Criteria of Identity Without Sortals

Justin Mooney

University of Massachusetts Amherst

jmooney90@gmail.com

1. Phasalism

All ordinary objects should be treated like children. A child can cease to be a child without ceasing to exist. That is what happens when it grows into an adult. Similarly, I believe that a clay statue can cease to be a statue without ceasing to exist, which is what happens when it is squashed into an amorphous lump; a car can cease to be a car without ceasing to exist, which is what happens when it is crushed into a block of scrap metal; and a person can cease to be a person without ceasing to exist, which is what happens when a person dies and becomes a corpse.[1] I will call this view

---

[1] These examples are taken from the literature. The statue/lump case and the person/corpse case are widely discussed. The car/block of scrap metal case is from Hirsch (1982: 25-26). Roughly, an object is ordinary if and only if it is an object of a sort that the folk countenance. Admittedly, folk acceptance of objects of a given sort is probably best viewed as falling along a spectrum, rather than being a binary property. But I will regard many familiar organisms (e.g., hippos, trees) and artifacts (e.g., cars, houses), as well as some objects which are neither organisms nor artifacts (e.g., boulders) as being accepted firmly enough in folk metaphysics to warrant the label "ordinary object". Throughout this paper I will assume that *conservatism* is true, where conservatism is "the view that, when

---

phasalism, because it amounts to the view that the sortal properties which ordinary objects instantiate are so-called *phase sortal properties*, i.e., sortal properties that an object can begin or cease to instantiate without thereby beginning or ceasing to exist.[2]

Phasalism is not widely endorsed.[3] Contemporary metaphysics is dominated by the view that ordinary objects instantiate certain sortal properties permanently in the following sense: not only does each ordinary object instantiate a certain sortal property throughout its career; it cannot cease to instantiate that sortal property without thereby ceasing to exist. Since the sortal properties in question are known in the literature as substance sortal properties, I will call this view *substantialism*. Versions of substantialism have been endorsed by a slew of recent authors.[4]

Many substantialists believe that substance sortals have an important role to play in criteria of identity over time for ordinary objects. Proponents of this view include Wiggins (1967, 1980, 2001), Hirsch (1976a, 1976b, 1982), and Lowe (1989a, 1989b, 2009), among others. Hirsch (1982: ch. 3) goes so far as to contend that substantialism is a natural by-product of formulating a criterion of identity over time that can handle even fairly mundane cases

it comes to which highly visible objects there are right before our eyes, things are more or less the way they seem", and so ordinary objects exist (Korman, 2015: 1). Following Korman, I believe conservatism is justified by either perceptual experience or rational intuition. But this isn't the place to defend conservatism, so I direct readers to Korman's monograph for that argument.

[2] I borrow the term "phasalism" from Korman (2015: 204-205), who uses it for the approach to the problem of material coincidence which claims that, e.g., *being a statue* is a phase sortal property of a piece of clay. The term "phase sortal" was introduced by Wiggins (1967: 7).

[3] Proponents of phasalism or something like it include Ayers (1974), Price (1977), Jubien (1993, 2001), Tichý (2004 [1987]: 718-720), Schwartz (2009), and Mooney (2021). Cf. Mackie (2006) and Goldwater (2018).

[4] Including, but not limited to, Geach (1980 [1962]: 68), Wiggins (1967; 1980; 2001), Quinton (1973: ch. 3), Hirsch (1976a; 1976b; 1982), Brody (1980), Lowe (1989a; 1989b; 2009), Burke (1994a; 1994b), Hoffman & Rosenkrantz (1997: esp. 170-176, 188-191), Runggaldier (1998), Baker (1997; 2000: 35-39, 105-106; 2007: 32-39), Johnston (2006), Oderberg (2007), Thomasson (2007), Elder (2004; 2011: ch. 3), Evnine (2016), Koslicki (2018), and others.

of persistence. Nevertheless, I want to explore the prospects for a phasalist criterion of identity, i.e., a criterion which entails that objects survive the sortal changes substantialists deny that they survive.

I am going to argue that the phasalist is at least as well-off as the substantialist when it comes to providing criteria of identity for ordinary objects. I will do this by arguing that there is a phasalist criterion of identity that is at least as successful as substantialist rivals in two important respects: extensional accuracy and explanatoriness. The criterion that I am going to defend is a version of a change-minimizing criterion of identity first discussed by Hirsch, but with an added twist that gives sortal properties a privileged role in determining what qualifies as change-minimizing, without entailing substantialism.

I formulate the phasalist criterion I am going to defend in Section 2. Then I consider its extensional accuracy in Section 3, where I argue that it handles a variety of difficult cases of identity (or non-identity) over time and compares favorably with substantialist rivals. In Section 4, I consider whether the phasalist criterion is explanatory. I decide that the phasalist criterion is not plausible when construed as an explanatory criterion, but I argue that the same is likely true for its substantialist rivals. I conclude that the substantialist has no clear advantage over the phasalist with respect to providing extensionally accurate and explanatory criteria of identity for ordinary objects.

2. A Phasalist Criterion

Following the lead of others, I prefer to formulate criteria of identity as conditions on the relationship between momentary states in the careers of persisting objects. Let's say that an *ordinary object state* is any complex fact or state of affairs that consists of a particular ordinary object instantiating all of the properties it instantiates at a particular instant in its career. And let's say that the object which instantiates the properties in any particular ordinary object state is the *instantiator* of that state. For example, my present ordinary object state consists of my instantiating certain properties like

3

being human, *being a philosopher*, having a certain height, weight, and so on, and the instantiator of that state is me - a particular ordinary object.

Ordinary object states never come alone. They are always accompanied by other, very similar, states, which are often states of the same instantiator. My current ordinary object state was preceded by other states that consisted in my instantiating properties like *being human*, *being a philosopher*, and so on, and (I hope) it will be followed by similar states as well.

Criteria of identity concern which ordinary object states at distinct times do and do not have the same instantiators. Various kinds of criteria of identity have been distinguished and/or discussed in the literature. Some criteria of identity are *epistemic criteria of identity*, i.e., epistemic rules or guidelines for deciding when two or more ordinary object states have the same instantiator. I will not be concerned with epistemic criteria of identity in what follows. Other criteria of identity are *conceptual criteria of identity*, i.e., the conditions under which two or more ordinary object states satisfy our concept of having the same instantiator. I will not be concerned with conceptual criteria either, at least not directly. My concern will be with *metaphysical criteria of identity*, i.e., the conditions on identity over time for ordinary objects, independently of how they are conceived. A metaphysical criterion is an answer to the following question: for any series, S, of ordinary object states,[5] what are the necessary and sufficient conditions under which all the members of S have the same instantiator?[6]

---

[5] A series should be understood as temporally extended in the sense that each member of the series occurs at a different time. Hence, my discussion will be limited in scope to diachronic identity.

[6] More carefully, criteria of identity *for ordinary objects* answer this question. I leave it an open question whether there are criteria of identity for other kinds of entities, such as abstract objects and events. If there are, then perhaps we can understand the notion of a criterion of identity simpliciter (as opposed to a criterion of identity for ordinary objects) in terms of the relations between *entity states*, where "entity" is understood along the lines of Hoffman and Rosenkrantz (1994, 1997). Thanks to a referee for raising this issue.

