Different Samenesses: Essays on Non-Standard Views of Identity

Dissertation

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Abstract

Few views are as widely held as the Standard View of Identity. Here I am concerned with minority views that depart from the standard account. First, I attempt to illuminate such views and the debates concerning them by identifying the principles of identity at issue, articulating some of the assumptions underlying the debates, and presenting some of the evidence used against the Standard View of Identity. Second, I enter two of these debates myself. I first defend two Non-Standard Views of Identity from the charge that they violate a principle of identity, namely the Transitivity of Identity. I then present an overlooked consequence of another Non-Standard View of Identity that challenges the view on one of its own methodological principles. Third, I draw on recent work in ontological and parthood pluralism to show how one might be led to think that there is more than one way of being identical. That is, I show how one might be an identity pluralist.

Dedication

To Chelsea, for pushing me through the swamp of jello,

and for Ezra and Elliot.

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Chapter 1:   Introduction

> A relation [of identity] would thereby be expressed of a thing to itself, and indeed one in which each thing stands to itself but to no other thing. (Frege 1892b, p. 26)

What more can be said of identity than this? I contend that much more can. In fact, before articulating this now famous slogan, Gottlob Frege wrote

> [Identity] gives rise to challenging questions which are not altogether easy to answer. (Frege 1892b, p. 26)[1]

While he might not have anticipated the questions explored here, I think Frege was right to suggest that there are many difficult questions regarding the identity relation.

Here, I contribute to debates concerning identity in several ways. In this chapter, because such debates tend to focus on the merits of particular views, I provide some generalizations of these debates that illuminate their common features. Next, I enter two debates directly. In the first of these entries, Chapter 2, I defend two Non-Standard Views of Identity[2] against the attack that they violate a commonly held

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[1]   What I have written as "identity" is "equality" in the original. Frege (1892b, n. A) says he uses "[equality] in the sense of identity [Identität] and understand[s] '$a = b$' to have the sense of 'a is the same as b' or 'a and b coincide'."

[2]   Defined below.

principle of identity. In the second, Chapter 3, I raise an objection for a different Non-Standard View of Identity. Finally, in Chapter 4 I apply recent developments in the literature on ontological pluralism to identity, sketch arguments in favor of identity pluralism, and propose new tests for pluralism more generally.

Here are some stylistic conventions I have chosen. Views and principles are introduced using `monospaced typeface`. Subsequent uses are simply capitalized. Names of objects and views are typeset using SMALL CAPS throughout.

1.1 Principles of Identity

One contemporary articulation of the slogan that echos Frege is that "identity is the relation that each thing has to itself and to nothing else" (Hawthorne 2003, p. 99). One way to further explicate the relation is to identify principles that it obeys. I classify such `Principles of Identity` into three groups. The first group are called Logical Principles of Identity. The second, Leibniz's Law, is in one sense a single principle, and in another sense two. The last group are called Metaphysical Principles of Identity. Below I present the standard versions of these principles. As will be articulated later, some views discussed will either call some of these principles into question or adopt reformulations of them.

Throughout, the symbol "=" refers to identity. Precisely because what follows concerns non-standard views of identity, it will be an open question to what relation, if any, the symbol "=" refers. What I mean is that for some principle of identity P, those advocating for that principle will claim that = is the identity relation, while detractors will claim either that the principle is false or that, if "=" refers, = is not

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the identity relation.[3]

1.1.1 Logical Principles of Identity

As the name suggests, `Logical Principles of Identity` are principles that describe the logical properties of the relation. Identity is thought to be an equivalence relation. In fact, it can be said to be *the* equivalence relation. As such it is reflexive, symmetric, and transitive.

Reflexivity of Identity

Generally, a relation is said to be reflexive when, every object stands in the relation to itself. Specifically, identity is thought to be a relation such that every object stands in to itself. More precisely, where '=' refers to the identity relation:

`Reflexivity of Identity` $\forall x (x = x)$

Symmetry of Identity

Generally, a relation is said to be symmetric when, for two objects, the first stands in the relation to the second just in case the second stands in it to the first. Specifically,

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[3] To preview the disputes, in cases when it is used in the articulation of a principle held by those holding Standard View of Identity, those theorists will claim it refers to the identity relation. But in those cases, someone holding a Non-Standard View of Identity might, depending on their particular view, claim that it does not refer to identity. Conversely, when the symbol is used in the articulation of a principle held by a Non-Standard View of Identity theorist, that theorist will take it refer to the identity relation. But someone holding Standard View of Identity (and even opposing Non-Standard View of Identity theorists) will say it does not refer to identity. Context should make it clear to the reader when which type of theorist takes the symbol to refer to identity and when which type of theorist disputes the reference.

identity is thought to be a relation such that one object stands in it to another just in case the other stands in it to it. More precisely:

Symmetry of Identity $\forall x \forall y (x = y \leftrightarrow y = x)$

Transitivity of Identity

Generally, a relation is said to be transitive when, for three objects, if the first stands in the relation to the second and the second stands in the relation to the third, then the first stands in the relation to the third. Specifically, identity is thought to be a relation such that when one objects stands in it to a second and that second object stands in it to a third, then the first object stands in it to the third. More precisely:

Transitivity of Identity $\forall x \forall y \forall z [(x = y \wedge y = z) \rightarrow x = z]$

1.1.2   Leibniz's Law

Leibniz's Law, attributed to Leibniz, describes the relation between property instantiation and identity. Roughly, identical objects have the same properties. There are a few more precise characterizations of this relation. One version says that if objects are identical, then they have exactly the same properties. Another says that if objects have exactly the same properties, then they are identical. The first is called The Indiscernibility of Identicals and the second The Identity of Indiscernibles. More precisely, where Φ is schematic for properties:

The Indiscernibility of Identicals $\forall x \forall x [(x = y) \rightarrow \forall \Phi (\Phi x \leftrightarrow \Phi y)]$

The Identity of Indiscernibles $\forall x \forall x [\forall \Phi (\Phi x \leftrightarrow \Phi y) \rightarrow (x = y)]$

It is generally thought that at least The Indiscernibility of Identicals is true. Whether both The Indiscernibility of Identicals and The Identity of Indiscernibles are true is more controversial. If one thinks there can be cases of distinct objects having exactly the same properties, then one would deny the truth of The Identity of Indiscernibles.[4] In the discussion that follows, this possibility is suppressed and I assume Leibniz's Law is the conjunction of both directions, as follows:

`Leibniz's Law` $\forall x \forall x[(x = y) \leftrightarrow \forall \Phi(\Phi x \leftrightarrow \Phi y)]$

1.1.3 Metaphysical Principles of Identity

As the name suggests, `Metaphysical Principles of Identity` are principles that describe the metaphysical features of identity. Specifically, they describe what is true of identical objects in different circumstances.

Absoluteness of Identity

Roughly, a relation is absolute when its holding between objects is not dependent on, relative to, or only with respect to something else (like a category or sortal). Identity is commonly thought to hold between objects without dependence on, relativity to, or respect to things like categories or sortals. Here is an attempt to make this precise, where Φ and Ψ are possible "something elses" and the subscripts are relativizations of identity:

`Absoluteness of Identity` $\neg \diamond (x =_\Phi y \wedge x \neq_\Psi y)$

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[4] For an example of this view, see Black 1952.

Eternality of Identity

Roughly, a relation holds eternally just in case if it holds between objects at one time, it holds between them at all times (at least, when the objects exist). With respect to identity, if objects are identical at some time, then they are identical at all times. More precisely, where t ranges over times:

`Eternality of Identity:` $\forall x \forall y \forall t [\exists t_1 (t_1 : x = y) \rightarrow t : x = y]$

Necessity of Identity

Roughly, a relation holds necessarily just in case if it holds between objects it could not have failed to hold beween them. With respect to identity, if objects are identical then it not possible that they not be identical. More precisely:

`Necessity of Identity:` $\forall x \forall y [x = y \rightarrow \Box(x = y)]$

Determinacy of Identity

Roughly, a relation is determinate just in case either it determinately holds or it determinately fails to hold between objects. With respect to identity, for any objects, either it is determinate that they are identical or it is determinate that they are not identical (that is they are determinately distinct). More precisely, where '!' expresses determinacy:

`Determinacy of Identity` $\forall x \forall y (!x = y \lor !x \neq y)$

One-to-Oneness of Identity

Roughly, a relation is one-to-one just in case when the relation holds the relata have the same cardinality.[5] With respect to identity, identity only holds between single objects and not between any plurality and a single object.[6] More precisely, where xx ranges over pluralities:

`One-to-Oneness of Identity` $\forall x \forall xx \, \neg(x = xx)$

1.2   Views

In this section, I categorize various views about identity and the theoretical stances taken towards Principles of Identity.

1.2.1   Standard View of Identity

If one holds the `Standard View of Identity`, then one holds that each of the principles in §1.1 is true *as formulated*. The articulation is formulated as a necessary

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[5]   For most discussions, the focus is on the fact that a one-to-one relation only holds between single objects. Since the definition is meant to rule out the relation holding between a single object and a plurality, the definition allows that relations that hold between pluralities of the same cardinality are one-to-one.

[6]   One might maintain that identity holds between some pluralities. Plausibly, the relation could hold between a collection of objects and itself. It seems that in such cases either a distinct but closely related relation holds or identity holds in some derivative sense. In the first case, there might be relation holding between pluralities just in case, for each of the members of one plurality, they stand in the identity relation to exactly one of the members in the other plurality. In the second case, identity might hold in some derivative sense just in case, for each of the members of one plurality, they stand in the identity relation to exactly one of the members in the other plurality. I set these possibilities aside here. What is needed is that One-to-Oneness of Identity rule out the possibility of identity holding between a single object and a plurality.

condition so as to anticipate the possibility that the Standard View of Identity involves the commitment to more principles than those articulated above. This leaves room for a Non-Standard View of Identity not articulated below. If a new departure from the Standard View of Identity emerges, then a corresponding principle might be added, and a necessary condition for holding the view might be holding this new principle.

1.2.2   Non-Standard Views of Identity

If one rejects one of the Principles of Identity articulated in §1.1, then one holds a `Non-Standard View of Identity`. This sufficient condition is meant to capture both those who reject a principle on account of its formulation and those who reject a principle outright. The sufficient condition leaves open the possibility (in a way that is directly converse of the necessary condition for holding the Standard View of Identity) for an unidentified Principle of Identity to serve as a point of departure from the Standard View of Identity.

Here are some examples:

`Relative Identity`   Those who hold Relative Identity reject the Absoluteness of Identity. They hold that identity is relative to something (like a sortal).

`Occasional Identity`   Those who hold Occasional Identity (sometimes called Temporary Identity) reject Eternality of Identity. They hold that identity can hold between objects at some times and not at others.

`Contingent Identity`   Those who hold Contingent Identity reject Necessity of Identity. They hold that identity can hold between objects at some worlds and

not at others.

Indeterminate Identity   Those who hold Indeterminate Identity reject Determinacy of Identity. They hold that it might be indeterminate that identity hold between some objects.

Composition as Identity   Those who hold Composition as Identity, at least in a strong form, reject One-to-Oneness of Identity. They hold that because pluralities can compose a single object, pluralities can be identical to a single object.

As will be commented on in §1.3 below, these departures are defined in terms of giving up one of the Metaphysical Principles of Identity, not one of the Logical Principles of Identity.

1.2.3   Absolutism

Absolutism is a view toward particular Principles of Identity, and what their general formulations ought to be.[7] Absolutism toward a principle involves at least holding that the principle is true. But it goes further to say that the only way to formulate principles of this kind is in the way it is formulated with respect to identity.[8] For example, the way Transitivity of Identity is formulated is the way *all* transitivity principles, including non-identity relations, ought to be formulated. If a principle is not so formulated, then, according to Absolutism about transitivity, such a principle, whether true or of interest, is not a *transitivity* principle.

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[7]   The name is borrowed from Gilmore 2009.

[8]   This is not meant to suggest that their specific formulations with respect to identity are in some way prior to their general form.

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Let us use a generic relation R to illustrate this.

Transitivity of Identity $\forall x \forall y \forall z([(x = y) \wedge (y = z)] \to x = z)$

Transitivity of R $\forall x \forall y \forall z([(xRy) \wedge (yRz)] \to xRz)$

Imagine Ankari holds Absolutism about transitivity. She encounters someone who thinks parthood, normally thought to be a two-place relation, is actually a three-place relation. As part of articulating their view of parthood, this person proposes a transitivity principle that is not an instance of the general form Transitivity of R shown above. Not only does Ankari think such a proposal is false, she thinks the principle articulated as part of the theory of parthood is not even a transitivity principle. That is, she rejects the idea that a principle could be in a form different than the Transitivity of R form and be a transitivity principle.

Consider the following from Cody Gilmore.

