists when dealing with objects which appear to coincide temporarily: lumps, statues, cats, tail-complements, bisected brains, repaired ships, and the like. Some cases – personal fission, for example – seem to involve temporary coincidence between objects of the same kind. Other cases – a cat and its flesh, a statue and its lump – seem to involve objects of different kinds.

When two objects temporarily coincide, they are indiscernible in many basic, temporary respects, but they are discernible in respect of their future careers or past histories. How can this be? How can indiscernibility in all sorts of immediate, ordinary respects fail to guarantee indiscernibility in every respect? This is the 'temporal grounding problem'.

According to perdurantists, temporary coincidence is mere sharing of (temporal) parts. Whilst the objects coincide, they share temporal parts, but when they diverge they do not. The spatial analogy is familiar: these chunks of tarmac right here are parts of both High Street and the Great North Road, those chunks of tarmac over there are parts of the Great North Road but not of High Street. Moreover, we do not expect High Street and the Great North Road to be indiscernible merely because they share a few parts: there is no 'spatial grounding problem'. The partial-overlap account of temporary coincidence is commonly taken to solve the temporal grounding

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problem, and thereby to secure some advantage for perdurance theory over endurance theory.

This advantage is not conclusive: perdurantism and endurantism compete on various fronts, and if endurantists triumph elsewhere, they may simply accept that some differences between temporary coincidents are ungrounded, or else argue that temporary coincidence never occurs. Moreover, the perdurantist story about partial overlap does not apply where objects appear to coincide permanently: here perdurantists and endurantists have similar resources available. Nevertheless, a straightforward account of temporary coincidence is a valuable prize, not least because it provides the ontological resources for an epistemicist or a semantic-indecision account of vagueness in persistence: such accounts standardly require hordes of almost-indiscriminable temporarily-coincident objects.

Ryan Wasserman has challenged the idea that perdurantists have any advantage in accounting for temporary coincidence (Matthew McGrath makes a similar point, to which I will return below; see also Lowe (2002)). Wasserman (2002) argues that, insofar as perdurantists may invoke the fact that temporarily-coincident objects differ mereologically at other times, endurantists may invoke a similar fact. Temporarily-coincident enduring objects differ in their spatial parts at times when they do not coincide; trivially so if one of them goes out of existence. If other-time differences in temporal parts can ground differences between temporarily-coincident perduring objects, then surely other-time differences in spatial parts can do the same job for temporarily-coincident enduring objects. There is, Wasserman suggests, nothing exclusively perdurantist about grounding present differences in other-time mereological differences. What makes these coincident objects distinct? Why, the fact that they will have different parts in the future!

It is of course true that, if two enduring objects coincide temporarily, then they differ in what parts they have at some other time, and that this is a mereological difference between the two. Why then did anyone ever think that endurantists had a special difficulty with the temporal grounding problem? And exactly how was the perdurantists' invocation of mereological difference between temporary coincidents supposed to solve the problem?

To recover the advantage for perdurantists, we need to examine questions of grounding or determination. If we could describe the world without commitment to facts about persistence or identity, endurantists and perdurantists would agree on that description: if they disagreed about this, we could hope to choose between them empirically. The temporal grounding problem concerns

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determination or dependence, not just correlation or supervenience (so does the analogous modal problem, as Bennett (2004) and Shagrir (2002) have shown); it challenges us to identify a qualitative *ground* for differences between the temporarily coincident objects in question.

So if there is a special difficulty for endurantists here, it is because endurantists have a special reason to think that facts about number, identity or sort must be determined by temporally intrinsic facts, a reason which does not apply to perdurantists. And indeed a special reason does seem to present itself. An enduring object is wholly present whenever it exists. The notion of 'being wholly present at' a region has resisted uncontroversial clarification, but must involve localness somehow: if an object is wholly present at a region, then important facts about it are determined by what's going on within that region. In contrast, if an object is only partially present at a region, then we do not expect the central facts about it to be exhausted by what's going on in that region.