Substantialist answers to this question appeal to sortals, because they require that objects retain certain sortal properties throughout their careers. But I believe the phasalist can embrace the substantialist position that sortals play a role in criteria of identity for ordinary objects, and moreover the phasalist can even use sortals to do much of the same work that they do for the substantialist. To see this, let's consider a phasalist criterion of identity which Eli Hirsch (1982) discusses but ultimately exchanges for a substantialist alternative: a change-minimizing criterion. One version of this criterion may be formulated as follows:

> *Change-minimizing criterion*: for any series, S, of ordinary object states, all the members of S have the same instantiator if and only if:
>   (i) S is appropriately continuous; and
>   (ii) S is change-minimizing.[7]

This criterion places two conditions on identity. For ease of reference, I will call condition (i) the *continuity condition* and condition (ii) the *change-minimizing condition*.[8] In the continuity condition, "appropriately continuous" is a placeholder for whatever sort of continuity is necessary for persistence. Candidates include spatiotemporal continuity,[9] qualitative

---

[7] This is based on Hirsch's (1982: 81) "basic rule". His rule is not equivalent to this change-minimizing criterion, but I will treat them as equivalent because the differences are not going to matter. Hirsch offers his basic rule as a component of a conceptual criterion of identity, but the change-minimizing criterion stated here should be interpreted as a metaphysical criterion.

[8] The latter name is also used by Hirsch (1982: 81-82).

[9] For proposed analyses or discussion of spatiotemporal continuity, see Strawson (1959: 37), Shoemaker (1963: 5, n. 3), Coburn (1971), Swinburne (1981: 19-24), Hirsch (1982: ch. 1), Forbes (1985: 148-149), Oderberg (1993: 5-15), and Hoffman & Rosenkrantz (1994: 173-174). (I am indebted to Oderberg (1993) for most of these references.)

continuity,[10] causal continuity,[11] and material continuity.[12] Any combination of these could be used to fill out the continuity condition, and for my purposes, it doesn't matter which of them we choose.

What about the change-minimizing condition? To put it a bit metaphorically, the notion of a change-minimizing series of ordinary object states is the notion of a series that forces less change on an object at any given point in its career than any other existing series does. So any state in a change-minimizing series resembles its immediate successors at least as much as any other states simultaneous with it do. But I will also require that it resembles its immediate predecessors at least as much as any states simultaneous with it do.[13] To be more precise, let's say that, for any pair of appropriately continuous ordinary object states, s and s*, s* is minimally different from s if and only if s* resembles s at least as much as any other state which is both simultaneous with s* and appropriately continuous with s. Then:

> *Change-minimizing series*: an appropriately continuous series, S, of ordinary object states is change-minimizing if and only if, for any state, s, such that s is a member of S:
>
> (i)   if s has successors which are members of S, then there is some successor, s*, such that every member of S between s and s* is minimally different from s; and

[10] Nozick (1981: 34-37), Hirsch (1982: chs. 1-2) and Swinburne (1981: 19-24) endorse a qualitative continuity constraint on diachronic identity. See Oderberg (1993: 19-32) for criticism of a qualitative continuity constraint.

[11] See Shoemaker (1979), Armstrong (1980), and Nozick (1981: 35) for early endorsements of a causal condition on diachronic identity, and see Zimmerman (1997) for a detailed study of immanent causation. See Hirsch (1982: 218-222) for resistance to a causal condition on diachronic identity.

[12] Unger (1990: 123-125) and Hershenov (2002) defend a material continuity condition on diachronic identity.

[13] Here I am indebted to Nozick (1981: 42), who includes a similar closest-predecessor requirement in his closest-continuer theory, a cousin of the change-minimizing criterion.

(ii)　if s has predecessors which are members of S, then there is some predecessor, s*, such that every member of S between s and s* is minimally different from s.[14]

The change-minimizing criterion is a phasalist one, as it does not require that objects retain certain sortal properties throughout their careers. According to the change-minimizing criterion, a car which is crushed into a block of scrap metal survives this fate (though it ceases to be a car), because the series of car states transitioning to block-of-scrap-metal states is both appropriately continuous and change-minimizing. Same for a series of statue states transitioning to amorphous-lump states, person states transitioning to corpse states, and so on.

Even though the change-minimizing criterion is a phasalist criterion, there is a way to incorporate sortal properties into it without giving up on phasalism. And if this is done right, it will enable the phasalist to do much of the same work with sortal properties that the substantialist does with them. Or so I shall argue. How exactly can sortal properties be incorporated into the change-minimizing criterion? Notice that the definition of change-minimization leaves open the issue of how degrees of similarity between ordinary object states are determined. Which ordinary object states bear the greatest resemblance to each other is going to depend on what weights are assigned to the various properties that they do and do not share (Hirsch, 1982: 86-87; cf. Nozick, 1981: 33-35).

With that in mind, I would like to suggest that sortal properties carry decisive weight when it comes to determining which ordinary object states are most alike, and therefore which sequences of ordinary object states are change-minimizing. What I mean by this is roughly that any ordinary object state bears a higher degree of similarity to states of the same sort than it does to states of a different sort, regardless of what other similarities and differences there are between them.

---

[14] This is my own analysis. Cf. Hirsch's (1982: 82) analysis of a change-minimizing series.

To put the idea more carefully, let's say that any pair of ordinary object states, s_1 and s_2, share property P if and only if P is one of the properties that the instantiator of s_1 has (when it is in state s_1), and P is also one of the properties that the instantiator of s_2 has (when it is in state s_2). Then:

> *Sortal-weighted similarity*: for any ordinary object states, s_1, s_2, and s_3, if there is some sortal property that s_1 shares with s_2 but not s_3, and there is no sortal property that s_1 shares with s_3 but not s_2, then s_1 and s_2 are more alike than s_1 and s_3.

Notice that there is no ceteris paribus clause in this sortal-weighted similarity thesis. Regardless of what other similarities and differences there may be between any given ordinary object states, ordinary object states of the same sort are more alike than ordinary object states of different sorts (roughly speaking). This is the sense in which sortal properties have decisive weight when determining similarity between ordinary object states.

We can call the conjunction of the sortal-weighted similarity thesis and the change-minimizing criterion the sortal-weighted version of the change-minimizing criterion. This version of the change-minimizing criterion is not equivalent to simply requiring change-minimization with respect to sortal properties only. For as we will see, there are cases where the antecedent of the sortal-weighted similarity thesis is not satisfied because all of the relevant ordinary object states share their sortal properties. In these cases, other properties become relevant to determining which sequences of states are change-minimizing and which are not.

Nor does the sortal-weighted change-minimizing criterion entail a substantialist requirement on identity over time. The easiest way to see this is to compare the sortal-weighted change-minimizing criterion to a parallel substantialist criterion. So consider the following version of Hirsch's (1982) preferred substantialist criterion of identity:

> *Sortal criterion*: for any series, S, of ordinary object states, all the members of S have the same instantiator if and only if there is a substance sortal, F, such that:
>
> (i)   S is appropriately continuous; and
>
> (ii)   every member of S is an F-state.[15]

Like the change-minimizing criterion, the sortal criterion places two conditions on diachronic identity. It retains the continuity condition, but it replaces the change-minimizing condition with what we can call *the sortal condition*.