> Strictly speaking, of course, transitivity can be a property of two-place relations only. Thus if we insist that parthood[9] must turn out to be transitive in the strictest possible sense, we should cling to Absolutism; only Absolutists can take parthood (expressed by '<') to be governed by
> Transitivity2P: $\forall x \forall y \forall y[(x < y \wedge y < z) \to x < z]$
> However it is often noted that there is a very natrual and straightforward *analogue* of the transitivity principle that presumably governs parthood if that relation has three argument places. If we symbolize the predicate 'x is a part of y at z' as 'x$<_z$y', then the analogue is:
> Transitivity3P: $\forall x \forall y \forall z \forall w[(x <_w y \wedge y <_w z) \to x <_w z]$

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[9] In the original, Gilmore names the relation in question 'Parthood$_m$'. This subscript is included to make it clear he is speaking about the monist view of parthood. This specificity is not necessary for present purposes. However, it will play a role in Chapter 4. Additional instances of '$_m$' have been removed from this quote for clarity.

In words, this says that if x is part of y at w and y is part of z at w then x is part of z at w. A somewhat different way of capturing the intuitive idea underlying this principle is to say that the three-place relation part-of-at is such that for any r, the *two*-place, 'indexed' relation part-of-at-r is transitive in the strict sense. (Gilmore 2009, p. 103)

Gilmore is proposing that Transitivity3P qualifies as a transitivity principle. Ankari, who holds Absolutism about transitivity, would reject that such a principle, even if true or interesting, is a transitivity principle.

1.2.4 Moderation

Consider the following from André Gallois.

Suppose that Sally, Mary, and Miranda are all the same height in 1970. In 1990 Miranda is taller than Sally.

Clearly the relation of being the same height is a transitive relation. The following principle is indisputable:

SH $\forall x \forall y \forall z[(x$ is the same height as $y \wedge y$ is the same height as $z) \to x$ is the same height as $z]$

Now for an argument based on SH to show that Miranda and Sally must be the same height in 1990 if Sally, Mary, and Miranda all share their height in common in 1970. One instance of SH is:

[(Sally is the same height as Mary and Mary is the same height as Miranda) $\to$ Sally is the same height as Miranda].

The antecedent [...] is true because Sally, Mary, and Miranda all share their height in common in 1970. So the consequent [...] is true. However the consequent [...] contradicts the assumption that Sally and Miranda are not the same height in 1990. End of Argument.

The argument is an obvious sophistry. No one would hesitate to make the following reply to it. The antecedent and consequent of any instance

of SH have to be understood as obtaining at the same time. One way to make this perspicuous is by replacing SH with the more explicit

SH_t $\forall x \forall y \forall z \forall t[($ at $t : x$ is the same height as $y \wedge$ at $t : y$ is the same height as $z) \rightarrow$ at $t : x$ is the same height as $z].$[10] (Gallois 1998, p. 78)

Gallois (like Gilmore above) is asking for (or perhaps demanding) moderation from his opponents. Gallois argues that it would be absurd to take from the fact that heights change over time that the same height relation is not a transitive relation. He claims that it would be perfectly acceptable to relativize height to times and express the transitivity of the same height relation as above.

For any of the Principles of Identity, I define `Moderation` with respect to that principle as the view that a reformulation of that principle should not be dismissed merely for being a reformulation. This is not to say that Moderation towards a principle implies acceptance of a reformulation or openness to *any* proposed formulation. Moreover, since Moderation is relative to a principle one can hold Moderation with respect to some principle, but hold Absolutism with respect to another.

1.2.5 Radicalism

In contrast to both Absolutism and Moderation, another stance one can take towards Principles of Identity is Radicalism. I define `Radicalism` toward one of the Principles of Identity as the stance that a reformulation of a principle is not necessary when faced with the choice of reformulating a principle or rejecting it. From this formulation arise two forms of Radicalism: vacuous and non-vacuous.

Here is what I mean by vacuous Radicalism. By definition, if someone rejects one

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[10] For consistency, the logical notation has been reformulated.

of the Principles of Identity, then they are hold a Non-Standard View of Identity. Because they reject one of the Principles of Identity, they would presumably not be offering a reformulation of that principle. They then, by my definition, adopt Radicalism with respect to that principle. They are radical, but just in virtue of holding the view of identity that they do.

Here is what I mean by non-vacuous. It might be the case that the way in which someone rejects one of the Principles of Identity means they can no longer hold some distinct principle as formulated. They then have a choice. They can adopt Moderation about that principle and make the case that their reformulation is acceptable. Or they could reject any demand for a reformulation. This strikes me as Radicalism in an interesting sense. The principle they do not attempt to reformulate is not the principle they rejected from the outset, but its rejection and lack of reformulation are downstream results of the view.[11]

Who adopts Radicalism about a principle in this non-vacuous way? The closest example I can identify is Donald Baxter. I think that he is best characterized as someone who rejects One-to-Oneness of Identity. In several places he seems to say that he accepts that his many-one view of identity has as a consequence that some Principles of Identity are false, and does not seem to feel the obligation to provide

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[11] The non-vacuous cases of Radicalism tend to be someone rejecting either Leibniz's Law or one of the Logical Principles of Identity as a consequence of their rejection of one of the Metaphysical Principles of Identity. That is their rejection of one of the Metaphysical Principles of Identity is more central to their theory of identity and they did not reject either Leibniz's Law or one of the Logical Principles of Identity at the outset. To preview the next section, this is because rejecting one of the Metaphysical Principles of Identity is considered preferable to rejecting either Leibniz's Law or one of the Logical Principles of Identity. One is unlikely to make rejecting Leibniz's Law or one of the Logical Principles of Identity the focus of their Non-Standard View of Identity, but they might be a radical with respect to one of those principles from rejecting one of the Metaphysical Principles of Identity.

reformulations.

He seems to reject Leibniz's Law when he writes

> Think of a mixed blessing like a car. To the extent that a car provides
> easy transportation it is good. To the extent that it fouls the air it is not
> good. But it is the same car that is good and not good. These are all
> ways of distinguishing something from itself. I do the same thing with
> a whole. The whole insofar as it occupies one location differs from the
> whole insofar as it occupies another. One is in a location the other is not
> in. Yet it is the same whole that is so differing. (Baxter 1988, p. 204)

However, he also seems to suggest that this rejection of Leibniz's Law is independently motivated, and not simply a result of his many-one identity view that he accepts. He writes elsewhere

> Countenancing the discernibility of identicals, however, ought not to
> be regarded as accepting contradiction. Consider alternation. On the
> face of it, the same thing becomes different. This thing as it now is differs
> from itself as it was. That somethign differs from itself in such a case is
> as plain as day. So there is some way for something to differ from itself
> without contradiction. An account that does not preserve this literal
> differing makes alteration an illusion. Commitment to the indiscernibility
> of identity precludes the literal differing. It endarkens what is plain as
> day. (Baxter 2014, p. 248)

Whether Baxter actually holds Radicalism in the interesting, non-vacuous sense, he strikes me as the closest to articulating such a Radicalism.

1.3 Theory Choice

I think that the following claims accurately reflect a set of debates concerning identity.

1. All else being equal, we should prefer theories on which the Principles of Identity are true as formulated. That is, all else being equal, we should, for each of the Principles of Identity, embrace Absolutism.

2. All else being equal, in choosing between theories on which one of the Principles of Identity is false, we should prefer theories on which one of the Metaphysical Principles of Identity is false over theories on which either one of the Logical Principles of Identity or Leibniz's Law is false. That is, all else being equal, Radicalism with respect to one of the Metaphysical Principles of Identity is preferable to Radicalism with respect to one of the Logical Principles of Identity or Leibniz's Law.

3. All else being equal, we should prefer theories that reformulate Principles of Identity over those that reject them outright.

I think that their accuracy is borne out in the introductions of identity puzzles below and the exploration of non-standard views in later chapters. One way to support this interpretation is by thinking about the relative strength of evidence one would need to depart from the Standard View of Identity. I take it that the Standard View of Identity being the *standard* position about identity is enough to show 1. The burden is on those who want to introduce a Non-Standard View of Identity to present compelling evidence for doing so. In general, those who reject one of the Principles of Identity tend to reject one of the Metaphysical Principles of Identity rather than one of the Logical Principles of Identity or Leibniz's Law. This suggests that 2 is true. That those holding a Non-Standard View of Identity seem obliged to provide reformulations for principles suggests 3 is true. This is evidenced by the difficulty of

finding examples of those holding non-vacuous forms of Radicalism.

1.4   Arguing about Identity

In this section I describe the general contours debates about identity take. As mentioned above, I assume that, all things being equal, one should prefer theories that are such that the principles of identity are true as formulated. Why might someone consider that not all things are equal?

The dominant reason, in my estimation, is the belief of those who hold a Non-Standard View of Identity that the world does not behave the way that the Standard View of Identity describes. The evidence that the world does not so behave comes from puzzle cases. These are described below. Here is the pattern this sort of argument follows.

1. If this principle of identity is true, then it leads to an unintuitive claim about some case.

2. The unintuitive claim about the case is not true.

3. So the principle of identity is false.

The dialectic between the person advancing a Non-Standard View of Identity and someone holding the Standard View of Identity can proceed along a few directions. I do not assume the following are exhaustive, but they sketch the routes traveled or resisted in the following chapters.

1.4.1 Incoherence

Presumably the person advocating a Non-Standard View of Identity is not just offering a negative theory. They are likely advancing their own Principles of Identity or principles nearby that led to the rejection of the Standard View of Identity. One route for an adherent of the Standard View of Identity to take is to argue that this Non-Standard View of Identity is incoherent.

A famous instance of this argument is Gareth Evans's brief argument against Indeterminate Identity.[12] If Evans's argument is successful, then the discussion does not even get to debates regarding Absolutism, Moderation, or Radicalism with respect to the Determinacy of Identity. The proposal, according to him, does not even get off the ground. Because it will play a role in Chapter 3, I review the argument and possible responses.

Here is the argument where '$\bigtriangledown$' is the indeterminacy operator, and 'λ' is the property abstraction operator:

1. $\bigtriangledown(a = b)$ (Assumption for *reductio*)

2. $\neg \bigtriangledown (a = a)$ (necessary truth about a)

3. $\neg\lambda x[\bigtriangledown(a = x)]a$ (property abstraction from 2)

4. $\lambda x[\bigtriangledown(a = x)]b$ (property abstraction from 1)

5. $\exists X[\neg Xa \ \& \ Xb]$ (from 3 & 4)

6. $a \neq b$ (from 5 by Leibniz's Law, contradiction with 1)

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[12] Salmon (1981, Appendix I) gives a similar objection separately.

1 is just the claim that it is indeterminate that a is identical to b. If Indeterminate Identity is true, then this is possibly true for some objects a and b. 2 follows from Necessity of Identity. Since a is necessarily identical to itself, it cannot be the case that it is indeterminate that a is identical to itself. 3 abstracts the property *is indeterminately identical to a* and restates 2. That is, a lacks the property *is indeterminately identical to a*. 4 is a restatement of 1 with the same property, *is indeterminately identical to a*. b has the property *is indeterminately identical to a*. 5 is the claim that there exists a property that b has which a lacks. 6 follows from 5 and Leibniz's Law to say that a and b are distinct. 6 contracts the assumption of 1.

If the argument is valid, then any supposed case of objects being such that it is indeterminate that they are identical will lead to a contradiction.

Replying to Evans's Objection

1 simply assumes that two objects are indeterminately identical. 2 seems to be a necessary truth that an Indeterminate Identity theorist cannot deny. An Indeterminate Identity theorist accepts the move from 5 to 6. The Indeterminate Identity theorist is left with challenging the moves to 3 and 4 that abstract the same property from 1 and 2, and the subsequent inference to 5 that a and b differ with respect to this property.[13]

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[13] One response to the argument is to argue that it is invalid if the indeterminacy is due to either of the expressions flanking the identity sign being referentially indeterminate. Lewis (1988) argues that, at least in Evans's case, this is to misinterpret Evans's actual target of worldly indeterminacy, not semantic or referential indeterminacy. Hirsch (1999) argues that there can be semantic indeterminacy even without the expressions flanking the identity sign being referentially indeterminate. He argues that the indeterminacy can result from indeterminacy in what he calls the 'referential apparatus'. However, this reply cannot aid the Indeterminate Identity theorist since they think that the indeterminacy is in the world.

There are two types of replies one can give. Elizabeth Barnes (2009) argues that, by understanding Indeterminate Identity using supervaluationist semantics over counterpart relations, the argument is invalid. She argues that the properties abstracted in the moves to 3 and 4 are not the same because they do not involve the same counterpart relation. If she is right, then the move to 5 equivocates between properties.