The main goal of this paper is to substantiate the thought that endurantists and perdurantists should differ about what determines what, that they should disagree about temporal intrinsicness. First, I will clarify the temporal grounding problem, distinguishing two versions of it (section 2). Then, I will examine the differences between endurantism and perdurantism (section 3), and show how perdurantism is better placed with respect to the temporal grounding problem (sections 4 and 5). Finally, and briefly, I will make some connections between the temporal grounding problem and 'metaontological' scepticism about the distinction between perdurantism and endurantism (section 6).

2. Two Temporal Grounding Problems

What are the facts, features or properties whose grounding is at stake in the temporal grounding problem? Standardly, these are taken to be differences in properties between the temporarily-coincident objects in question, respects in which they differ even while they coincide: these include differences in past- or future-directed properties, and, sometimes, sortal differences and the modal differences consequent upon these. Wasserman's point is that both endurantists and perdurantists can call upon mereological differences at other times to ground differences in past- and future-directed properties. (I will return to sortal and modal differences below). It is significant that these differences are mereological: temporarily-coincident objects are

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mereologically indiscernible whilst they coincide, and the temporal grounding problem can be seen as the challenge of explaining how mereologically-indiscernible objects can nevertheless differ. Identifying a mereological difference between temporarily-coincident objects addresses the challenge by undermining its presumption.

But casting the temporal grounding problem in mereological terms disguises its true nature. The intuitions which drive the grounding problem do not turn on numerical identity of parts, or, indeed, spatial coincidence. Instead, they turn on the idea that qualitative properties at some relatively basic level determine those at less basic levels, however this is to be spelt out. Mereological (or spatial) coincidence is important merely as a guarantee of indiscernibility at the more basic level, which in turn creates a presumption of total indiscernibility. But neither spatial nor mereological coincidence is required to create this presumption and thus prompt the temporal grounding problem.

To see this, consider a mirror-symmetrical universe, made up of two qualitatively identical halves. Suppose each half includes within it a spatial region which exactly contains both a statue and a lump of clay; perhaps the lumps will survive squashings in which the statues perish. These two distinct spatial regions are indiscernible in all their qualitative intrinsic and extrinsic features (they are weakly indiscernible, in the sense of Quine (1976)). Now compare the statue from one region with the lump from the *other* region: isn't it puzzling that one of these objects is a statue and yet the other is a lump, given that they are indiscernible in every presently-manifested qualitative respect? Isn't it puzzling that they differ in their future-directed properties, that one will survive longer than the other, given their indiscernibility in present basic respects? The fact that these two objects occupy numerically distinct regions, and have numerically distinct parts is no comfort at all: if there is a problem here, it is because we expect higher-level differences between objects to be grounded in lower-level differences, however this notion of levels is to be spelt out.

So the underlying question is how temporarily-coincident objects can differ in their past- or future-directed properties whilst they are indiscernible in their basic, present properties; mereological indiscernibility is a mere surrogate for indiscernibility in basic, present properties.

This object-focused temporal grounding problem highlights differences and similarities between coincident objects. A second temporal grounding problem is region-focused; it emerges most clearly where there is supposedly temporary coincidence between objects of the same kind, as in 'multiple occupancy' accounts of

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fission or fusion cases. Where same-kind coincidence occurs, the number of persisting objects present in a spatial region supposedly covaries with events occurring either earlier or later: if fission will occur, there are two people here already, but if it will not, there is only a single person. This raises a temporal grounding problem for the properties of spatial regions themselves, rather than the properties of the objects momentarily occupying those regions. What determines that this spatial region contains exactly two distinct objects at this time? Not the intrinsic properties of the region, at any rate, since there could be a qualitatively intrinsically identical region which contained only one object.