The difference between the sortal criterion and the sortal-weighted change-minimizing criterion is clearest precisely where it is most important in the present dialectical context: sortal changes. The sortal criterion (along with any other substantialist criterion) entails that objects do not survive some appropriately continuous sortal changes, whereas the change-minimizing criterion, even when it is sortal-weighted, entails that they do. To see this, suppose that *being a car* is a substance sortal property and consider again a car, C, that is crushed into a block of scrap metal. C's career up to the point when it is crushed has consisted of an appropriately continuous series of car states, but when C is crushed those car states come to an end. The sortal criterion, in virtue of the sortal condition, entails that C ceases to exist when the (appropriately continuous) car states run out. C cannot survive as a non-car.

The sortal-weighted change-minimizing criterion does not have this consequence. Sortal-weighting entails that C follows an appropriately continuous series of car states, but it does not entail that C ceases to exist when the appropriately continuous car states come to an end. The final car states in C's career are appropriately continuous with the subsequent hunk-

---

[15] This is based on Hirsch's (1982: 36) "sortal rule." His rule is not equivalent to the sortal criterion, but I will treat them as equivalent because the differences are not going to matter. Hirsch offers his sortal rule as a component of a conceptual criterion of identity, but I will regard the sortal criterion stated here as a metaphysical criterion.

of-scrap-metal states. By the time these hunk-of-scrap-metal states commence, there are no further (appropriately continuous) car states to compete with them for the prized position of being most similar to the final car states in C's career. Provided that these hunk-of-scrap-metal states have no other successful competitors for this distinguished position either, the sortal-weighted change-minimizing criterion entails that C continues to persist, albeit as a hunk of scrap metal rather than a car. The transition from car states to hunk-of-scrap-metal states is therefore a phase sortal change.

By applying this same line of reasoning to appropriately continuous sortal changes involving ordinary objects of all sorts, both real and imaginary, we see that the sortal-weighted version of the change-minimizing criterion entails that all of these sortal changes are phase sortal changes. It is a phasalist criterion of identity. In what remains of this paper, I argue that this phasalist criterion is at least as defensible as rival substantialist criteria such as the sortal criterion. First, I will evaluate the phasalist criterion's extensional accuracy, and then its explanatoriness.

3. Extensional Accuracy

In this section I will defend the sortal-weighted change-minimizing criterion's extensional accuracy. I will consider a handful of challenging cases of (non-)identity over time, and I will argue that the change-minimizing criterion, when it is sortal-weighted, handles these cases at least as well as substantialist rivals. We will see that the substantialist has no clear advantage over the phasalist when it comes to formulating an extensionally accurate criterion of identity.

Perhaps the most difficult cases of (non-)identity which criteria of identity must handle are sequences of ordinary object states that are appropriately continuous but nevertheless shift arbitrarily between states of one object and states of another. Consider a tree that consists of only a

trunk and a single, small branch.[16] This tree and its trunk overlap to an enormous extent, differing only by one small branch. Now consider a series of ordinary object states that shifts arbitrarily from states of the tree to states of the trunk and vice versa. Call this the tree/trunk series. The tree/trunk series does not feature the same instantiator throughout, since the instantiator of the tree states (i.e., the tree) is distinct from the instantiator of the trunk states (i.e., the trunk).

But it is not easy to formulate a criterion of identity which gives us this verdict. Appropriate continuity won't do the trick, no matter how we spell it out. Because the tree and the trunk overlap to such a large extent, the tree/trunk series is spatiotemporally, qualitatively, and materially continuous to a high degree. The discontinuities involved in shifting from tree to trunk are similar to those that occur when a branch abruptly snaps off of a tree - a change which trees normally persist through. Moreover, many features of the trunk at one time will counterfactually depend on features of the tree at slightly earlier times, which indicates that there is causal continuity in the tree/trunk series as well.[17]

---

[16] Hirsch (1982: ch. 1-3, *passim*) discusses multiple variations of this case. Noonan (2019: 205) attributes a version of it to Saul Kripke.

[17] To see this, start by considering two closely neighboring times in the tree's career, t_1 and t_2. If the tree had been taller at t_1, it would have been taller at t_2 as well. If a woodpecker had pecked a hole in it at t_1, the tree would have had that hole in it at t_2 as well. If the tree hadn't existed at t_1, it wouldn't have existed at t_2 either. If the counterfactual account of causation is right, then these counterfactual dependencies entail that the tree's state at t_1 causally influences its state at t_2. And if counterfactual dependence is at least a fairly reliable indicator of causation, then these counterfactual dependences are evidence that the tree's state at t_1 causally influences its state at t_2.

Similar counterfactual dependencies link tree states and trunk states. If the trunk at t_1 had been taller, then the tree would have been taller at t_2. If a woodpecker had pecked a hole in the trunk at t_1, then the tree would have that hole in it at t_2. If the trunk hadn't existed at t_1, then the tree wouldn't have existed at t_2. These counterfactual dependencies suggest the presence of the same kind of causal connections that link tree states within the series. So the alternating tree/trunk series looks like it might be causally continuous. Of course, if this is correct, it means that many of the tree's features at t_2 are overdetermined by its own state at t_1 and its trunk's state at t_1. But that seems exactly right to me. Compare:

In short, the tree/trunk series seems to have all the continuity one might want from the career of a single object. How then can we get the verdict that it actually shifts between states of one object, the tree, and states of another, the trunk? Substantialist criteria can handle this case. The key is to say that *being a tree* is a substance sortal property. As long as *being a tree* is a substance sortal property, any substantialist criterion, such as the sortal criterion, will entail that a tree state and a trunk state have the same instantiator only if both states are members of a series of tree states. But the trunk state is not a member of any series of tree states since it is not itself a tree state. Therefore, the tree states and the trunk states do not share an instantiator (Hirsch, 1982: ch. 2).

The change-minimizing criterion also gets the right verdict about the tree/trunk series, provided that a series of only tree states is more conservative than one which shifts from tree states to trunk states (ibid.: 77-82). But it's especially interesting for my purposes that, if we adopt the sortal-weighted similarity thesis, the change-minimizing criterion does not merely get the right verdict about this case; it does so in virtually the same way substantialist criteria do.