The second type of reply is to argue, as Rosanna Keefe and Terence Parsons do, that the abstract '$\lambda x[\triangledown(a = x)]$' in 3 and 4 does not refer to a genuine property. Keefe (1995, pp. 183–90) argues that, if Indeterminate Identity is true, then objects are indeterminately identical in virtue of there being properties such that one has (or lacks) them and it is indeterminate if the other has them. She argues that Evans's objection relies on the fact that the objects being such that it is indeterminate that they are identical obtains in virtue of one of the objects having indeterminate properties which the other lacks. She objects that, while objects indeterminately have properties, they do not have indeterminate properties.

Parsons (2000, pp. 50–2) argues that the predicate in 3 and 4 does not express a genuine property because of how the property is constructed. Because he defines identity in terms of sharing properties, the property abstraction from an identity quantifies over all properties. He argues that, since the property abstraction in 3 and 4 quantifies over all properties, it quantifies over itself. According to Parsons, this property is self-referential and problematic in a way similar to the Russell set. This is why he thinks that the predicate does not express a genuine property.

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1.4.2 Reformulation Inadequacy

Another route is one in which the Standard View of Identity adherent adopts Moderation with respect to a reformulation of one of the Principles of Identity. This interlocutor agrees with the Non-Standard View of Identity theorist that the principle might admit of reformulation, but finds reason to think that the proposed refomulation is inadequate. This is the form that the next chapter takes.

1.4.3 Empirical Inadequacy

This route returns the charge from the Non-Standard View of Identity to the Standard View of Identity back to the Non-Standard View of Identity theorist. Recall that the Non-Standard View of Identity theorist claimed that because the Standard View of Identity delivered unintuitive results this was evidence for rejecting the Standard View of Identity. The rejoinder here is that the Non-Standard View of Identity offered also delivers unintuitive results. I take this route in a later chapter.

1.5 Identity Puzzle Cases

In this section I review some puzzle cases that are often presented as evidence against the Standard View of Identity and to advance a Non-Standard View of Identity.[14]

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[14] For more extensive discussions of these and other cases, see, for example, the first chapters of Parsons 2000; Gallois 1998.

1.5.1 SHIP OF THESEUS

The SHIP OF THESEUS puzzle is a famous identity puzzle. It is a version of (or perhaps, variation on) a sorites paradox. A sorites paradox involves a series of small changes that, individually, are not thought to make a difference to the facts of the case. However, taking the entire series of changes does in fact lead to an obvious difference. Accepting that the small change does not make a difference leads, at least, to an unintuitive result.

The paradigmatic example of a sorites involves a heap made of individual grains of sand. The case begins with a single grain. This collection of a single grain is not a heap. The case introduces the claim that adding a single grain to a non-heap does not result in a heap. Repeated applications of this claim results in claims that obvious heaps (like a collection of 1 million grains) are not heaps.

Whereas the heap involves the question of when collections of grains are properly heaps, SHIP OF THESEUS involves questions about the identity of ships. Here is how the puzzle goes.

Imagine Theseus has a ship made of a certain number of planks. Each day he replaces one of the planks with a brand new plank. He proceeds to do this until he has a ship made entirely of brand new planks. As a matter of property rights, this ship is presumably his. But it is another question whether the ship that he now has is the same ship that he had at the beginning. To be more precise let us, as shown in figure 1.1, call the original ship ORIGINAL SHIP and the ship made entirely of replacement planks REPLACEMENT SHIP. The question is, "is ORIGINAL SHIP identical to REPLACEMENT SHIP?"
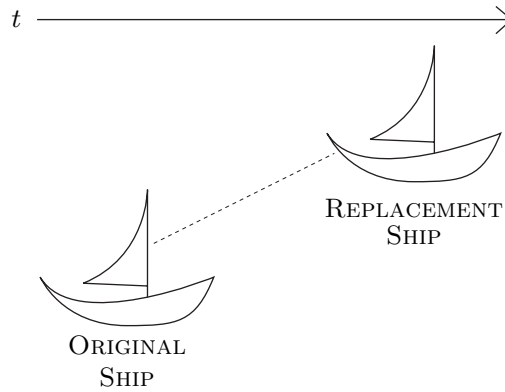
Figure 1.1: ORIGINAL SHIP and REPLACEMENT SHIP

It might seem obvious that the answer is yes. Presumably what underlies this response is the intuition that changing a single part does not make a difference to the identity of the object. Put differently, the intuition is that objects survive the change of a single part. This is the analog to saying that a single grain does not make a difference to whether a collection is or is not a heap.

The case is complicated by considering the planks that were replaced. Imagine that those planks are collected and arranged in the same manner as they were when they were part of ORIGINAL SHIP. Call this ship reassembled from the original planks REASSEMBLY SHIP. In addition to "is ORIGINAL SHIP identical to REPLACEMENT SHIP?" we can now ask "is ORIGINAL SHIP identical to REASSEMBLY SHIP?"

Solving SHIP OF THESEUS

It cannot be the case that the answer to both questions is yes. The reason is that, if REPLACEMENT SHIP is identical to ORIGINAL SHIP and ORIGINAL SHIP is identical
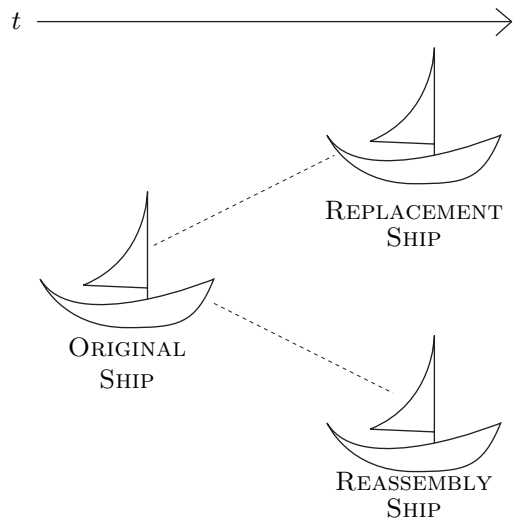
Figure 1.2: SHIP OF THESEUS

to REASSEMBLY SHIP, then, by Transitivity of Identity, REPLACEMENT SHIP is identical to REASSEMBLY SHIP. But these are, as shown in figure 1.2, two distinct ships, made of entirely different planks.

Here are two types of strategies for responding to the puzzle.

Every Change Counts   According to this strategy, despite appearances, any change in a part makes for a difference in identity.

Privileged Change Counts   According to this strategy, not all changes are equal. There is at least one change in a part that makes for a difference in identity.

Each strategy has its costs. The cost associated with the Every Change Counts strategy is that it is counterintuitive. Objects seem to survive changes of their parts all the time. According to this strategy, each time there is a change in parts, some

object ceases to exist and a new, albeit very similar object, comes into existence. This strategy has the virtue of not requiring any revisiting of the principles of identity, but comes at the cost of rejecting intuitions about changes in parts. Those who opt for this strategy likely subscribe to Mereological Essentialism. Mereological Essentialism is the view that objects have their parts essentially; they could not have had different parts than they do.[15]

The cost associated with the Privileged Change Counts strategy is that is appears to be arbitrary. The arbitrary nature of this solution arises when we interrogate which change or change in parts makes for a difference and why they make make a difference. Perhaps it is the case that some parts are in some sense necessary or essential to the object. Puzzles involving personal identity might appeal to such parts (for example, perhaps the human brain makes for a difference for the identity of human persons). But returning to our case of material ships, it is less obvious what part is privileged in this way. This is especially true if we stipulate that the planks are qualitatively the same.

Perhaps it is the case that it is not a particular plank that makes a difference, but rather a particular plank's place in the series of replacement that makes a difference. Maybe the plank at exactly the halfway mark makes for the difference in identity. One might still raise worries about arbitrariness regarding that plank. This worry is motivated by thinking about how the replacement process might have gone differently than originally described. For example, perhaps the process stops at some plank or perhaps the process proceeds with a different number of planks than before. Arguably,

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[15] See Chisholm 1973 for an articulation of Mereological Essentialism, and Chisholm 1975; Plantinga 1975 for an early discussion of the view.

such considerations challenge the privilege held by plank at the halfway point in the replacement process. I will not adjudicate these issues here,[16] but present them as possible theoretical costs for the Privileged Change Counts strategy.

Another way of characterizing this arbitrariness is to attribute it to vagueness. And one way to understand vagueness is to adopt the view, most associated with Timothy Williamson, that "vagueness is an epistemic phenomenon" (Williamson 1994, p. 3). On this view, there are sharp cut-offs for sorites puzzles that really make a difference. But the difficulty we have in identifying where the change is and why that change justifies making a difference is just a reflection of our epistemic state. According to this strategy, we might not know which change makes a difference, but that does not affect the fact that a change *does* make a difference.

A different type of strategy takes the case as evidence that one of the principles of identity ought to be rejected. Let us classify the Every Change Counts and Privileged Change Counts as a `Principle-Preserving Strategy`. Strategies that jettison a principle of identity can then be called a `Principle-Rejecting Strategy`. Chapter 3 explores the particular strategy of rejecting Determinacy of Identity.

1.5.2 Other Puzzles

TIBBLES

Another type of identity puzzle involves the question of which particular collection of parts counts as object. Imagine there is a cat, named TIBBLES, on the mat.[17] The

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[16] Although I will adjudicate related issues later.

[17] According to Wiggins (1968, p. 9), Peter Geach introduced this now famous example.

cat is composed, presumably, of collections of molecules. The number of molecules is very large. Further, there are molecules at the edges of TIBBLES such that it is difficult to say whether or not each of those particular molecules is part of TIBBLES. For example, bits of fur might become easily detached. Are those part of TIBBLES or just temporarily attached to TIBBLES?

A way of characterizing the case involves specifying cat candidates and asking for each of them, "is this candidate identical to TIBBLES?" In principle, we can consider a candidate that has exactly a certain number of molecules as parts and ask if it is TIBBLES. We can then consider another candidate that differs with respect to exactly one molecule and ask of that candidate whether or not *it* is TIBBLES. A fully articulated version of the case involves a very large number of partly overlapping cat candidates differing from one another by some number of molecules.

The puzzle is to answer the question "which of the many cat candidates is TIBBLES?" The difficulty becomes apparent when one considers that, for any candidate one is tempted to offer as identical to TIBBLES, it is difficult to say why the candidate that differs from it by only one molecule is not identical to TIBBLES.

A possible Principle-Preserving Strategy is, as with SHIP OF THESEUS above, to attribute the difficultly in determining which candidate is TIBBLES to epistemic difficulties. On this solution, there is exactly one cat candidate that is TIBBLES, but our inability to eliminate the other candidates is a reflection our poor epistemic position. This means that we do not know which cat candidate is TIBBLES, even though one of them actually is.

A Principle-Rejecting Strategy is, as above, to deny that identity is determinate. On this strategy, TIBBLES is, at the same time, indeterminately identical to each

of the cat candidates. This avoids arbitrariness worries since no candidate cat is privileged.

Parcels *and* Six Pack

This type of identity puzzle concerns the relationship between identity and counting. A first pass at the relationship is that when counting objects one ought to proceed in the count when encountering an object that is distinct from each of the previously counted objects. To do otherwise (to proceed in the count when the object is identical to a previously counted object) is to "double count" the object. So it appears that distinctness and non-identity go together with counting.

But the relationship is complicated by thinking about cases like the following.

Donald Baxter (1988, p. 200, p. 197, respectively) introduces cases I will call Parcels and Six Pack. Imagine that you are purchasing a six pack, and only a six pack, at the grocery store. The store has express checkout lines for orders of six or less items. It would be odd if the cashier chastised you for illegitimately using the express line. You would object that you only have one item. It would be even odder if the cashier then said, "There are six individual beverages in the six pack. That is six. Then the collection of the beverages is itself an individual object distinct from the six individual beverages. This is because identity is a one-to-one relation. The six pack cannot stand in the identity relation to six objects. So it must be distinct from the six beverages. That means that there is one object in addition to the six. That is why you have exceeded the six item limit."

Your puzzlement would turn to outrage if they proceeded to charge you for seven distinct items.

Similarly, if someone divided a plot of land into individual parcels, sold the parcels, and then tried to sell the original plot as a single object, we would accuse her of fraud.

In each case, we want to say that the cashier and the land owner are guilty of double-counting. But their act of proceeding in the count seems to follow the rule that we proceed in the count when we encounter a new object. The six pack does not stand in the identity relation to the six beverages. And the large plot of land does not stand in the identity relation to the smaller parcels. The puzzle is how to reconcile the relationship between identity and counting with the intuition that there is double-counting going on.

One Principle-Rejecting Strategy to the puzzle is to deny that identity is a one-to-one relation. This strategy says that pluralities can stand in the identity relation to single objects. Specifically, the objects that compose a single object are said to collectively stand in the identity relation to the single object that they compose. A version of this view takes the composition relation *to be* the identity relation.

A Principle-Rejecting Strategy must explicate the relationship between identity and counting that allow double-counting violations to occur even when the objects are, strictly speaking, distinct.

TRUNCATION

TRUNCATION is a puzzle concerning identity over time.