So temporary coincidence raises both an object-focused and a region-focused grounding problem. First, what determines that this object is F, whilst that object is not F (where *being F* is some future- or past-directed property)? Second, what determines that this region contains two (or more) objects, whilst that region contains only one? The questions differ formally, in that one directly concerns the properties of objects, and the other the properties of regions. Yet the difference is not merely formal. Providing an informative response to the region-focused problem is compatible with providing only an uninformative, 'brutalist' response to the object-focused problem; indeed this combination may be inevitable for same-kind coincidence. Why does this region contain two distinct objects (people, say) rather than one? Because it is suitably-connected to a future fission event. Why does this person end up body A, whilst this other person ends up in body B? Well, this person *just is* the one who ends up in body A, whilst that one *just is* the one who ends up in body B (Langford 2007). We may explain why a region contains objects with different futures, without thereby explaining why this particular object has this particular future rather than that.

This idea resonates with Theodore Sider's suggestion about permanently-coincident objects: that it may be determinate that these objects differ in their essential properties, yet indeterminate which object has which essential properties (Sider, forthcoming). Sider's suggestion in turn resembles the usual story about certain entangled pairs of fermions: it is determinate that they have opposite spins, yet indeterminate which fermion has which spin. However the present idea is not that it is indeterminate which temporary coincident has which future, but rather that a determinate fact about which has which may be ungrounded, even when the fact that the two objects have different futures is itself grounded.

I have described two distinct temporal grounding problems – object-focused and region-focused – and argued that the former,

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which is the more usually discussed, is best understood as arising fundamentally from the temporary indiscernibility of such objects in terms of their basic properties, not their temporary spatial coincidence or mereological identity. Do perdurantists have any advantage in tackling either of these temporal grounding problems? In order to address this question, I will first clarify the respects in which perdurantism differs from endurantism, then argue that perdurantists do have an advantage in tackling the region-focused temporal grounding problem. I will then return to the object-focused question, and argue that, whilst endurantists and perdurantists are on a par with respect to same-kind temporary coincidence, perdurantists have an advantage with respect to different-kind cases.

3. Temporal Extent and Temporal Parts

Josh Parsons has usefully distinguished two elements of perdurantism: the claim that ordinary objects have temporal parts, and the claim that ordinary objects have temporal extent (Parsons 2000; see also Effingham 2007). The distinction is useful because it seems at least conceivable that an object could be temporally extended without having temporal parts. The spatial analogue may be more familiar: those who believe in the possibility of spatially-extended simples believe that an object can extend through a spatial region without having a proper part in every proper sub-region of that region (e.g. Markosian 1998). Likewise, Parsons posits temporally-extended temporal simples: objects which are extended through time but without having temporal parts.

What is the difference between such 'Parsons objects' and ordinary enduring things, which also persist through time without having temporal parts? Sider (2001) argues that endurantism is best characterised as the purely negative claim that not every ordinary object has an instantaneous temporal part at every moment of its existence. But according to Parsons there is a second crucial element of endurantism: the claim that persisting objects are multiply-located in spacetime (like aristotelian universals), that they are wholly present at more than one time. Both enduring objects and Parsons objects lack temporal parts, but an enduring object is wholly present at each of several times, whilst a Parsons object occupies a temporally-extended region without being wholly present at any single time.

The distinction between enduring objects and Parsons objects depends upon a non-mereological distinction between occupying a spatiotemporal region by being multiply-located at various of

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its subregions, and occupying it by extending through it, a distinction between two ways in which a simple object might conceivably occupy a region. I will argue that insofar as endurantism is at a disadvantage in addressing the temporal grounding problems, it is because enduring objects are multiply-located, not because they lack temporal parts.

But some readers will be sceptical about this distinction between lacking temporal parts and being wholly present at several times (such readers will also be sceptical about the distinction between having temporal parts and being temporally extended). This scepticism is a special case of scepticism about extended simples, a scepticism which comes in different strengths. First, one might accept the distinction between spatiotemporal extent and multi-location, but argue that extent requires parthood: extended simples are in some sense conceivable, but nevertheless they cannot or at least do not exist. Second, one might doubt whether we can even make sense of the distinction between spatiotemporal extent and multi-location in non-mereological terms.