Consider a point where the tree/trunk series suddenly shifts from states of the tree to states of its trunk, and call the final tree state prior to that shift s. Given the sortal-weighted similarity thesis, s is more like the tree states that immediately follow it than it is like the trunk states that immediately follow it. After all, s shares a sortal property with the tree states that follow, namely, *being a tree*. It does not share that sortal property with the trunk states, since they are not tree states, nor does it share the sortal property *being a trunk* with the trunk states, since s is not a trunk state. Perhaps the tree states and the trunk states share a sortal property such as *being a hunk*

If the tree falls on a nearby fern and crushes it under its trunk, it sounds right to say that the tree crushed the fern. But it also sounds right to say that the tree *trunk* crushed the fern. Both the tree and the trunk cause the fern to be crushed. (See also the literature on overdetermination and ordinary objects, e.g: Merricks, 2001; Thomassaon, 2007: ch. 1; and Korman, 2015: ch. 10.)

of wood, but if they do, then the tree states that immediately follow s also share that property with s. So there doesn't seem to be any sortal property that s shares with the trunk states that immediately follow it but not with the tree states that immediately follow it. It follows by the sortal-weighted similarity thesis that the tree/trunk series is not change-minimizing, and so according to the change-minimizing criterion, its members do not all have the same instantiator.

So far, so good. But Hirsch (ibid: ch. 3) contends that there are cases where appropriately continuous yet aberrant sequences of ordinary object states like the tree/trunk series *are* change-minimizing. He begins with the following example. Suppose I have a red table and I begin to paint it black. As I paint, the red part of the table shrinks and the black part grows. Or at any rate, that is how we are normally inclined to describe what happens. But one might think there are two candidate change-minimizing series of states here: a series that progresses from red table states to red-and-black-table states, and another series which diverges from this one when I begin painting, a series that progresses from red table states to red table-part states. The first series minimizes change in some respects, e.g., in respect of the table's size, whereas the second series minimizes change in other respects, e.g., in respect of the table's color.

Without the sortal-weighting thesis, the change-minimizing criterion doesn't tell us which of these sequences continues the table's career, while substantialist criteria do. As long as *being a table* is a substance sortal property, substantialist criteria entail that an object which is a table has a career that consists exclusively of table states, and so not one which shifts from table states to red table-part states. Therefore the table changes color rather than size and shape. So substantialist criteria not only give us a verdict about this case; they give us the intuitively correct verdict.

Hirsch considers the possibility that the change-minimizing criterion could deliver a verdict here if some of these properties are assigned greater weight than others in our judgements of similarity between ordinary object

states, but he criticizes attempts to pull this off.[18] For example, he considers the suggestion that the change-minimizing criterion gets the right answer in the table case because similarity in size and shape weigh very heavily in determining overall similarity. He asks us to imagine that a pair of large, gaudy bumpers are attached to a car. In this case we want to say that the car acquires new bumpers, even though this involves a significant change in size and shape. If size and shape weigh so heavily in determining overall similarity between ordinary object states, then the series of states which begins with states of a car without gaudy bumpers and transitions to states of a car with gaudy bumpers is not likely to be change-minimizing. Instead, the change-minimizing series will be one which begins with states of a car without gaudy bumpers and transitions to states of a certain car-part: that part which consists of all of the car except its bumpers. Hirsch points out that this problem for the change-minimizing criterion generalizes to many cases of part acquisition.

One way to respond to Hirsch's challenge is to deny that there are any such things as the part of the table that consists of all of it except that portion that has been painted black, or the part of the car which consists of all of it except its bumpers.[19] If there are no such things, then there are no corresponding sequences of ordinary object states. And I am skeptical of so-called arbitrary undetached parts like these. But even if these things do exist, the change-minimizing criterion can handle them. Although Hirsch considers the possibility that some properties, like size and shape, carry special weight when it comes to fixing similarity relations between ordinary object states, he does not consider the possibility that *sortal* properties do.

If we adopt the sortal-weighted similarity thesis, the change-minimizing criterion delivers the same verdicts about these cases that substantialist criteria do. In the case where the red table is painted black, the series that

---

[18] As a referee notes, this response would require a sparse view of properties (to which I am amenable).

[19] Hirsch (ibid: 92ff) himself seems to be sympathetic to this view, at least as regards the car part.

preserves the table's size and shape also preserves the sortal property *being a table*. Whereas the series that preserves the table's color at the expense of its size and shape shifts from table states to table-part states when I begin to paint the table black. Moreover, there is no plausible candidate sortal property that the red table states share with the red table-part states but not with the red-and-black table states. So the series of increasingly black table states is change-minimizing while the series of red table states shifting to red table-part states is not, and therefore the table changes color rather than changing size or shape. That's the right verdict.

In the case of the car with gaudy bumpers, the series which begins with car states prior to the addition of the bumpers and transitions to car states after the addition of the bumpers preserves the sortal property *being a car*. Every member of the series is a car state. Whereas the series which begins with car states prior to the addition of the bumpers and transitions to car-part states rather than car states when the bumpers are attached does not preserve the sortal property *being a car*. It shifts from car states to car-part states when the bumpers are added. As long as there is no sortal property shared by the pre-bumper car states and the car-part states, but not the post-bumper car states, the sortal-weighted change-minimizing criterion entails that the bumpers become part of the original car when they are attached to it. That is again the right verdict.

One might object that I have overlooked some relevant sortal properties. In the car case for example, there *is* a sortal property shared by the pre-bumper car states and the car-part states, but not the post-bumper car states. The sortal property in question is *being a bumper-complement*, where a bumper-complement is that part of a car which consists of all of it except its bumpers (if it has any bumpers). Then the pre-bumper car states include both the sortal property *being a car*, which they share with the post-bumper car states but not the post-bumper bumper-complement states, and the sortal property *being a bumper-complement*, which they share with the post-bumper bumper-complement states but not with the post-bumper car states.

There are a few ways to reply to this objection. First, we could deny that *being a bumper-complement* is a sortal property. Hirsch limits sortals to sortal-candidates which we actually deploy in ordinary life when tracking objects through time. I take this class of sortals to correspond at least roughly to the sorts of objects countenanced by folk metaphysics. Just as some call the objects countenanced by folk metaphysics ordinary objects, I will call the sortal properties that feature in folk metaphysics ordinary sortal properties. *Being a bumper-complement* is arguably not an ordinary sortal property. (It is certainly a much less plausible candidate than *being a car*.) So if, following Hirsch, we claim that the only true sortals are ordinary sortals, then *being a bumper complement* isn't a sortal property after all. Alternatively, even if we don't restrict the class of true sortals to ordinary sortals, we could limit the sortal-weighted similarity thesis to ordinary sortals, thus giving ordinary sortals like *being a car* more weight than non-ordinary sortals like *being a bumper-complement*.

And even setting all of that aside, the phasalist could deny that the pre-bumper car states are also bumper-complement states, as opposed to merely being coincident with bumper-complement states. If there really is such a thing as a bumper-complement, then it was coincident with the car prior to the addition of the bumpers. One way to flesh this out is to suppose that there were actually two distinct but coincident sequences of ordinary object states prior to the addition of the bumpers - a sequence of car states and a coincident sequence of bumper-complement states. The two sequences ceased to be coincident when the bumpers were added.

So the change-minimizing criterion, when it is sortal-weighted, can successfully weave its way through the same cases that substantialist criteria can, in roughly the same way that substantialist criteria do. However, there are also appropriately continuous sequences of ordinary object states that shift arbitrarily between states of distinct objects *of the same sort*. Importantly, the sortal-weighted change-minimizing criterion has the resources to handle these cases as well.