Consider my bicycle as represented in figure 1.3. It has lots of parts. Now consider the collection that is all those parts except for half of the right brake lever (see figure 1.4). Because that collection of parts lacks half of the right brake lever, it is not
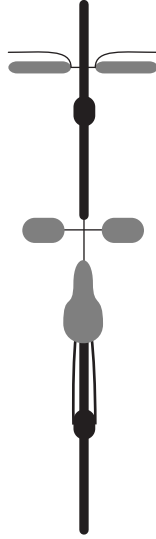
Figure 1.3: Bicycle from above

identical to my bike. Now imagine that this half of the right brake lever falls off.[18] Now the collection of parts without that right half of the right brake lever appears to be identical to my bike. Now my bike just is the collection of parts that does not include that half of the right brake lever.

On pain of denying Eternality of Identity, we cannot say that the collection of parts without half of the right break lever was previously distinct from my bicycle, but now is identical to it. Peter van Inwagen identifies the following assumption as the source of this puzzle.

> For every material object M, if R is the region of space occupied by M at time t, and if sub-R is *any* occupiable sub-region of R *whatever*, there exists a material object that occupies the region sub-R at t. (van Inwagen

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[18] This is not difficult since it in fact happened.
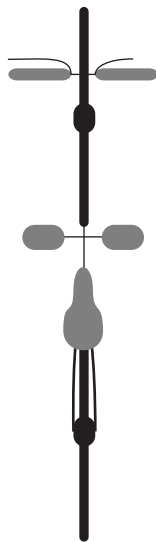
Figure 1.4: Bicycle without half of the right brake lever

1981, p. 123)

He calls this "The Doctrine of Arbitrary Detached Parts" and by denying it, he is not forced to accept that my bicycle without the right half of the brake lever is actually an object.

Another Principle-Preserving Strategy is to deny that objects persist through time. This removes the temptation to think that objects might be identical at some times and not others by denying that there is any identity across time.

As hinted above, another strategy for responding to the puzzle is to deny Eternality of Identity. An example of this Non-Standard View of Identity is Occasional Identity.
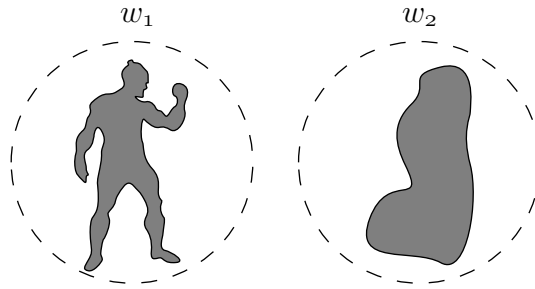
Figure 1.5: Clay formed as statue and possibly as just a lump

Destruction

Destruction is a puzzle concerning identity across worlds. It comes from Allan Gibbard (1975).

Imagine a clay statue just formed such that the clay is still malleable. It appears that the collection of clay particles is identical to the statue. But just at the moment of formation the clay *could* be pushed into a shapeless lump (see figure Figure 1.5). The collection of clay particles would still be there. But the statue would not be. So it seems that the collection of clay has a property the statute does not, namely being able to survive the smushing of clay. But this seems to contradict Necessity of Identity.

One Principle-Preserving Strategy to the cases is to allow for coincident objects. We might have thought that the fact that the clay makes up the statue means that the clay is identical to the statue. But if we deny this, as for example Lynn Rudder Baker (1997) does, then we can allow that the clay is distinct from the statue that it

makes up. And if they are distinct then there is no issue in allowing that they have distinct properties.[19]

A principle rejecting route is to deny the Necessity of Identity. A Non-Standard View of Identitythat does this is Contingent Identity.

FISSION

The following example comes from Gallois (1998, §1.6). Imagine an amoeba called AMOEBA undergoes a division such that there are two amoebas at a later time. One of them, called SLIDE, ends up under a microscope. The other, called POND, ends up in a pond. SLIDE and POND seem to be distinct objects. See figure 1.6 for a representation of the division.

But the division process could have proceeded other than it did. For example, the amoebic material that makes up POND could have dispersed in such a way that POND never came to exist (see figure 1.7). In that case, there seems to be reason to think that AMOEBA would be identical to SLIDE.

The same possibility could be run with POND. The amoebic material that makes up SLIDE could have dispersed in a such a way that SLIDE never came to exist (see figure 1.8). In that case, there seems to be reason to think that AMOEBA would be identical to POND.

So, considered in isolation, it seems we have reason to think that both SLIDE and POND are identical to AMOEBA. If both are identical to AMOEBA, then by Transitivity of Identity, SLIDE and POND are identical. But SLIDE and POND are distinct! Call this the FISSION puzzle.

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[19] For more examples and discussion of this strategy, see Fairchild 2020.
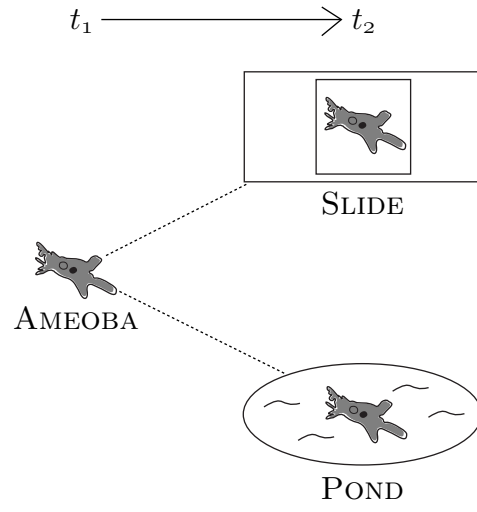
Figure 1.6: Amoeba division
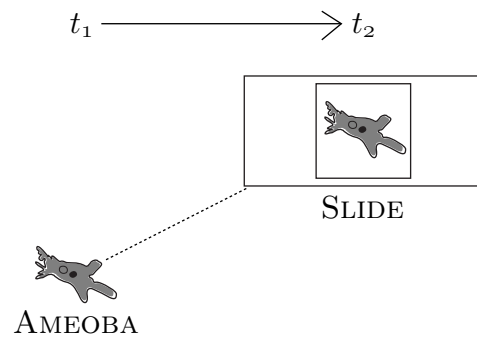
Figure 1.7: SLIDE without POND

$$t_1 \xrightarrow{\hspace{3cm}} t_2$$
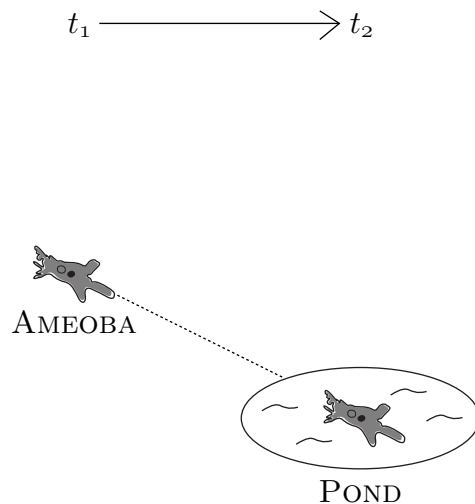
Figure 1.8: POND without SLIDE

For reasons that will be explored in Chapter 2, Gallois thinks that his Occasional Identity view can hold that AMEOBA is identical to SLIDE and POND without violating Transitivity of Identity.

FUSION

The case, or a structurally similar case, can be run backwards to produce the FUSION puzzle. In this puzzle two distinct objects fuse to form one object. Arguably, there is reason to think that had the fusion not occurred the identity of the two objects would be preserved. If so, then it is not the case that objects ceased to exist when the fusion occurred. Moreover, there is reason to think that the object after the fusion is not just a new object composed of the two objects. If so, then there is reason to identify it with the two objects.

For example, consider a version of the case provided by Ralf Bader (2012, p. 143). He imagines that a tele-transporter malfunctions such that it combines the distinct brain hemispheres into a single body. Arguably, had the malfunction never occurred, the identity of the hemispheres would have been preserved. Further, it seems that there is one person after the malfunction. So, there seems to be reason to think that the distinct objects become identical as a result of the tele-transporter malfunction.[20]

Unlike the above cases, FUSION is not introduced by Gallois as evidence for his Non-Standard View of Identity. In fact, it is not discussed in Gallois 1998. However, someone might come to the same Non-Standard View of Identity that Gallois develops by way of arguing for the plausibility of FUSION. Rather, the case is included here because of the role that it plays in the objection to Gallois's Occasional Identity (and Contingent Identity) in Bader 2012. That objection is the subject of Chapter 2.

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[20] The actual version of the case Bader presents is more complicated and he uses it to introduce his objection to Gallois's Occasional Identity. I discuss it in Chapter 2.

Chapter 2: The Transitivity of Contingent Identity and Occasional Identity

2.1   Introduction

In this chapter I consider objections raised by Ralph Bader (2012) against views held by André Gallois (1998), namely, Contingent Identity and Occasional Identity.[1] Bader argues that these non-standard views of identity violate one of the Logical Principles of Identity, namely Transitivity of Identity. I argue that one can expand Gallois's notion of instantiation to reply to Bader's objections.

In section 2.2, I review Bader's arguments that Contingent Identity and Occasional Identity are about relations that are not transitive. In section 2.3, I review Gallois's understanding of instantiation, and in section 2.4, I expand it based on his views of temporally and modally indexed properties. In section 2.5, I apply the expanded instantiation relation to a transitive relation that is not identity. Finally, in section 2.6, I show how one can use such an expansion to meet Bader's objections.

Recall from section 1.1 that, according to Contingent Identity, Necessity of Identity is false. According to Contingent Identity, identity can hold between objects at some worlds and not at others. That is, it is possible that there are some objects that are identical, but might have been distinct. Recall also from subsection 1.2.2

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[1]   See Gallois 1998, pp. 69–70 for an argument that Occasional Identity implies Contingent Identity.

that, according to Occasional Identity, the Eternality of Identity is false. According to the Occasional Identity, identity can hold between objects at some times and not at others. That is, it is possible that there are some objects that are identical at one time, but distinct at another. Put more precisely,

Contingent Identity $\Diamond \exists x \exists y [x = y \wedge \Diamond\, x \neq y]$

Occasional Identity $\Diamond \exists x \exists y \exists t \exists t'[$ at t: $x = y \wedge$ at t': $x \neq y]$

2.2 Objections from Transitivity

Recall from subsection 1.2.2 that Transitivity of Identity is the principe that says of identity that (i) if one object is identical to a second object and (ii) the second object is identical to a third object, then the first object is identical to the third object. Put more precisely:

Transitivity of Identity $\forall x \forall y \forall z [(x = y \wedge y = z) \rightarrow x = z]$

2.2.1 The Argument from Transitivity against Occasional Identity

Gallois considers the following objection to Occasional Identity. Recall the case of Fission from Chapter 1, §1.5.2 (depicted in Figure 2.1 from Chapter 1, §1.5.2. Assume that the amoebic division described is a case of Occasional Identity.[2] There is a single amoeba, AMOEBA, at t_1. At t_2 there is a division of the amoeba, resulting in two distinct amoeba, SLIDE and POND (named in virtue of their respective locations).

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[2] By "a case of Occasional Identity" and "a case of Contingent Identity" I mean a case that, if it were true, would be sufficient for the truth of Occasional Identity or Contingent Identity, respectively.

Gallois (1998, pp. 75–6) maintains that at t_1 SLIDE and POND are identical, but at t_2 they are distinct. Here is the objection he considers:

1.1. at t_1: SLIDE = POND $\land$ at t_2: SLIDE $\neq$ POND (assumption for reductio).

1.2. That which is POND at t_1 = that which is SLIDE at t_1 (from 1.1).

1.3. That which is SLIDE at t_1 = that which is SLIDE at t_2.(by Reflexivity of Identity)[3]

1.4. That which is POND at t_2 = that which is POND at t_1.(by Reflexivity of Identity)

1.5. That which is POND at t_1 = that which is SLIDE at t_2 (by Transitivity of Identity, 1.2, and 1.3).

1.6. That which is POND at t_2 = that which is SLIDE at t_2 (by Transitivity of Identity, 1.4, and 1.5).

1.7. at t_2: POND = SLIDE (From 1.6, which contradicts the assumption in 1.1.)[4]

2.2.2 The Argument from Transitivity against Contingent Identity

In defending Contingent Identity, Gallois does not consider an argument from transitivity against the view. However, it is not difficult to construct an objection to

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[3] The opponent of Contingent Identity would justify 1.3 and 1.4 by Reflexivity of Identity. Gallois (1998, pp. 76–7) would agree that 1.3 and 1.4 are true by the particulars of the case, but not in virtue of Reflexivity of Identity. While not discussed in Gallois 1998, an Occasional Identity theorist would, for reasons similar to relativizing Transitivity of Identity, only accept a reformulation of Reflexivity of Identity that fixes the principle to the same time. See Gallois 1998, pp. 91–2 for a discussion of reflexivity.