To sceptics of the first kind: even if temporally-extended objects inevitably have temporal parts, it is worth seeing that it is the extent rather than the parts which solves the temporal grounding problem. Recall Wasserman's argument that, whilst perdurantists differentiate temporary coincidents by their later differences in temporal parts, endurantists may appeal to later differences in spatial parts. These moves look equally good only if we cast the temporal grounding problem and theories of persistence alike in wholly mereological terms; focusing instead on questions about location and extent can help distinguish perdurantism from endurantism.

To sceptics of the second kind: I will try to flesh out the nonmereological distinction somewhat in the remainder of the paper, though nothing I say will persuade a determined sceptic. My argument has a conditional form: if endurantists and perdurantists differ about (nonmereological) temporal extent, then they differ in their approaches to the temporal grounding problem. Wasserman's arguments suggest that we can turn this conditional into a biconditional: if endurantists and perdurantists differ only in their attitudes to temporal parts, then they will not differ significantly in their approaches to temporary coincidence.

4. The Region-Focused Temporal Grounding Problem

Consider the spatial region you occupy right now: according to the 'multiple occupancy' view of personal fission, if a fission event lies

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in your future, then 'your' current region is occupied by two people right now, whereas if no such event lies in your future, and no fusion lies in your past, then the region contains just one person (Lewis 1983). There are of course alternative accounts of fission: perhaps fission marks the demise of one person and the beginning of two new people; perhaps there are as many people occupying 'your' current spatial region as are required to account for all possible future fission events, so that their number does not depend upon what happens in the actual future. But these alternatives have their drawbacks, and one perceived advantage of perdurantism has been its apparent hospitality to the multiple occupancy view.

Can we spell out why perdurantism seems to have an advantage over endurantism in solving the region-focused temporal grounding problem, and thus permitting multiple occupancy? It is fairly straightforward to explain how perdurantists can permit multiple occupancy; the difficulty, as Wasserman shows, is to explain why endurantists cannot. I will address these points in turn.

Consider a region: what determines how many of its super-regions exactly contain an object? It is pretty clear that this is not intrinsically determined within the region itself: the features of each super-region could hardly be encapsulated in this smaller region. Thus the number of objects at-least-partially present in a region is not determined intrinsically (where an object is at-least-partially present in a region iff that region is a proper or improper subregion of the region exactly occupied by that object). No surprise then that the number of temporally-extended objects at-least-partially present in a spatial region at an instant may be determined by temporally-extrinsic facts: perdurantists have no trouble with the region-focused temporal grounding problem.

What about endurantists? If an enduring object E is at-least-partially present at an instantaneous region R, then it is wholly present either at R, or else at a super-region which is spatially larger than R but nevertheless instantaneous. Which of these is the case is determined by both intrinsic and spatially-extrinsic features of R. However, given that E is at-least-partially present at R, temporally-extrinsic features of R can make no difference as to whether E is wholly present there or just partially present. Why not? Because E is an *enduring* object: if it is at-least-partially present at that time, then it is wholly present at that time.

So far, so good. But we cannot straightforwardly conclude that the number of enduring objects present at a time is determined by facts intrinsic to that time. After all, temporally-extrinsic facts might help determine how many enduring objects are at-least-partially

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present at that time, by helping determine which of the super-regions of that region are worldtubes of persisting objects; in this sense, a worldtube exactly contains a perduring object, or is the sum of all the various exact locations of an enduring object. Anything perdurantists can do, endurantists can do too?[2]

At this point endurantists ought to baulk, not at the correlation claim but at the determination claim. Both endurantists and perdurantists can agree that the number of objects at-least-partially present at an instantaneous spatial region is correlated with the number of four-dimensional super-regions of that region which are worldtubes of objects. (This correlation fails if permanent coincidence occurs, and a single four-dimensional region can be the worldtube of several distinct objects. But it is legitimate to ignore permanent coincidence here, since the goal is to establish whether perdurance has an advantage in accounting for multiple occupancy which is determined by actual later differences, not merely possible differences.)