Sutton (2014) describes cases where, for some sortal property, F, an F has a large proper part that is also an F, and F is a plausible candidate for a

substance sortal property. Imagine a tile that is composed of other tiles. Call this tile "Big Tile." Big Tile is composed of a tile only slightly smaller than it, which we can call "Small Tile", plus a hundred tiny tiles that form a perimeter around Small Tile. Now consider a series of ordinary object states that alternates arbitrarily between states of Big Tile and states of Small Tile. This series is spatiotemporally, qualitatively, materially, and causally continuous to roughly the same extent as the tree/trunk series. But this time all the states in the series seem to be states of the same sort of object, namely, a tile, so it is hard to see how either substantialism or sortal-weighting can rule out this aberrant series. I am going to set aside the challenge that this case poses to substantialist criteria and return to it in the next section. Here, I will only argue that the sortal-weighted change-minimizing criterion can handle this difficult case.

Fortunately, although all of the relevant states in the Big/Small Tile series are tile-states, and therefore sortal-weighting doesn't guide us here, other similarities between states become relevant when sortal similarities drop out of the equation. A series of ordinary object states that alternates between states of Big Tile and states of Small Tile is arguably not change-minimizing, because the shift from bigger tile states to smaller tile states is a bigger change than the change involved in the series which continues with bigger tile states instead of shifting to smaller ones. The former involves a larger shift in (e.g.) size than the latter, while preserving nothing significant that the latter doesn't also preserve.

One might wonder if we can construct problem cases like that of Hirsch's painted table, but where sortal-weighting won't help because all of the states involved are states of the same sort. For example, suppose that at some point the border of tiny tiles around Small Tile changes color. Then a sequence of tile states that shifts from states of Big Tile to states of Small Tile at the point when the border changes color is change-minimizing in respect of color but not size, whereas a sequence of tile states that stays with states of Big Tile through the color change is change-minimizing in respect of size but not color. Does the change-minimizing criterion tell us what to do here?

By my lights, it is intuitively clear that the size-preserving series is more conservative than the color-preserving series. One way to vindicate this intuition is to give size more weight than color when it comes to fixing similarity relations between ordinary object states. Hirsch argued that this was problematic in the table case because weighing size heavily would lead us to the wrong conclusion in, e.g., cases of part acquisition like the car with gaudy bumpers. But we have already seen that, as long as the change-minimizing criterion is sortal-weighted, it gets the right verdict in that case. Sortal similarity still takes priority over size even if size takes priority over color.

What about cases of part acquisition involving objects of the same sort? Suppose I start out with a single tile the same size as Small Tile, without a border of tiny tiles around it. Then I add a border of tiny tiles, resulting in a larger tile composed of a slightly smaller tile and a border of tiny tiles. Once again, we can call the larger tile "Big Tile" and the slightly smaller tile that is a part of it "Small Tile". If we weigh size heavily when it comes to fixing similarity relations between ordinary object states, the change-minimizing criterion is probably going to entail that the original tile prior to adding the border of tiny tiles is identical to Small Tile rather than Big Tile, since the series of states that begins with states of the original tile and then proceeds to states of Small Tile when the border is added is size-preserving, whereas the series that shifts to states of Big Tile when the border is added is not. So the original tile hasn't gained parts but has become a part of a larger tile.

In this case, I think the verdict that the original object hasn't gained parts is plausible. What has happened, I suggest, is that I have assembled a new tile out of smaller tiles - specifically, I have built Big Tile out of Small Tile and a slew of tiny tiles, much like I might build a wall out of bricks or stones of varying size. Insofar as this is a plausible interpretation of what has happened, the case poses no serious problem for the sortal-weighted change-minimizing criterion.

The sortal-weighted change-minimizing criterion is therefore able to handle a range of difficult cases of (non-)identity over time. Moreover, we

have seen that sortal-weighting closely mimics the work done by the distinctive substantialist commitment that objects retain certain sortal properties throughout their careers. Insofar as that is true, it is a reason to doubt that the substantialist will be able to dig up other cases which give them a significant advantage over the phasalist with respect to providing extensionally accurate criteria of identity over time for ordinary objects.

4. Explanatoriness

But the substantialist may have an advantage over the phasalist when it comes to providing an explanatory criterion of identity. Some philosophers who seek criteria of identity want more than just the informative necessary and sufficient conditions under which distinct ordinary object states have the same instantiator. They also want those conditions to be explanatory in the sense that they are the conditions *in virtue of which* distinct ordinary object states have the same instantiator. I take it that the relevant kind of explanation here is a metaphysical explanation, such as a grounding explanation.[20]

For the change-minimizing criterion to be explanatory in this sense, it would have to be the case that, when a series of ordinary object states is both appropriately continuous and change-minimizing, these facts about the series metaphysically explain the fact that every member of the series has the same instantiator. Unfortunately, there is a reason to worry that the change-minimizing criterion cannot be metaphysically explanatory. I will first spend some time discussing this worry and how I think the proponent of the change-minimizing criterion should respond to it. Then I will turn to the comparative issue of whether the substantialist has any advantage over the phasalist in this regard.

The problem facing the proponent of the change-minimizing criterion is a version of a problem that also afflicts its close cousin, Nozick's (1981: 29-

---

[20] See Oderberg (1993). Zimmerman (1998) emphasizes supervenience - specifically, the supervenience of wholes on their parts.

37) closest-continuer theory of identity: *being change-minimizing* is an extrinsic property of a series of ordinary object states, and it seems to some philosophers that extrinsic properties such as this are not suitable to do the explanatory work that is being asked of them. This intuition is often expressed as the so-called Only X and Y Principle, which may be formulated as follows:

> *The Only X and Y Principle*: for any objects at different times, x and y, if x is identical to y, this identity depends only on intrinsic features of x and y and the relations between them.[21]

We can reformulate this principle in terms of ordinary object states in the following way:

> *The Only S Principle*: for any series, S, of ordinary object states, if all the members of S have the same instantiator, this fact depends only on intrinsic features of S.

For now, I will assume that "depends" expresses the sort of metaphysical dependence that an explanandum has on its explanans in cases of metaphysical explanation. Since *being change-minimizing* is an extrinsic property of a series of ordinary object states, if we construe the change-minimizing criterion as a metaphysically explanatory criterion, it violates The Only S Principle. I will follow tradition by illustrating this point using Hobbes's variant of the ancient puzzle about The Ship of Theseus (*De Corpore* 11.7).

Suppose that, in the course of standard maintenance, The Ship of Theseus's planks are gradually replaced, one by one, until all of the original

---

[21] The principle has its roots in Williams (1956, 1973) and Wiggins (1980: 95; 2001: 96-102); it is criticized by Nozick (1981: 29-37); and it has been defended in detail by Noonan (1985a; 1985b; 1985c; 2019: ch. 7). Noonan discusses a difficulty about how to formulate the principle that I am going to ignore here.

planks have been replaced by new ones. And suppose that the old planks, rather than being discarded, are saved and later reassembled into a ship, just as they were before. Now we have two duplicate ships, each of which has a claim to being The Ship of Theseus. The ship made of new planks has a claim to being The Ship of Theseus because ships seem to be able to survive gradual turnover of their planks. And the ship made of the old planks has a claim to being The Ship of Theseus because it seems possible to reconstruct a ship by reassembling the planks that once composed it.