[4] The argument has been adapted. The original uses descriptions instead of names to illustrate a different point.
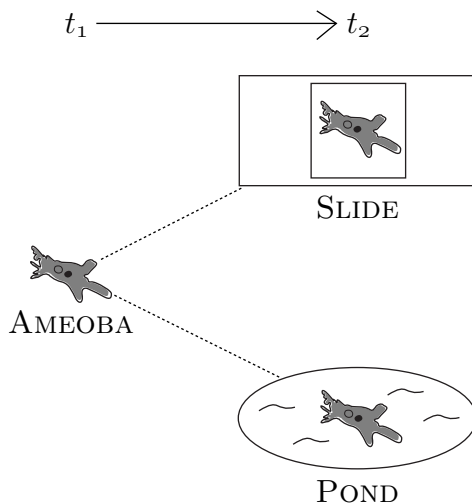
Figure 2.1: Amoeba division

Contingent Identity that is analogous to the one just given against Occasional Identity. In fact, Bader (2012, p. 145) presents an argument like the one that follows. Recall the case of Destruction from Chapter 1, §1.5.2. GOLIATH and LUMP$_1$ are actually identical, but we are to imagine that the clay from which GOLIATH could be made is compressed into a non-statue form. As a purported case of Contingent Identity, GOLIATH and LUMP$_1$ would not be identical if that were to happen.

2.1. at @[5]: GOLIATH = LUMP$_1$ $\land$ at w_1: GOLIATH $\neq$ LUMP$_1$ (assumption for reductio).

2.2. That which is GOLIATH at @ = that which is LUMP$_1$ at @ (from 2.1).

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[5] Where @ is the actual world.

2.3. That which is LUMP_1 at @ = that which is LUMP_1 at w_1 (by Reflexivity of Identity).[6]

2.4. That which is GOLIATH at w_1 = that which is GOLIATH at @ (from Reflexivity of Identity).

2.5. That which is GOLIATH at @ = that which is LUMP_1 at w_1 (by Transitivity of Identity, 2.2, and 2.3).

2.6. That which is GOLIATH at w_1 = that which is LUMP_1 at w_1 (by Transitivity of Identity, 2.4, and 2.5).

2.7. at w_1: $\text{GOLIATH} = \text{LUMP}_1$ (From 2.6, which contradicts the assumption in 2.1).[7]

2.2.3 Replying to Transitivity Arguments

Gallois replies to the argument against Occasional Identity by objecting to the applications of transitivity in 1.5 and 1.6. The reason is that the formulation of transitivity presupposes the Standard View of Identity. The Standard View of Identity assumes that, if the relation holds at one time, then it must hold at all times. This is precisely what Occasional Identity theorists reject (Gallois 1998, pp. 76–9). However, Occasional Identity theorists are committed only to a formulation of Transitivity of

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[6] See above for a discussion of the justification for 2.3 and 2.4.

[7] The names 'GOLIATH' and 'LUMP$_1$' are the names for a statue and lump of clay in an example given by Allan Gibbard (1975). Gibbard argues that it is possible that a statue is identical to the clay that composes it. However, he thinks that they could have been distinct.

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Identity that relativizes transitivity to particular times.[8] Here is the formulation Gallois claims that those who endorse Occasional Identity ought to hold:

Transitivity of Identity$_t$: $\forall x \forall y \forall z \forall t[(\text{ at } t : x = y \land \text{ at } t\text{: } y = z) \rightarrow \text{ at } t : x = z]$

That is, for all objects and times, if (i) it is the case that one object and a second object are identical at one time and (ii) it is the case that the second object and a third object are identical at that same time, then it is the case that the first object and the third object are identical at that same time. Adopting Transitivity of Identity$_t$ as the reformulation of Transitivity of Identity allows those who endorse Occasional Identity to object to the argument in subsection 2.2.1. According to Transitivity of Identity$_t$, one cannot rely on transitivity to make inferences about identities at distinct times. Proponents of Occasional Identity can reply by pointing out that the identities in 1.2, 1.3, and 1.4 are identities across distinct times. These identities are not the antecedents of instances of Transitivity of Identity$_t$. So the argument fails on this formulation of transitivity, because the moves to 1.5 and 1.6 are not correct applications of *modus ponens.*

Similarly, Bader points out that proponents of Contingent Identity can appeal to the following reformulation of Transitivity of Identity that relativizes with respect to worlds to block the objection to Contingent Identity at lines 2.5 and 2.6.

Transitivity of Identity$_w$: $\forall x \forall y \forall z \forall w[(\text{ at } w : x = y \land \text{ at } w\text{: } y = z) \rightarrow \text{ at }$
$\quad w : x = z]$

[8] See Chapter 1, §1.3 for a discussion of the merits of reformulating Principles of Identity with respect to theory choice.

That is, for all objects and worlds, if (i) it is the case that one object and a second object are identical at one world and (ii) it is the case that the second object and a third object are identical at that same world, then it is the case that the first object and the third object are identical at that same world. Adopting Transitivity of Identity$_w$ as the reformulation of Transitivity of Identity allows those who endorse Contingent Identity to object to the argument in subsection 2.2.2. According to Transitivity of Identity$_w$, one cannot rely on transitivity to make inferences about identities at distinct worlds. Proponents of Contingent Identity can reply by pointing out that the identities in 2.2, 2.3, and 2.4 are identities across distinct worlds. These identities are not the antecedents of instances of Transitivity of Identity$_w$. So the argument fails on this formulation of transitivity, because the moves to 2.5 and 2.6 are not correct applications of *modus ponens*.

2.2.4   Bader's Objections from the Transitivity of Identity

However, the above objections are not the arguments that Bader uses to object to Occasional Identity and Contingent Identity. His arguments rely on the possibility fusions of objects occurring at the same time as fissions of those objects. Gallois (1998, Chap. 1, §VI) presents his view of Occasional Identity as a view that can explain identity puzzles. According to him, the case of AMOEBA, SLIDE, and POND is a case of Occasional Identity.

Reverse cases presumably are examples of fusions, where the pre-fusion objects are distinct, but identical after the fusion. Bader assumes that Gallois takes his view to apply to cases of fusions. The example of the truncated car can be seen as such a case (Gallois 1998, Chap. 1, §II).
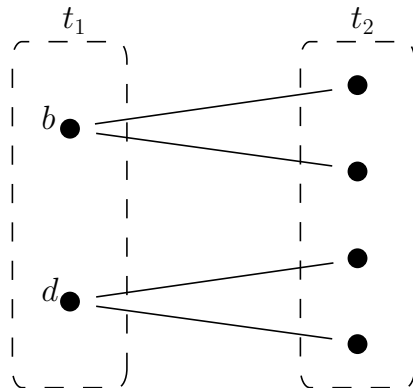
Figure 2.2: Two Amoebas Dividing

I present generalizations of Bader's arguments. He uses the possibility of tele-portation and the severing of brain hemispheres to present a case of simultaneous fissions and fusion and a modally analogous case (Bader 2012, p. 143, pp. 145–6). I do not think that Bader's reliance on this particular version of co-located fissions and fusion is compelling. It seems that, for it to be compelling, one must accept some assumptions about personal identity. However, I think that the general form of the arguments are serious objections to Occasional Identity and Contingent Identity.

Against Occasional Identity

Bader's argument against Occasional Identity begins with two objects b and d at at time t_1. There are two fissions of each of these objects at a later time t_2. In a simpler case (see Figure 2.2), this would mean that there are now four objects at t_2 (a pair that at t_1 were identical to b and another pair that at t_1 were identical to d). However, there was also one fusion that occurred when the fissions happened. One of
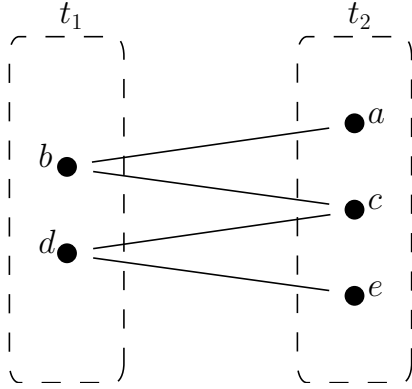
Figure 2.3: Fission and Fusion of Two Amoebas

the post-fission objects of b was fused with one of the post-fission objects of d. This means that there are three, rather than four, objects at t_2. Let a be the post-fission object of b that did not fuse. Let e be the post-fission object of d that did not fuse. Let c be the fusion of the post-fission objects of b and d (Bader 2012, pp. 143–4). See figure Figure 2.3 for a representation of the case.

According to Occasional Identity, the distinct objects that result from a fission are identical prior to the fission. Conversely, objects that were distinct prior to a fusion are identical after it. So, at t_1, a and c are identical in virtue of being b at t_1. Similarly, at t_1, c and e are identical in virtue of being d at t_1. However, since at t_1, $b \neq d$, it is not the case that, at t_1, $a = e$.

Bader's objection can then be formulated as follows.

3.1. $\forall x \forall y \forall z \forall t [(\text{ at } t : x = y \wedge \text{ at } t\text{: } y = z) \rightarrow \text{ at } t : x = z]$ (assumption for reductio).

3.2. at $t_1 : a = c \wedge$ at t_1: $c = e \wedge$ at $t_1 : a \neq e$ (from the case)

3.3. (at $t_1 : a = c \wedge$ at t_1: $c = e$) $\rightarrow$ at $t_1 : a = e$ (instance of 3.1).

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3.4. at $t_1 : a = e \land$ at $t_1 : a \neq e$ (from 3.2 and 3.3, a contradiction).

3.5. $\neg \forall x \forall y \forall z \forall t[($ at $t : x = y \land$ at t: $y = z) \rightarrow$ at $t : x = z]$ (the negation of Transitivity of Identity$_t$).

Recall from Chapter 1, §1.2.4 that Moderation is one of the attitudes one can take to one of the Principles of Identity. In the debate between Gallois and Bader, both have taken the stance of Moderation toward Transitivity of Identity. Gallois, as a proponent of a Non-Standard View of Identity that rejects Transitivity of Identity as formulated has offered Transitivity of Identity$_t$ as a reformulation. By his objection, Bader accepts the reformulation as a plausible reformulation of Transitivity of Identity. His objection is against the adequacy of Transitivity of Identity$_t$. Since, according to him, Transitivity of Identity$_t$ is false, by a plausible Occasional Identity interpretation of simultaneous fissions and fusion, then Occasional Identity is false in one of two ways. Either the theory says true things about a relation it falsely claims is the relation is the identity relation or it says false things about the identity relation. That is, the theory fails either at describing the relation it purports to or what it does say is not true.

Against Contingent Identity

Bader objects to Contingent Identity with an analogous argument. Instead of there being a case of simultaneous fissions and a fusion, he imagines a case where two objects might have been subject to a fission and fusion. In the modal analog, at w_1 objects b and d are distinct. In w_2, b is distinct objects a and c, and d is distinct objects c and e. See Figure 2.4 for a representation of the case.

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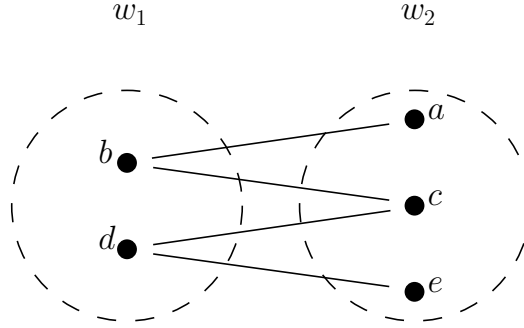
Figure 2.4: Possible Fission and Fusion of Two Amoebas

As in the temporal case, objects a and c that are distinct in w_2 are identical in w_1 in virtue of being b there. By the same reasoning, objects c and e that are distinct in w_2 are identical in w_1 in virtue of being d there (Bader 2012, pp. 144–6). The objection can be run as follows.

4.1. $\forall x \forall y \forall z \forall w [($ at $w : x = y \land$ at w: $y = z) \to$ at $w : x = z]$ (assumption for reductio).

4.2. at $w_1 : a = c \land$ at w_1: $c = e \land$ at $w_1 : a \neq e$ (from the case).

4.3. (at w_1: $a = c \land$ at w_1: $c = e) \to$ at $w_1 : a = e$ (instance of 4.1).

4.4. at $w_1 : a = e \land$ at w_1: $a \neq e$ (From 4.2 and 4.3, a contradiction).

4.5. $\neg \forall x \forall y \forall z \forall w [($ at $w : x = y \land$ at w: $y = z) \to$ at $w : x = z]$ (the negation of Transitivity of Identity$_\text{w}$).