However endurantists should baulk at the claim that temporally distant goings-on can determine whether an object is present at a time at which, if it were present at all, it would be wholly present. This determination is not causal (it can operate backwards in time), and it seems entirely mysterious (for related discussion, see Hawley 2005).

The point generalises to other multiply-locatable entities. Consider John O'Leary-Hawthorne's suggestion (1995) that, if objects are bundles of universals, then Max Black's 'two spheres' world in fact contains a single bi-located sphere (Black 1952). Suppose such multiply-located objects are indeed possible, and suppose that they may coincide. What determines how many such objects are wholly present at a given spatial region? Spatially- or, indeed, temporally-extrinsic features of the region may be relevant: perhaps it contains both a statue and a lump because of the earlier intentions of a sculptor. But the possibility of bilocation does not seem to make a difference: the fact that one or more of the objects wholly present at the region may also be wholly present elsewhere does not affect the count of objects wholly present there, and the distant regions where the objects are also present have no special determining role. I take it that this is part of the force of saying that the objects are wholly present at the region, insofar as this goes beyond a mereological notion.

[2] For discussion of a related issue, see Balashov (1999) and (2000), and Gibson and Pooley (2006, section 6).

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What goes for spatial extension versus multi-location goes for temporal extension versus multi-location too. How many perduring objects or Parsons objects have this spatial region as their full spatial extent right now? This is a temporally extrinsic matter: the spatial region in question may be merely a proper subregion of the region exactly occupied by the perduring objects (or Parsons objects) in question. How many enduring objects have this spatial region as their full spatial extent right now? This is a temporally intrinsic matter: however many they are, they are all right here right now.

My suggestion, then, is that it is the 'wholly present at each time' or 'multi-location' element of endurantism which makes the region-focused temporal grounding problem so serious, and that both perdurantism and Parsons' nonmereological four-dimensionalism have a solution to hand. (That said, temporal parts do have some advantages above and beyond mere temporal extent: most obviously, they permit a straightforward account of change, though Parsons has an alternative. And they help solve a further puzzle about temporary coincidence, explaining our inclination to say that there is only one object present in a spatial region even when we are simultaneously inclined to say that there are two: as Lewis suggested, we may count not by identity but by common parthood in such circumstances.)

How can endurantist fans of temporary coincidence respond? One option is to give up the 'multi-location' element of endurantism, taking the no-temporal-parts element as fundamental, and perhaps invoking scepticism about any nonmereological distinction between temporal extent and multi-location. But this option is problematic for at least two reasons. First, Sider (2001) argues that the no-temporal-parts claim must in fact be rather weak – merely that not every object has a temporal part at every moment of its existence – and this hardly seems to capture an attractive, distinctive position. Second, Gibson and Pooley (2006) argue that the notion of a *temporal* part is unsustainable given the relativity of simultaneity (there are no *times*, as such), and thus that the key distinction between endurantism and perdurantism must be captured by the contrast between multi-location and temporal extent, rather than by claims about temporal parts.

A second option for endurantists would be to retain the 'wholly present' formulation of their view, in conjunction with the denial of temporal parts, but to resist any inference from an object's being wholly present at a region, to its having central features determined locally at that region. I will return to this option below.

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5. Object-Focused Temporal Grounding Problems

I have argued that endurantists have trouble with the region-focused grounding problem because enduring objects are wholly present whenever they exist. What about the object-focused problem? What grounds differences in past- or future-directed properties between temporarily-coincident objects? As Wasserman shows, both endurantists and perdurantists can point to past or future mereological differences between temporary coincidents. This of course raises the question of how temporarily-coincident objects can enjoy such past- or future- directed mereological differences, and, in turn, whether endurantism and perdurantism may differ about this.

Matthew McGrath has recently presented this problem in a thought-provoking new way, as a conflict between causal determinism and the apparent possibility of temporary coincidence (2007). He presents this as a problem for perdurantism, but the underlying problem seems to affect both perdurantism and endurantism equally. McGrath defines an object's 'basic properties' at a time to be those it possesses in virtue of how things are (regarding that object and others) at that time. These properties stand in contrast to historical and futural properties.