There are two salient sequences of ordinary object states in this story. On the one hand, there is the sequence of ship states that links the original ship made of the original planks to the ship made of replacement planks. Call this the replacement series. On the other hand, there is the sequence of ship states that consists of states of the original ship with its original planks and also states of the reassembled ship. Call this the reassembly series. I will assume that disassembled objects cease to exist while disassembled, so the reassembly series is temporally gappy. I will also assume that both of these sequences are appropriately continuous.[22]

The change-minimizing criterion entails that the ship made of replacement planks is the original ship, while the reassembled ship is not. After the original planks are removed, there continue to be ship states

---

[22] Can a temporally gappy series such as the reassembly series be appropriately continuous? That depends on how we spell out appropriate continuity, but there are definitely ways to spell it out that accommodate temporally gappy sequences. For example, I am inclined to say that appropriate continuity includes at least a form of causal continuity, but one that permits temporally gappy sequences in cases of reassembly. A series, S, of ordinary object states is appropriately continuous only if, for each member, s, of S, and for each instantiator x, of s, there is some level of decomposition at which the majority of x's parts at s are linked by immanent-causal connections to parts of the instantiators of all the nearest members of S. This condition is satisfied in paradigm cases of persistence where the immanent-causal connections characteristic of persistence are uninterrupted. But it is also satisfied in cases of reassembly, because an object can only be reassembled out of the parts into which it was disassembled. Those parts are immanent-causally linked to the parts the object had when it was disassembled. (On the notion of immanent causation, see Zimmerman (1997)).

which are members of the replacement series. But, until the old planks are reassembled, there are no members of the reassembly series to compete with members of the replacement series for the honor of most closely resembling the states of the original ship with its original planks. Consequently, the replacement series is change-minimizing and the reassembly series is not. It follows by the change-minimizing criterion that the ship with replaced planks is the original ship and the reassembled ship is not.

Compare this to an alternative version of this case in which the old planks removed from the original ship are not replaced, and are later reassembled. This time, there is a reassembly series but no replacement series to compete with it, so the reassembly series turns out to be change-minimizing. It follows by the change-minimizing criterion that the reassembled ship is the original ship. So whether the reassembly series is change-minimizing depends on something extrinsic to it, namely: whether the replacement series occurs. By the change-minimizing criterion, it follows that whether all the members of the reassembly series have the same instantiator depends on an extrinsic fact about the series, contrary to The Only S Principle.

One way to respond to this challenge is to reject The Only S Principle (Nozick, 1981: 29-37). But I prefer to affirm the principle and concede that the change-minimizing criterion is not a metaphysically explanatory criterion. This isn't a novel suggestion. A number of philosophers have challenged the claim that there are any criteria of identity for ordinary objects which are explanatory in the sense I have specified, or in something like that sense (e.g., Oderberg, 1993; Jubien, 1996; Merricks 1998; and Williamson, 2013). Speaking for myself, I prefer to think of criteria of identity, not as explaining facts about identity over time, but merely as identifying the patterns which characterize persistence over time. Diachronic identity facts about ordinary objects seem to be correlated with certain empirical conditions. For example, fences always survive (merely) being painted. No one believes that, although fences normally persist through being painted, every once and a while - at random - painting a

fence a different color actually destroys the fence and replaces it with a new one. One thing we might want from a criterion of identity for ordinary objects is for it to capture these empirical correlations. The change-minimizing criterion does that much, even if it is not metaphysically explanatory.

One might object that The Only S Principle is plausible, not merely as a principle about metaphysical dependence, but also as a principle about counterfactual dependence: whether all the members of S have the same instantiator should not even counterfactually depend on extrinsic properties of S. On this reading, the change-minimizing criterion still clashes with the Only S Principle. For even if we deny that the change-minimizing criterion is explanatory, it remains true that whether all the members of the reassembly series have the same instantiator counterfactually depends on an extrinsic fact about the series, namely, whether the replacement series occurs.

However, I do not think The Only S Principle is plausible when interpreted as ruling out this sort of counterfactual dependence. That is because there is a fairly innocuous causal story that we can tell to explain this sort of counterfactual dependence. I propose that all ordinary objects have a *conservative disposition*, by which I mean a disposition to retain their properties over time as much as circumstances and other constraints on persistence allow. Given this conservative tendency, the original Ship of Theseus persists through the gradual replacement of its planks because persisting through each replacement is a fairly small change - certainly much less dramatic than ceasing to exist altogether. So by the time the old planks are reassembled, the original ship is the instantiator of states with new planks - states which are not appropriately continuous with states of the reassembled ship. Therefore, reassembling the old planks causes a new ship to come into existence. Hence, although the ship states prior to removing the original planks are states of the Ship of Theseus, the ship states that occur in the reassembly series following reassembly of those planks have a different instantiator.

By contrast, in the case where the old planks are never replaced, the original ship has nowhere to go when its original planks are removed, and so it ceases to exist. Once it ceases to exist, its conservative disposition can no longer influence what happens to it, and so cannot cause it to come back into existence. But the boards it was made of still exist, and they have their own conservative dispositions. Therefore, they will tend to retain their disposition to compose the original Ship of Theseus, and when circumstances allow, they do compose the original Ship of Theseus. And in this case, circumstances allow it: in the absence of the replacement series, the most recent states of the Ship of Theseus were those immediately preceding its disassembly, and those states are appropriately continuous with the states of the reassembled ship. Hence, every member of the reassembly series is a state of the Ship of Theseus.

This causal explanation of the change-minimizing criterion does not make the criterion itself explanatory. It is merely an explanation of why diachronic identity facts about ordinary objects are correlated with the conditions specified by the change-minimizing criterion; it does not entail that those conditions themselves explain the identity facts they are correlated with.

So, while trouble looms if we construe the change-minimizing criterion as an explanatory criterion of identity, I think we can make sense of it as a merely informative criterion of identity. Still, those who seek an explanatory criterion of identity will no doubt see this as a major drawback of the change-minimizing criterion, particularly if another criterion *can* play the role of an explanatory criterion. This brings us to the comparative issue of whether the substantialist is any better off than the phasalist when it comes to supplying explanatory criteria of identity for ordinary objects. If a substantialist criterion such as Hirsch's sortal criterion can be explanatory, then the substantialist may have an important advantage over the phasalist.

However, I do not think that substantialist criteria are better suited to being explanatory than the change-minimizing criterion is. For one thing, I am sympathetic to some of the general worries about explanatory criteria in the literature, and these apply to substantialist criteria as well as phasalist

24

criteria. For another thing, the substantialist might have to violate The Only S Principle as well. We can see this by returning the Big/Small Tile series from Section 3. How can the substantialist distinguish states of Big Tile from States of Small Tile? Hirsch's sortal criterion won't do the trick. If *being a tile* is a substance sortal property, then the sortal criterion incorrectly entails that every state in the Big/Small Tile series has the same instantiator.[23]

Some deny that artifact sortals are substance sortals, in which case *being a tile* is not a substance sortal. Perhaps we can use this view to ensure that there is no substance sortal property that Big Tile and Small Tile share, thereby ensuring that Hirsch's sortal criterion doesn't entail that they are identical. But if we do that, then Hirsch's sortal criterion also doesn't entail that distinct states of Big Tile have the same instantiator, since they don't share any substance sortal property. (Same with distinct states of Small Tile.)