As with Occasional Identity, the debate is between those who have taken the stance of Moderation toward Transitivity of Identity. Gallois is offering Transitivity

of Identity$_w$ as a reformulation of Transitivity of Identity. By his objection, Bader accepts the reformulation as a plausible reformulation Transitivity of Identity. His objection is against the adequacy of Transitivity of Identity$_w$. Since, according to him, Transitivity of Identity$_w$ is false, by a plausible Contingent Identity interpretation of possibly simultaneous fissions and fusion,[9] Contingent Identity is false in one of two ways. Either the theory says true things about a relation it falsely claims is the relation is the identity relation or it says false things about the identity relation. That is, the theory fails either at describing the relation it purports to or what it does say is not true.

2.3   Instantiation as a Relation

To respond to the above arguments, I will argue that Gallois ought to reformulate Transitivity of Identity$_t$ and Transitivity of Identity$_w$ in light of his understanding of instantiation.

Gallois motivates his version of Occasional Identity by arguing that it best solves puzzle cases about identity.[10] The puzzles combine two types of issues about identity. The first type of issue, diachronic identity, concerns the identity and distinctness of objects across time. The second type of issue, synchronic identity, concerns the

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[9]   This is perhaps too hasty. According to Gallois (1998, pp. 69–70), while Occasional Identity implies Contingent Identity, Contingent Identity does not imply Occasional Identity. It could be that a Contingent Identity theorist who does not accept Occasional Identity would not interpret the case of possible simultaneous fissions and fusion in the way Gallois does. In that case, Bader's target might not be the adequacy of Transitivity of Identity$_w$ in general, but rather its adequacy when accompanied by certain commitments held by those who espouse Occasional Identity in addition to Contingent Identity.

[10]   See Gallois (1998, Chap. 2) for the puzzles he considers.

identity and distinctness of objects at the same time. Issues of diachronic identity are part of the general problem of explaining how objects can persist and yet change. In this respect, Gallois's particular version of Occasional Identity involves commitments within the debate about persistence and change.

I assume that the claim that objects can be identical at one time but distinct at another, especially as a solution to identity puzzles, is best understood in conjunction with the view that objects persist "by being wholly present at more than one time" (Lewis 1986, p. 202). That is, Occasional Identity seems to go with `Endurantism`. Otherwise, Gallois could the style of strategies employed by `Perdurantism`[11] and `Exdurantism`[12] for dealing with the puzzles that he identifies.

As an Endurantist, Gallois should have an explanation for how objects can have a property at one time and lack it at another. Gallois (1998, pp. 37–8) considers several ways of understanding what it is for an object to instantiate a property at a time. He rejects the proposal that properties should be thought of as relations between objects and times. He also rejects views that explain having properties at particular times in terms of sentential operators or as adverbial modifiers of instantiation.[13] The view he accepts treats instantiation as a three-place relation between objects, properties and times.[14]

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[11] The view that objects persist "by having different temporal parts, or stages, at different times, though no part of is wholly present at more than one time" (Lewis 1986, p. 202).

[12] The view that objects persist by having counterparts of itself at different times. See Haslanger 2003, especially §2, for more on different views of persistence.

[13] The former would read "a is F at t" as "at t it is the case that a is F." The latter would read "a is F at t" as "a is t-ly F."

[14] Lewis (2002, §4) argues that treating instantiation as a relation leads to an infinite explanatory regress. At present, I refrain from attempting to reply to this objection on Gallois's behalf, but

Where I is the instantiation relation, a the instantiating object, F the instantiated property, and t the time of instantiation, let the view be expressed by the following schema:

Instantiation at a Time$_\texttt{G}$: at t: a is F just in case $I(a, F, t)$.[15]

Gallois does not address his interpretation of analogous modal predication (like at w: a is F). If he were to take the same view as he does in the case of time, then we can provide the following schema for instantiation at a world.

Where I is the instantiation relation, a the instantiating object, F the instantiated property, and w the world of instantiation:

Instantiation at a World$_\texttt{G}$: at w: a is F just in case $I(a, F, w)$.

2.4 Expanding the Instantiation Relation

In this section I will argue that the notion of instantiation just characterized should be revised. The revision is motivated by considering Gallois's understanding of temporally and modally indexed properties. This results from considering his replies to objections to both Occasional Identity and Contingent Identity based on Leibniz's Law. One of the arguments he replies to is given by Saul Kripke (1971). This argument relies on the Necessity of Self-Identity. This is the claim that, necessarily, everything is identical to itself. Gallois treats the Necessity of Self-Identity as a claim

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note that a full defense of instantiation as a relation requires a reply to this objection.

[15] Gallois's formulation is in terms of truth conditions for the sentence expressing the proposition that at t: a is F. I take it that the truth conditions of the sentence depend in some way on those of the proposition.

about a modally indexed property that quantifies over all worlds. According to him, something is necessarily self-identical just in case whatever it is identical to at some world is identical to it at all worlds.

Gallois also replies to a temporal analog of this argument from the `Eternality of Self-Identity`. This is the claim that everything is identical to itself at all times. He treats this as a claim about a temporally indexed property that quantifies over all times. Similarly, according to him, something is always self-identical just in case whatever it is identical to at some time is identical to it at all times.

2.4.1 Kripke's Objection

Kripke's argument against Contingent Identity, and the analogous argument against Occasional Identity, appeal to Leibniz's Law. For reasons similar to those for relativizing transitivity, Gallois accepts only the following relativized versions of Leibniz's Law, where Φ is schematic for properties:

`Leibniz's Law`$_\mathtt{t}$: $\forall t \forall x \forall y$ [at $t : x = y \rightarrow$ (at t: $\Phi x \leftrightarrow$ at t: Φy)]

`Leibniz's Law`$_\mathtt{w}$: $\forall w \forall x \forall y$ [at $w : x = y \rightarrow$ (at w: $\Phi x \leftrightarrow$ at w: Φy)]

Here is a formulation of Kripke's argument against Contingent Identity using Leibniz's Law$_\mathrm{w}$, given as a reductio:[16]

5.1. at w_1: $a = b \wedge$ at w_2: $a \neq b$ (a case of Contingent Identity, an assumption for reductio).

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[16] Roughly, the following formulation follows the order given in Kripke 1971, while making more of the suppressed steps explicit as Gallois 1998, p. 142 does.

5.2. $\forall x$ necessarily: $x = x$ (Necessity of Self-Identity).

5.3. $\forall w \forall x \forall y$ [at $w : x = y \rightarrow$ (at w: $\Phi x \leftrightarrow$ at w: Φy)] (Leibniz's Law$_w$).

5.4. at w_1: $a = b \rightarrow$ [at w_1: necessarily:$(a = a) \leftrightarrow$ at w_1: necessarily$(a = b)$] (an instance of 5.3)[17]

5.5. at w_1: necessarily:$(a = b) \wedge$ at w_2: $a \neq b$ (from 5.1, 5.2, and 5.4, a contradiction).

The argument begins (5.1) by assuming, for reductio, a purported case of Contingent Identity. 5.2 is just Necessity of Self-Identity. 5.3 is Leibniz's Law$_w$, the reformulation of Leibniz's Law adopted by proponents of Contingent Identity. 5.4 is an instance of Leibniz's Law$_w$ with the property *is necessarily identical to a*. 5.5 says that b has the property *is necessarily identical to a* and is not identical to a at w_2. This is a contradiction.

And here is the analogous argument against Occasional Identity:

6.1. at t_1: $a = b \wedge$ at t_2: $a \neq b$ (a case of Occasional Identity, an assumption for reductio).

6.2. $\forall x$ always: $x = x$ (Eternality of Self-Identity).

6.3. $\forall t \forall x \forall y$ [at $t : x = y \rightarrow$ (at t: $\Phi x \leftrightarrow$ at t: Φy)] (Leibniz's Law$_t$).

6.4. at t_1: $a = b \rightarrow$ [at t_1: always: $(a = a) \leftrightarrow$ at t_1: always: $(a = b)$] (an instance of 6.3).

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[17] Potential worries about mixing modal operators with quantification over worlds will be resolved when the former is understood in terms of the latter in Gallois's reply below.

6.5. at t_1: always: $(a = b) \land$ at t_2: $a \neq b$ (from 6.1, 6.2, and 6.4, a contradiction).[18]

The argument begins (6.1) by assuming, for reductio, a purported case of Occasional Identity. 6.2 is just Necessity of Self-Identity. 6.3 is Leibniz's Law$_t$, the reformulation of Leibniz's Law adopted by proponents of Occasional Identity. 6.4 is an instance of Leibniz's Law$_t$ with the property *is always identical to a*. 6.5 says that b has the property *is always identical to* a and is not identical to a at w_2. This is a contradiction.

Each formulation of the arguments is intended to result in a contradiction between the conjuncts in lines 5.5 and 6.5. The first conjunct in 5.5 expresses that b is such that at w_1 it is necessarily identical with a. The second conjunct expresses that b is such that it is distinct from a at w_2. In the temporal analog, the first conjunct in 6.5 expresses that a is such that at t_1 it is always identical with b. The second conjunct expresses that b is such that it is distinct from a at t_2.

2.4.2 Gallois's Replies

Gallois's response is to argue that the conjunctions in lines 5 of both arguments are not contradictions. He does this by arguing that what it means for something to have a necessary property at a given world is for, in that world, the object to be identical to something that, at all worlds, has that property at all worlds. Similarly,

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[18] Gallois (1998, Chap. 5, §V; Chap. 6, §VII) presents versions of the original argument from Kripke (1971, p. 136). The arguments ignore the complications that arise from considering objects that do not exist at some worlds or times. Presumably one can ignore these complications by conditionalizing the universal generalizations. Or one might hold that there are facts about an object's identity that obtain even when an object does not exist. Relatedly, Gallois (1998, p. 83, n. 7) does not intend his account to commit him to views about whether or not non-existent fictional objects have properties.

according to him, for an object to have an eternal property at a time is for it to be identical to something at that time that has that property at all times. Here are the formalizations of those claims:

Necessarily-at-a-world: $\Box\forall x\forall w[($ at w: necessarily: $\Phi x) \leftrightarrow \exists y($ at w: $x = y \wedge \forall w'($at w': $\Phi y))]$

Always-at-a-time: $\Box\forall x\forall t[($ at t: always: $\Phi x) \leftrightarrow \exists y($ at t: $x = y \wedge \forall t'($at t': $\Phi y))]$[19]

If these generalizations are true, then the conjunctions in lines 5 of each argument are not contradictions. Consider the instances of Necessarily-at-a-world and Always-at-a-time corresponding to the first conjunct from lines 5 of each argument:

- at w_1: necessarily: $(a = b) \leftrightarrow \exists y($ at w_1: $b = y \wedge \forall w($ at w: $a = y))$

- at t_1: always: $(a = b) \leftrightarrow \exists y($ at t_1: $b = y \wedge \forall t($ at t: $a = y))$[20]

If the first conjuncts in lines 5 are in fact equivalent to the right-sides of these biconditionals, then there are no contradictions. In the modal case, b has the property of necessarily being identical to a at w_1 just in case there is something it is identical to at w_1 that is identical to a at every world. Such a something is a. a is identical to b at w_1 and a also identical to a at every world. In particular, a is identical to a at w_2: the world in which it is distinct from b.

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[19] These are formulated on p. 154 and p. 129, respectively.

[20] Note that the left-side of each biconditional is meant to, in each case, express the predication of a necessary and eternal property to b at w_1 and t_1. In the first case it is the property of necessarily being identical to a. In the second, it is the property of always being identical to a.

Similarly, in the temporal case, b has the property of always being identical to a at t_1 just in case there is something it is identical to at t_1 that is identical to a at every time. Such a something is a. a is identical to b at t_1 and a also identical to a at every time. In particular, a is identical to a at t_2: the time at which it is distinct from b.

For the predication of modally and temporally indexed properties that reference only single worlds and times, Gallois argues that the following hold:

`Possibly-at-a-world:` $\Box \forall x \forall w \forall w'[(\text{ at } w\colon \text{ at } w'\colon \Phi x) \leftrightarrow \exists y(\text{ at } w\colon x = y \wedge \text{ at } w'\colon \Phi y)]$

`Sometime-at-a-time:` $\Box \forall x \forall t \forall t'[(\text{ at } t\colon \text{ at } t'\colon \Phi x) \leftrightarrow \exists y(\text{ at } t\colon x = y \wedge \text{ at } t'\colon \Phi y)]$.[21]

Notice the structural similarity between Necessarily-at-a-world and Possibly-at-a-world. The former says that for an object, at a world, to instantiate the property *is necessarily* Φ is for that object, at that world, to be identical to something that at all worlds is Φ. The latter says that for an object, at a world, to instantiate the property *is possibly* Φ is for that object, at that world, to be identical to something that at some

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[21] When presented (on p. 149 and p. 84, respectively), these are considered along with variations that replace the existential quantifier that binds the y variable in the right-hand side of the biconditional with a universal quantifier. On these understandings of modally and temporally indexed properties, to have such a property is for everything that an object is identical to at that world or time to have the property at another world or time. Arguably, while objects might have modally and temporally indexed properties in this sense, these construals cannot capture some modally and temporally indexed properties that Contingent Identity and Occasional Identity theorists might want to capture. Gallois officially accepts that there might be some properties that are best captured under this formulation. However, in the case of necessary and eternal properties, he argues that the formulations with existential quantifiers best capture what it means for an object to have necessary and eternal properties, respectively. Further, he suggest that the interpretation of eternal properties and temporally indexed properties naturally come together. Similarly, for necessary and modally indexed properties. If this is so, then there is reason to accept the existential formulations rather than the universally quantified ones.

world is Φ. The only differences between them are (i) "necessarily" in the former is replaced with "at w'" in the latter and (ii) "$\forall w'$" inside the existential generalization in the former is replaced with "at w'" in the latter. Similarly for Always-at-a-time and Sometime-at-a-time.