McGrath then makes a plausible case for the claim that if two objects share all their spatial parts at a time, then they share all their basic properties at that time. He also argues that if two objects share all their basic properties at a time, then we have very good reason to think that they share their future properties, since an object's future behaviour is determined by its current properties together with the laws of nature. Crucially, neither of these arguments seem to appeal to any particular theory of persistence: it seems that both endurantists and perdurantists have good reason to think that if two objects share all their present parts, then they share all their futural properties (a slightly more complex argument applies to historical properties). The argument presupposes a form of causal determinism, but appeals to empirical indeterminism seem to be beside the point.

If this argument succeeds, then it rules out the possibility of temporary coincidence between distinct objects, whether those objects perdure or endure. McGrath considers a number of ways of 'saving' temporary coincidence, but concludes that each either fails or else is available equally to both perdurantists and endurantists. In particular, we might think that the futural properties of an object are determined by present basic properties in conjunction with laws, external influences and – crucially – the sortal property

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of the object in question. For example, a statue and a lump share their basic properties whilst coincident, and are subject to the same laws and external influences, but they differ in their future properties because they satisfy different sortals, belong to different kinds, and thus react differently to changes in circumstance.

As McGrath notes, this proposal cannot handle cases apparently involving temporary coincidence between objects of the very same sort. Moreover, nothing in the sortal account of futural differences is specifically perdurantist. Endurantists are entitled to talk of sortal properties and sortal predicates, and are, it seems, entitled to explain the future differences between statue and lump by citing their sortal differences. Where, then, is the supposed advantage of perdurantism in dealing with the object-focused temporal grounding problem?

I will argue for the following three claims. First, causal determinism is compatible with both same-kind and different-kind temporary coincidence, for both perdurantists and endurantists. Second, both perdurantists and endurantists should accept that same-kind coincidence involves irreducible facts about which objects have which futural (or historical) properties. Third, perdurantists can offer a more reductive account of different-kind coincidence than can endurantists, and thus have some advantage here. This third point will rely on my earlier arguments about temporal extent and multi-location, and will provide an opportunity to reconsider endurantist responses to these.

Suppose a partless blob is cut by a knife, and divides into two partless blobs. And suppose you think of this as two coincident objects becoming separated. (Why? Perhaps because you think a blob can survive the destruction of half its matter, and you like the 'only x and y' principle; Hawley (2005).) What is causally (or nomologically) determined in this story? The qualitative state of the world at one moment, given the laws, determines the qualitative state at the next moment. That's to say, every time a blob like that meets a knife like that in circumstances like that, the result is two spatially-separated blobs, one which goes left and one which goes right.

Temporary coincidence does not conflict with a standard interpretation of determinism: it does not permit qualitative divergence of hitherto-indiscernible worlds. However, McGrath's arguments do bring out the way in which same-kind coincidence involves brute facts about persistence (see also Langford 2007). What is *not* determined by pre-fission facts and laws is the fact that blob A goes left, whilst blob B goes right, instead of *vice versa*. It seems we have no alternative in such cases of same-kind coincidence but to take facts

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about which object has which future as irreducible: blob A *just is* the one which goes left, and blob B the one which goes right.

It is tempting to think that perdurantists can make more progress in reducing such facts than can endurantists: blob A is the one which goes left because it has *these* later temporal parts rather than *those*. But reaching for a mereological or constitutive 'reduction' does not give perdurantists any advantage over endurantists here: after all, blob A is the one which goes left because it is made of *this* later stuff rather than *that*. Furthermore, mereological essentialism about temporal parts seems neither appealing nor illuminatingly reductive.

Matters are different where there is temporary coincidence between objects of different sorts, as with the statue and the lump, for example. It is evidently not a brute fact that it is the lump which survives the squashing, and the statue which does not, rather than *vice versa*. But what is the direction of determination? Is this object a statue because of its future career, or does it have the future career it does because it is a statue? Here there may be scope for differentiating perdurantists and endurantists.