Maybe a better idea is to say that, rather than *being a tile,* the relevant substance sortal properties are more specific, e.g., *being an ordinary tile,* where a tile made of other tiles doesn't qualify as ordinary. But what exactly is an ordinary tile? We could say that an ordinary tile is just a tile that doesn't have any proper parts that are tiles. But that strikes me as ad hoc. And if that is a substance sortal property, one might expect parallel properties that specify the kinds of parts a thing does or does not have to be substance sortal properties too. For example, one might expect *being a car without tires* to be a substance sortal property. But it isn't. If I put tires on a tireless car, no substantial change has occurred. On the other hand, if an ordinary tile is just a tile that's not unusual, then we get the implausible consequence that changing a tile in any unusual way, e.g., by painting it with glow-in-the dark pigment, is bound to be a substantial change.

---

[23] Hirsch (1982: 46-47) discusses a version of this problem involving a case where two tables are pushed together to form a larger table. The second response I consider below is based on one of his remarks. Oderberg (1993: ch. 1) discusses a case that poses a similar problem for the sortal criterion, based on Kripke's homogenous spinning sphere case. But Oderberg's version of the problem requires the existence of certain undetached parts that I am skeptical of.

Apparently the substantialist needs something more than just what Hirsch's sortal criterion has to offer in order to handle the Big/Small Tile series. I think the substantialist's best bet is to appropriate the change-minimizing criterion's approach to this case. For example, the substantialist could take the change-minimizing condition from the change-minimizing criterion and add it to Hirsch's sortal criterion. The resulting criterion would look like this:

> *Hybrid criterion*: for any series, S, of ordinary object states, all the members of S have the same instantiator if and only if there is a substance sortal property, F, such that:
> (i)   S is appropriately continuous;
> (ii)   every member of S is an F-state; and
> (iii)   S is change-minimizing.[24]

This hybrid criterion rules out aberrant sequences like the Big/Small Tile series, since - as we saw in Section 3 - those sequences are not change-minimizing. But it is still substantialist because it also includes the sortal condition - the distinctive component of any substantialist criterion of identity.

If I'm right that this is the substantialist's best way to handle the Big/Small Tile series, the substantialist is no better off than the phasalist with respect to providing an explanatory criterion of identity for ordinary objects. After all, it was the change-minimizing condition that gave rise to the worry that the change-minimizing criterion cannot be explanatory. Since the property *being change-minimizing* is an extrinsic property of a series of ordinary object states, any criterion of identity with a change-minimizing condition violates the Only S Principle, if it is construed as an explanatory criterion. Like the phasalist proponent of the change-

---

[24] Hirsch (1982: 47) comes very close to suggesting the hybrid criterion, but as I read him he seems to think that the sortal condition by itself does all the change-minimizing work he thinks he needs.

minimizing criterion, the substantialist must either bite the bullet and reject the Only S Principle, or concede that their criterion of identity is no more suitable than the phasalist's to be an explanatory criterion.

But suppose I am wrong that the change-minimizing condition is the substantialist's best way to handle the Big/Small Tile series. Suppose instead that there is some as-yet unidentified alternative condition that is plausible and can do the job just as well without violating The Only S Principle. A condition that is discriminating enough to distinguish states of Big Tile from states of Small Tile might also be discriminating enough to distinguish states of trees from states of trunks, states of tables and cars from states of their undetached parts, and so on. Consequently, as long as it does not entail the sortal condition, it might actually give the phasalist an alternative to the change-minimizing criterion too. Then neither the phasalist nor the substanialist would need to violate The Only S Principle to supply explanatory criteria of identity for ordinary objects. But all of this is fairly speculative. As things presently stand, I see no compelling reason to think that the substantialist has an advantage over the phasalist when it comes to supplying explanatory criteria of identity for ordinary objects.

5. Conclusion

Traditionally, criteria of identity over time for ordinary objects are thought to entail that objects are permanent members of certain sortal kinds, namely, substance sortal kinds. My aim in this paper was to defend a criterion that does not have this consequence - a criterion suited to phasalism, the view that the sortal properties normally regarded as substance sortal properties are in fact phase sortal properties. I presented a (version of a) change-minimizing criterion first formulated, but not endorsed, by Eli Hirsch, and then added a twist: the criterion should be sortal-weighted.

The sortal-weighted version of the change-minimizing criterion is a phasalist criterion of identity because it entails that objects persist through the sortal changes that are traditionally regarded as substance sortal

changes. For example, we saw that, in the case of the car that is crushed into a block of scrap metal, the series of car states transitioning to block-of-scrap-metal states is change-minimizing, even despite the sortal change. So the change-minimizing criterion entails that this is a phase sortal change in which a single object changes from being a car to being a block of scrap metal. Similar comments apply to other sortal changes, like a statue becoming an amorphous lump or a person becoming a corpse.

I have argued that the phasalist change-minimizing criterion, at least when it is sortal-weighted, performs as well as substantialist rivals such as Hirsch's preferred sortal criterion in two important areas: extensional accuracy and explanatoriness. So although the traditional view is that criteria of identity are substantialist, I conclude that phasalism and substantialism are on a par in this territory.[25]

References

Armstrong, D. M. (1980). Identity Through Time. In P. van Inwagen (Ed.), *Time and Cause: Essays Presented to Richard Taylor* (pp. 67-78). Reidel Publishing. doi: https://doi.org/10.1007/978-94-017-3528-5_5

Ayers, M. (1974). Individuals without Sortals. *Canadian Journal of Philosophy, 4*, 113-148. doi: https://doi.org/10.1080/00455091.1974.10716925

Baker, L. R. (1997). Why Constitution is Not Identity. *Journal of Philosophy, 94*, 599-621. doi: https://doi.org/10.2307/2564596

Baker, L. R. (2000). *Persons and Bodies: A Constitution View*. Cambridge: Cambridge University Press.

Baker, L. R. (2007). *The Metaphysics of Everyday Life*. Cambridge: Cambridge University Press.

Brody, B. (1980). *Identity and Essence*. Princeton, NJ: Princeton University Press.

Burke, M. B. (1994a). Preserving the Principle of One Object to a Place: A Novel Account of the Relations Among Objects, Sorts, Sortals, and Persistence Conditions. *Philosophy and Phenomenological Research, 54,* 591-624. doi: https://doi.org/10.2307/2108583

Burke, M. B. (1994b). Dion and Theon: An Essentialist Solution to an Ancient Puzzle. *Journal of Philosophy, 91,* 129-139. Doi: https://doi.org/10.2307/2940990

Coburn, R. (1971). Identity and Spatio-temporal Continuity. In M. K. Munitz (Ed.), *Identity and Individuation* (pp. 51-101). New York: New York University Press.