Gallois's full defense of his interpretations of the predication of modally and temporally indexed properties is too extensive to review here.[22] The following are representative of how he motivates this interpretation of temporally and modally indexed properties. With respect to temporally indexed properties he writes,

> What does it take for it to be true that in 1990 George Bush will be the former President in 2000? ... In 1990 George Bush will be a former President in 2000 if and only if there exists someone who is identical with George Bush in 1990, and who is a former President in 2000. (Gallois 1998, pp. 83–4)

And with respect to modally indexed properties he says,

> It seems just as reasonable to say that, for example, in [the actual world] *Car* has the characteristic of being a car in W^* just in case something which is identical with *Car* in the actual world is a car in W^*. (Gallois 1998, p. 149)

Gallois (1998, pp. 96–9, pp. 155–7) accepts that a consequence of this view is that the following inferences are invalid:

Immutability Thesis: at t: at t': ϕ $\therefore$ at t': ϕ

Modal Invariance: at w: at w': ϕ $\therefore$ at w': ϕ[23]

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[22] Such defenses are given in Chaps. 3, 5, and 6.

[23] The names are those in the original.

2.4.3 Instantiation

With Gallois's interpretations of modally and temporally indexed properties available, I note a disharmony between the instantiation of these properties and the instantiation of properties that are not modally or temporally indexed. Consider an object a, a property F, times t and t', and worlds w and w'. Recall that Gallois's understanding of instantiation means that he accepts the following,

Instantiation-at-a-time$_G$: at t: a is F just in case $I(a, F, t)$.

Instantiation-at-a-world$_G$: at w: a is F just in case $I(a, F, w)$.

However, according to Gallois, the following biconditionals are true according to his generalizations about modally and temporally indexed properties:

at t: at t': $Fa \leftrightarrow \exists y($ at t: $a = y \wedge$ at t': $Fy)$,

at w: at w': $Fa \leftrightarrow \exists y($ at w: $a = y \wedge$ at w': $Fy)$,

at t: always: $Fa \leftrightarrow \exists y($ at t: $a = y \wedge \forall t'($ at t': $Fy)$,

and

at w: necessarily: $Fa \leftrightarrow \exists y($ at w: $a = y \wedge \forall w'($ at w': $Fy)$.

The right-hand side of the biconditionals concern several things: the object a, something that object is identical to (the object satisfying the existential quantifier), a property F, a time t or world w at which the identity holds, and another time t' or world w' at which the predication holds. This side of the biconditionals concerns

how five things are related,[24] whereas Gallois presents instantiation to be a relation between three things.[25] I propose to unify Gallois's analysis of instantiating a property at a time or world and his interpretation of instantiating temporally and modally indexed properties at a time or world. Let the following schemas express the relation between an object having a temporally or modally indexed property at a time or world, on the one hand, and the five-place instantiation relation, on the other.

$\texttt{Instantiation}_{\texttt{tG*}}$: at t: at t': a is F just in case $\exists x I(a, x, F, t, t')$

$\texttt{Instantiation}_{\texttt{wG*}}$: at w: at w': a is F just in case $\exists x I(a, x, F, w, w')$

To unify the cases of temporally or modally indexed instantiation of a property with the cases of temporally or modally indexed instantiation of a temporally or modally indexed property, I propose that the former be a special case of the latter. That is, the Occasional Identity or Contingent Identity theorist should take the I relation in Instantiation$_{\text{tG*}}$ or Instantiation$_{\text{wG*}}$ to be *the* instantiation relation.

There is an understandable tendency to read the expanded instantiation relation as follows.[26] In the temporal case, an object a at t has a property F at t' just in

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[24] More precisely, the latter two, in virtue of either quantifying over all times or quantifying over all worlds, concern at least five things.

[25] One might object to how I have counted on the basis of the identity between the object a and what is bound by y. This is due to the link between counting and identity. While it is true that at one time or one world, these objects are identical, the views under consideration allow that they might be distinct at other times and worlds. While it would be double counting to count them as distinct at that particular time or that particular world, it is not double counting when generalizing over all times and worlds.

[26] In a previous version of this chapter, an anonymous reviewer identified my previous articulation of the relation as problematic because it assumed Gallois's original three-place instantiation relation.

case there exists an object x that a is identical to at t that has the property F at t'. Similarly, in the modal case, an object a at w has a property F at a world w' just in case there exists an object x that a is identical to at w that has the property F at w'. Conceptually, we could then classify the first time or world as the time or world of identity and the second time or world as the time or world of instantiation.

The tendency is explained by the assumptions that identity is permanent and necessary. If we make these assumptions, then we can collapse the five-place instantiation relation into the more familiar three-place one. If identity is never occasional, then we have no need to track which objects things are identical to or distinct from at particular times. Similarly, if identity is never contingent, then we have no need to track which objects things are identical to or distinct from at particular worlds. So, under these assumptions, we might be tempted to say that:

$$I(a, a, F, t, t) \leftrightarrow I(a, F, t)$$

and

$$I(a, a, F, w, w) \leftrightarrow I(a, F, w).$$

However, my proposal for Occasional Identity and Contingent Identity theorists is that strictly speaking they ought to understand instantiation as a five-place relation. Perhaps in contexts where it is safe to assume that the Immutability Thesis or Modal Invariance are valid inferences, we can talk as if an object can simply instantiate a property at a time or a world.[27] However, I think that such talk should

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[27] For example, cases when we can assume that an object is not temporally or contingently identical to something might be cases in which Immutability Thesis and Modal Invariance are valid inferences, respectively.

be understood as shorthand for the relation of instantiation that holds between two objects, a property, and two times or two worlds. It just happens that some instances of the instantiation relation holding are between the same objects, a property, and the same times or same worlds. Another way to understand this is to think of the original three-place instantiation relation as a special case of the proposed five-place instantiation relation.

2.4.4 Relations

Although Gallois does not extend his understanding of instantiation to relations, I think that the following would be plausible candidates for schemas of the instantiation of a two-place relation, given his view of instantiation for monadic properties.

`Instantiation`$_\mathtt{r}$`-at-a-time`$_\mathtt{G}$**:** at t: a stands in R to b just in case $I(a, b, R, t)$

`Instantiation`$_\mathtt{r}$`-at-a-world`$_\mathtt{G}$**:** at w: a stands in R to b just in case $I(a, b, R, w)$

On the proposed expanded notion of instantiation, the schemas for the instantiation of a two-place relation would be the following.

`Instantiation`$_\mathtt{rtG*}$**:** at t: at t': a stands in R to b just in case $\exists x \exists y I(a, x, b, y, R, t, t')$

`Instantiation`$_\mathtt{rwG*}$**:** at w: at w': a stands in R to b just in case $\exists x \exists y I(a, x, b, y, R, w, w')$

As with Instantiation$_{\mathrm{tG}*}$, there is a temptation to read Instantiation$_{\mathrm{rtG}*}$ as follows. Objects a and b at t stand in relation R at t' just in case there exists objects x and y such that a is identical to x and b is identical to y at t and x and y stand in relation R at t'. Similarly, as with Instantiation$_{\mathrm{wG}*}$, there is a temptation to read

Instantiation$_{\text{rwG*}}$ as follows. Objects a and b at w stand in relation R at w' just in case there exists objects x and y such that a is identical to x and b is identical to y at w and x and y stand in relation R at w'. But as with Instantiation$_{\text{tG*}}$ and Instantiation$_{\text{wG*}}$, these readings presuppose the instantiation of relations. Strictly speaking, my proposal is that Occasional Identity and Contingent Identity theorists ought to say that two-place relation instantiation is seven-place.

This can be expanded to n-place relations so that n-place instantiation is (2n+3)-place.

2.5 Return to Transitivity

In this section I argue for a reformulation of Transitivity of Identity in light of the expanded instantiation relation. I start by considering a relation, assumed to be transitive, other than identity. In the next section I show how this reformulation of Transitivity of Identity blocks Bader's objection.

2.5.1 Transitivity of Relations other than Identity

Consider the relation *is to the right of*.[28] Like identity, it is a transitive relation. When (i) an object is to the right of a second object and (ii) the second object is to the right of a third, then the first object is to the right of the third. However, unlike identity, it is neither symmetric nor reflexive. If an object is to the right of a second object, then the second object is not to the right of the first object. Under simplifying

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[28] Further, for the sake of discussion, fix the orientation toward the objects in question.

Figure 2.5: SLIDE, TREE, and POND

assumptions,[29] it is not the case that objects are ever to the right of themselves. So, while transitive like identity, *is to the right of* is not an equivalence relation like identity.

Recall Gallois's original amoeba case (introduced in Chapter 1, §1.5.2 and reviewed above) where the AMOEBA at t_1 divides into POND and SLIDE at t_2. Now imagine, as depicted in Figure 2.5, that between POND and SLIDE at t_2 there is a tree, called TREE, such that POND is to the right of TREE, and TREE is to the right of SLIDE. Given that the relation is transitive, we can correctly infer from the fact that at t_2, POND is to the right of TREE, and that at t_2 TREE is to the right of SLIDE, that at t_2 POND is to the right of SLIDE.

But recall that, because this is a case of amoebic division, at t_2 AMOEBA is SLIDE. So, at t_2, TREE is to the right of AMOEBA. Moreover, at t_2, AMOEBA is POND. So, at t_2, POND is to the right of TREE. So, by the transitivity of *is to the right of*, at

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[29] For example, let us assume for present purposes that the geometry is not curved.

t_2 TREE is to the right of TREE.[30] This is contrary to the assumption that *is to the right of* is never reflexive.

The correct diagnosis of what is going on in the case becomes apparent when we move from the original Occasional Identity understanding of instantiation to one proposed in subsection 2.4.3. Recall that Gallois says that he accepts the following reformulation of the Transitivity of Identity.

`Transitivity of Identity`$_t$`:` $\forall x \forall y \forall z \forall t[(\text{ at } t : x = y \land \text{ at } t: y = z) \rightarrow \text{ at } t : x = z]$

This reformulation says that, for all objects and times, when, at a time, (i) one object is identical to a second object and (ii) the second object is identical to a third object, then, at that time, the first object is identical to the third.

Presumably, he would be prepared to accept the following formulation, where RT is the *is to the right of* relation, of a transitivity principle for *is to the right of*.

`Transitivity of RT`$_t$`:` $\forall x \forall y \forall z \forall t[(\text{ at } t : xRTy \land \text{ at } t: yRTz) \rightarrow \text{ at } t : xRTz]$.

This says that, for all objects and times, when, at a time, (i) one object is to the right of a second and (ii) the second is to the right of a third, then the first object is to the right of the third.

If we, according to Instantiation$_{tG*}$, formulate this principle in terms of instantiation, then the principle would read as follows.

`Transitivity of RT`$_t$`:` $\forall x \forall y \forall z \forall t[(I(x, y, RT, t) \land I(y, z, RT, t)) \rightarrow I(x, z, RT, t)]$

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[30] It is also the case that by transitivity, AMOEBA is to the right of AMOEBA. This is because AMOEBA is POND which is to the right of TREE which is to the right of SLIDE which is identical to AMOEBA.

This says that, for all objects and times, when (i) the instantiation relation holds between one object, a second object, the relation *is to the right of*, and a time, and (ii) the instantiation relation holds between the second object, a third object, the *is to the right of* relation, and the same time, then the instantiation relation holds between the first object, the third object, the relation *is to the right of*, and the same time.

An instance of Transitivity of RT_t involving SLIDE, TREE, and POND is:

A: $[I(\text{POND}, \text{TREE}, RT, t_2) \wedge I(\text{TREE}, \text{SLIDE}, RT, t_2)] \to I(\text{POND}, \text{SLIDE}, RT, t_2)$

This says that when (i) the instantiation relation holds between POND, TREE, the relation *is to the right of*, and t_2, and (ii) the instantiation relation holds between TREE, SLIDE, the *is to the right of* relation, and t_2, then the instantiation relation holds between POND, SLIDE, the relation *is to the right of*, and t_2. And in the case we imagined, both conjuncts of the antecedent are true. The instantiation relation holds between POND, TREE, the relation *is to the right of*, and t_2 because the case says that, at t_2, POND is to the right of TREE. And the instantiation relation holds between TREE, SLIDE, the relation *is to the right of*, and t_2 because the case says that, at t_2, TREE is to the right of SLIDE.