Perdurantists have the option of taking the futural qualitative properties of an object to help determine its sortal properties, rather than vice versa. Endurantists, I contend, do not have this option, because enduring objects are wholly present whenever they exist. I argued above that the number of objects wholly present in a region should be determined locally; similar arguments may suggest that the *sort* of an object wholly present in a region should be determined locally. But matters are more complicated here: sortal properties are typically taken to be maximal (roughly: an object cannot be an F if it is a large proper part of an F), and moreover many sortal properties cannot be possessed by objects which lack an appropriate causal history: for biological sorts, appropriate origins are required, for artefactual sorts, being appropriately situated with respect to our intentions may also be important. Nevertheless, an object's being wholly present at a time seems incompatible with its having its present sort determined by what happens a few days or years hence.

McGrath disagrees: citing Wasserman, he argues that nothing prevents endurantists grounding sortal differences outside the present time (2007, fn. 35). Enduring objects are not four-dimensional, but they do have four-dimensional careers, or worldtubes. This is the response I set aside at the end of section 4, the thought that endurantists should resist the inference from an object's being wholly present at a region to its having central features determined locally at that region. This disagreement concerns the implications of being wholly present, a notion which is notorious for its obscurity, so we

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are unlikely to reach a clear resolution. But the unattractiveness of a purely mereological conception of endurance, together with the relativistic dissolution of the temporal/spatial part distinction means that endurantists (at least) have strong reason to make sense of the notion of being wholly present.

If there is such a nonmereological difference between an object's being wholly present at a spatial region (as endurers are), and its being merely partially present there (as perdurers and Parsons objects are), then this can show up only as a difference in how the object's properties are determined. Part of what it is for an object to be located – partially or wholly – at a region is for how matters are at that region to have a determining role in how matters are for that object. An object not wholly located at a region may have its central features determined beyond that region, unlike an object wholly located there.

Now, these claims are merely suggestive: I do not wish to claim – falsely – that all the important features of an object are intrinsic to it. Nevertheless, it seems reasonable to think that, insofar as we can understand a nonmereological distinction between being wholly present and being partially present at a region, then central features of an object – like, of course, its sort – should be taken as intrinsic to that region, unless we have substantial reason to think otherwise (as with biological sorts and origins, or artefactual sorts and human intentions). If this is correct, then endurantists should not call upon futural features of an object to ground its present sort.

I have attempted to argue that, if endurantists want to retain a nonmereological sense in which persisting objects are wholly present whenever they exist, then they should accept consequent constraints upon how the properties of such objects are determined, constraints which make the object-focused temporal grounding problem look insoluble. This leaves endurantists with a couple of options. The first is simply to accept irreducible sortal properties – perhaps arguing that perdurantists will have to make the same concession when we turn to permanent coincidence (see Bennett (2004) and Hawthorne (2006) for discussion). The second is to reject the nonmereological sense of 'wholly present', and equate endurantism with the rejection of universal temporal parts.

6. Distinguishing Endurantism and Perdurantism

My main concern in this paper has been to clarify the various temporal grounding problems – object- or region-focused, same- or different-kind coincidence – and to show how four-dimensionalist

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accounts of persistence have some advantage in addressing some of these. But there has been an underlying theme about intrinsicness and determination, one which may help us address a certain form of scepticism about the persistence debate.

This debate may be cast as primarily ontological one, about the existence (or prevalence) of temporal parts. As such, it is prone to the various metaontological challenges recently raised by Hirsch (2002) and others (c.f. Miller (2005)). It can seem that each side can mimic whatever the other has to say, that temporal parts can stand in for endurers at a time, and vice versa, without loss of explanatory power. However, if a more fundamental difference between the theories concerns modes of location, multi-presence rather than temporal extent, and if this difference emerges in issues about temporal intrinsicness, then this challenge may be defused, or at least deflected (c.f. Schaffer (forthcoming)). The sceptic must undermine these notions of extent and location, as well as the ontological 'differences' regarding temporal parts; meta*ontology* will not be enough.

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