Evnine, S. (2016). *Making Objects and Events: A Hylomorphic Theory of Artifacts, Actions, and Organisms*. Oxford: Oxford University Press.

Elder, C. L. (2011). *Familiar Objects and their Shadows*. Cambridge: Cambridge University Press.

Elder, C. L. (2004). *Real Natures and Familiar Objects*. Cambridge, MA: MIT Press.

Forbes, G. (1985). *The Metaphysics of Modality*. Oxford: Clarendon Press.

Geach, P. T. (1980). *Reference and Generality: Third Edition*. Ithaca, NY: Cornell University Press. First edition published in 1962.

Goldwater, J. (2018). Physicalism and the Sortalist Conception of Objects. *Synthese, 195,* 5497-5519. doi: https://doi.org/10.1007/s11229-017-1459-z

Hirsch, E. (1976a). Physical Identity. *The Philosophical Review, 85,* 357-389. doi: https://doi.org/10.2307/2184047

Hirsch, E. (1976b). *The Persistence of Objects.* Philadelphia, PA: University City Science Center.

Hirsch, E. (1982). *The Concept of Identity*. Oxford: Oxford University Press.

Hoffman, J. and G. S. Rosenkrantz (1994). *Substance Among Other Categories*. Cambridge: Cambridge University Press.

Hoffman, J. and G. S. Rosenkrantz (1997). *Substance: Its Nature and Existence*. New York, NY: Routledge.

Johnston, M. (2006). Hylomorphism. *The Journal of Philosophy, 103*, 652-698. doi: https://doi.org/10.5840/jphil2006103125

Jubien, M. (2001). Thinking About Things. *Philosophical Perspectives, 15*, 1-15. doi: 10.1111/0029-4624.35.s15.1

Jubien, M. (1996). The Myth of Identity Conditions. *Philosophical Perspectives, 10*, 343-356. doi: https://doi.org/10.2307/2216251

Jubien, M. (1993). *Ontology, Modality, and the Fallacy of Reference.* Cambridge: Cambridge University Press.

Korman, D. Z. (2015). *Objects: Nothing Out of the Ordinary.* Oxford: Oxford University Press.

Koslicki, K. (2018). *Form, Matter, Substance.* Oxford: Oxford University Press.

Lowe, E. J. (1989a). What Is a Criterion of Identity? *The Philosophical Quarterly, 39*, 1-21. doi: https://doi.org/10.2307/2220347

Lowe, E. J. (1989b). *Kinds of Being: A Study of Individuation, Identity, and the Logic of Sortal Terms.* Malden, MA: Blackwell Publishing.

Lowe, E. J. (2009). *More Kinds of Being: A Further Study of Individuation, Identity, and the Logic of Sortal Terms.* Malden, MA: Blackwell Publishing.

Mackie, P. (2006). *How Things Might Have Been: Individuals, Kinds, and Essential Properties.* Oxford: Oxford University Press.

Markosian, N. (2010). Identifying the Problem of Personal Identity. In J. Campbell, M. O'Rourke, and H. Silverstein (Eds.), *Time and Identity* (pp. 127-148). Cambridge: MIT Press. doi: 10.7551/mitpress/9780262014090.003.0101

Merricks, T. (1998). There are No Criteria of Identity Over Time. *Nous, 32*, 106-124. doi: https://www.jstor.org/stable/2671929

Merricks, T. (2001). *Objects and Persons.* Oxford: Oxford University Press.

Mooney, J. (2021). Becoming a Statue. *Australasian Journal of Philosophy.* Advanced online publication. doi: https://doi.org/10.1080/00048402.2021.1975787

Noonan, H. W. (1985a). Wiggins, Artefact Identity and 'Best Candidate' Theories. *Analysis, 45*, 4-8. doi: 10.1093/analys/45.1.4

Noonan, H. W. (1985b). The Only X and Y Principle. *Analysis, 45,* 4-8. doi:
    https://doi.org/10.2307/3327461

Noonan, H. W. (1985c). The Closest-Continuer Theory of Identity. *Inquiry,
    28,* 195-229. doi: 10.1080/00201748508602052

Noonan, H. W. (2019). *Personal Identity: Third Edition.* New York, NY:
    Routledge.

Nozick, R. (1981). *Philosophical Explanations.* Oxford: Oxford University
    Press.

Oderberg, D. (1993). *The Metaphysics of Identity Over Time.* New York, NY:
    St. Martin's Press.

Oderberg, D. (2007). *Real Essentialism.* New York, NY: Routledge.

Price, M. (1977). Identity Through Time. *Journal of Philosophy, 74,* 201-217.
    doi: 10.2307/2025438

Quinton, A. (1973). *The Nature of Things.* London: Routledge & Kegan Paul
    Ltd.

Runggaldier, E. (1998). Sortal Continuity of Material Things. *Erkenntnis,
    48,* 359-369. doi: 10.1023/A:1005437826757

Schwartz, S. (2009). The Essence of Essence. *Australasian Journal of
    Philosophy, 87,* 609-623. doi: 10.1080/00048400802340634

Shoemaker, S. (1963). *Self-Knowledge and Self-Identity.* Ithaca, NY: Cornell
    University Press.

Shoemaker, S. (1979). Identity, Properties, and Causality. *Midwest Studies
    in Philosophy, 4,* 321-342. doi: 10.1111/j.1475-4975.1979.tb00384.x

Strawson, P. F. (1959). *Individuals.* London: Methuen.

Sutton, C. S. (2014). Against the Maximality Principle. *Metaphysica, 15,* 381-
    90. Doi: 10.1515/mp-2014-0023

Swinburne, R. (1981). *Space and Time: Second Edition.* New York, NY: St.
    Martin's Press.

Thomasson, A. (2007). *Ordinary Objects.* Oxford: Oxford University Press.

Tichý, P. (2004 [1987]). Individuals and Their Roles. In V. Svoboda, B.
    Jespersen, and C. Cheyne (Eds.), *Pavel Tichý's Collected Papers in
    Logic and Philosophy* (pp. 710-748). Dunedin, New Zealand:
    University of Otago Press, and Prague, Czech Republic: Filosofia.

Wiggins, D. (1967). *Identity and Spatio-Temporal Continuity*. Oxford: Basil Blackwell.

Wiggins, D. (1980). *Sameness and Substance*. Oxford: Basil Blackwell.

Wiggins, D. (2001). *Sameness and Substance Renewed*. Cambridge: Cambridge University Press.

Williams, B. (1973). *Problems of the Self*. Cambridge: Cambridge University Press.

Williams, B. (1956). Personal Identity and Individuation. *Proceedings of the Aristotelian Society, 57*, 229-252. doi: 10.1093/aristotelian/57.1.229

Williamson, T. (2013). *Identity and Discrimination*. Malden, MA: Wiley-Blackwell.

Zimmerman, D. (1998). Criteria of Identity and the 'Identity Mystics.' *Erkenntnis, 48*, 281-301. doi: 10.1023/A:1005304508456

Zimmerman, D. (1997). Immanent Causation. *Philosophical Perspectives, 11*, 433-471. doi: 10.1111/0029-4624.31.s11.19