Since the antecedent is true, then we can infer from it and the conditional that the instantiation relation holds between POND, SLIDE, the relation *is to the right of*, and t_2. This is true according to the case because POND is to the right of SLIDE at t_2.

However, consider the following instance of Transitivity of RT_t.

B: $[I(\text{TREE}, \text{AMOEBA}, RT, t_2) \wedge I(\text{AMOEBA}, \text{TREE}, RT, t_2)] \to I(\text{TREE}, \text{TREE}, RT, t_2)$

This says that when (i) the instantiation relation holds between TREE, AMOEBA, the relation *is to the right of*, and t_2, and (ii) the instantiation relation holds between AMOEBA, TREE, the *is to the right of* relation, and t_2, then the instantiation relation holds between TREE, TREE, the relation *is to the right of*, and t_2. And in the case we imagined, both conjuncts of the antecedent are true. The instantiation relation holds between TREE, AMOEBA, the relation *is to the right of*, and t_2 because the case says that, at t_2, TREE is to the right of AMOEBA in virtue of AMOEBA being SLIDE at t_2. And the instantiation relation holds between AMOEBA, TREE, the relation *is to the right of*, and t_2 because the case says that, at t_2, AMOEBA is to the right of TREE in virtue of AMOEBA being POND at t_2.

Since the antecedent is true, we can infer from it and the conditional that the instantiation relation holds between TREE, TREE, the relation *is to the right of*, and t_2. However, unlike the consequent of **A**, this, the consequent of **B**, is false according to the case because TREE is not to the right of itself at t_2 (as no object is to the right of itself).

Reformulating the transitivity of *is to the right of* in terms of the five-place instantiation relation suggested in subsection 2.4.3, allows us to validly infer an analog to the consequent of **A**, without inferring that the analog of the consequent of **B** is true.

The following is a first pass at the reformulation.

Transitivity of RT_{te}:

$\forall x \forall y \forall z \forall t[(\exists x_1 \exists y_1 I(x, x_1, y, y_1, RT, t, t) \land \exists y_2 \exists z_2 I(y, y_2, z, z_2, RT, t, t))$
$\rightarrow \exists x_3 \exists z_3 I(x, x_3, z, z_3, RT, t, t)]$

This reformulation says, for all objects x, y, and z, and for all times t, when (i) there exists two objects x_1 and y_1 such that the instantiation relation holds between x, x_1, y, y_1, the relation *is to the right of*, t, and t, and (ii) there exists two objects y_2 and z_2 such that the instantiation relation holds between y, y_2, z, z_2, the relation *is to the right of*, t, and t, then there exists two objects x_3 and z_3 such that the instantiation relation holds between x, x_3, z, z_3, the relation *is to the right of*, t, and t.

According to the case, both $I(\textsc{Pond}, \textsc{Pond}, \textsc{Tree}, \textsc{Tree}, RT, t_2, t_2)$ and $I(\textsc{Tree}, \textsc{Tree}, \textsc{Slide}, \textsc{Slide}, RT, t_2, t_2)$ are the case. For to understand $\textsc{Pond}$ being to the right of $\textsc{Tree}$ at t_2 in terms of the five-place instantiation relation is to say that the instantiation relation holds between $\textsc{Pond}$, $\textsc{Pond}$, $\textsc{Tree}$, $\textsc{Tree}$, the relation *is to the right of*, t_2, and t_2. And to understand $\textsc{Tree}$ being to the right of $\textsc{Slide}$ at t_2 in terms of the five-place instantiation relation is to say that the instantiation relation holds between $\textsc{Tree}$, $\textsc{Tree}$, $\textsc{Slide}$, $\textsc{Slide}$, the relation *is to the right of*, t_2, and t_2. This satisfies both conjuncts in an instance of Transitivity of RT_{te}, so we can conclude $\exists x \exists y I(Pond, x, Slide, y, RT, t_2, t_2)$. This inference gets the case right since $I(\textsc{Pond}, \textsc{Pond}, \textsc{Slide}, \textsc{Slide}, RT, t_2, t_2)$ is true. This is because $\textsc{Pond}$ being to the right of $\textsc{Slide}$ at t_2 understood in terms of the five-place instantiation relation is the instantiation relation holding between $\textsc{Pond}$, $\textsc{Pond}$, $\textsc{Slide}$, $\textsc{Slide}$, the relation *is to the right of*, t_2, and t_2.

Additionally, both $I(\textsc{Tree}, \textsc{Tree}, \textsc{Amoeba}, \textsc{Slide}, RT, t_2, t_2)$ and $I(\textsc{Amoeba}, \textsc{Pond}, \textsc{Tree}, \textsc{Tree}, RT, t_2, t_2)$ hold according to the case. This is because $\textsc{Tree}$ is to the right of $\textsc{Amoeba}$ at t_2 in virtue of $\textsc{Amoeba}$ being $\textsc{Slide}$ at t_2, and $\textsc{Amoeba}$ is to the right of $\textsc{Tree}$ at t_2 in virtue of $\textsc{Amoeba}$ being $\textsc{Pond}$ at

t_2. This satisfies both conjuncts in the antecedent of an instance of Transitivity of $\mathrm{RT_{te}}$, we can conclude $\exists x \exists y I(\textsc{Tree}, x, \textsc{Tree}, y, RT, t_2, t_2)$. But there is no x and y such that the instantiation relation holds between $\textsc{Tree}$, x, $\textsc{Tree}$, y, RT, t_2, and t_2. That is to say, $\textsc{Tree}$ is not to the right of itself.

This shows that Transitivity of $\mathrm{RT_{te}}$ does not capture the transitivity of *is to the right of* because different objects might satisfy the variables y_1 and y_2 bound by their respective existential quantifiers. If identities are never occasional or contingent, this would not be an issue. If objects were never occasionally or contingently distinct, there would never be distinct objects to satisfy y_1 and y_2. However, the example of $\textsc{Slide}$, $\textsc{Tree}$, and $\textsc{Pond}$ shows us that what we might call the 'intermediate' object in an instance of transitivity serves as the intermediate object in virtue of being distinct objects at t_2. $\textsc{Amoeba}$ serves as the intermediate object in the first conjunct of the antecedent of an instance of Transitivity of $\mathrm{RT_{te}}$ in virtue of being $\textsc{Pond}$ at t_2. But then it serves as the intermediate object in the second conjunct of the antecedent of Transitivity of $\mathrm{RT_{te}}$ in virtue, not of being $\textsc{Pond}$, but of being $\textsc{Slide}$ at t_2.

To properly formulate a transitivity principle for *is to the right of*, we need to bind the pair y_1 and y_2 to a single existential quantifier. Here is such a formulation:

Transitivity of $\mathrm{RT_{te*}}$:

$\forall x \forall y \forall z \forall t [\exists x_1 \exists y_1 \exists z_1 [I(x, x_1, y, y_1, RT, t, t) \wedge I(y, y_1, z, z_1, RT, t, t)]$

$\to \exists x_2 \exists z_2 I(x, x_2, z, z_2, RT, t, t)]$[31]

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[31] It might be suggested that we should also bind x_1 and x_2 to the same quantifier, and further, bind z_1 and $z2$ to the same quantifier. Although I do not think a counterexample demonstrating the inadequacy of this current formulation is forthcoming, I do not see why such a reformulation that binds those variables would be objectionable.

This reformulation says, for all objects x, y, and z, and for all times t, when there exists objects x_1, y_1, and z_1 such that (i) the instantiation relation holds between x, x_1, y, y_1, the relation *is to the right of*, t, and t, and (ii) the instantiation relation holds between y, y_1, z, z_1, the relation *is to the right of*, t, and t, then there exists objects x_2 and z_2 such that the instantiation relation holds between x, x_2, z, z_2, the relation *is to the right of*, t, t.

This formulation allows us to make the correct inference about the case (that, roughly speaking, POND is to the right of SLIDE), without making the incorrect one (that, roughly speaking, TREE is to the right of TREE). This is because $I(\text{POND}, \text{POND}, \text{TREE}, \text{TREE}, RT, t_2, t_2)$ and $I(\text{TREE}, \text{TREE}, \text{SLIDE}, \text{SLIDE}, RT, t_2, t_2)$ hold and satisfy the antecedent of an instance of Transitivity of $\text{RT}_{\text{te}*}$, and $I(\text{POND}, \text{POND}, \text{SLIDE}, \text{SLIDE}, RT, t_2, t_2)$ holds, which satisfies the consequent of that instance of Transitivity of $\text{RT}_{\text{te}*}$. However, $I(\text{TREE}, \text{TREE}, \text{AMOEBA}, \text{SLIDE}, RT, t_2, t_2)$ and $I(\text{AMOEBA}, \text{POND}, \text{TREE}, \text{TREE}, RT, t_2, t_2)$ do not satisfy the antecedent of Transitivity of $\text{RT}_{\text{te}*}$ because SLIDE and POND are distinct objects. This prevents the inference to $I(\text{TREE}, \text{TREE}, \text{TREE}, \text{TREE}, RT, t_2, t_2)$.

2.5.2 Generalization

Transitivity of $\text{RT}_{\text{te}*}$ suggests the general form that transitivity principles ought to take given the expanded notion of instantiation. Here are the schemas for the temporal and modal versions of transitivity where 'R' is the relation in question:

Transitivity of R_te*:

$$\forall x \forall y \forall z \forall t [\exists x_1 \exists y_1 \exists z_1 [I(x, x_1, y, y_1, R, t, t) \land I(y, y_1, z, z_1, R, t, t)] \rightarrow$$

$$\exists x_2 \exists z_2 I(x, x_2, z, z_2, R, t, t)]$$

Transitivity of R_we*:

$$\forall x \forall y \forall z \forall w [\exists x_1 \exists y_1 \exists z_1 [I(x, x_1, y, y_1, R, w, w) \land I(y, y_1, z, z_1, R, w, w)] \rightarrow$$
$$\exists x_2 \exists z_2 I(x, x_2, z, z_2, R, w, w)]$$

Transitivity of R_{te*} says that, for all objects x, y, and z, and for all times t, when there exists objects x_1, y_1, and z_1 such that (i) the instantiation relation holds between x, x_1, y, y_1, the relation R, t, and t, and (ii) the instantiation relation holds between y, y_1, z, z_1, the relation R, t, and t, then there exists objects x_2 and z_2 such that the instantiation relation holds between x, x_2, z, z_2, the relation R, t, t.

Similarly, Transitivity of R_{we*} says that, for all objects x, y, and z, and for all worlds w, when there exists objects x_1, y_1, and z_1 such that (i) the instantiation relation holds between x, x_1, y, y_1, the relation R, w, and w, and (ii) the instantiation relation holds between y, y_1, z, z_1, the relation R, w, and w, then there exists objects x_2 and z_2 such that the instantiation relation holds between x, x_2, z, z_2, the relation R, w, w.

With the general forms of transitivity, we can specify the temporal and modal reformulation of Transitivity of Identity as follows.

Transitivity of Identity_te*:

$$\forall x \forall y \forall z \forall t [\exists x_1 \exists y_1 \exists z_1 [I(x, x_1, y, y_1, =, t, t) \land I(y, y_1, z, z_1, =, t, t)] \rightarrow$$
$$\exists x_2 \exists z_2 I(x, x_2, z, z_2, =, t, t)]$$

Transitivity of Identity_we*:

$$\forall x \forall y \forall z \forall w [\exists x_1 \exists y_1 \exists z_1 [I(x, x_1, y, y_1, =, w, w) \land I(y, y_1, z, z_1, =, w, w)] \rightarrow$$
$$\exists x_2 \exists z_2 I(x, x_2, z, z_2, =, w, w)]$$

Transitivity of Identity$_{\text{te}*}$ says that, for all objects x, y, and z, and for all times t, when there exists objects x_1, y_1, and z_1 such that (i) the instantiation relation holds between x, x_1, y, y_1, identity, t, and t, and (ii) the instantiation relation holds between y, y_1, z, z_1, identity, t, and t, then there exists objects x_2 and z_2 such that the instantiation relation holds between x, x_2, z, z_2, identity, t, t.

Similarly, Transitivity of Identity$_{\text{we}*}$ says that, for all objects x, y, and z, and for all worlds w, when there exists objects x_1, y_1, and z_1 such that (i) the instantiation relation holds between x, x_1, y, y_1, identity, w, and w, and (ii) the instantiation relation holds between y, y_1, z, z_1, identity, w, and w, then there exists objects x_2 and z_2 such that the instantiation relation holds between x, x_2, z, z_2, identity, w, w.

The next section shows how these reformulations of Transitivity of Identity based on the expanded notion of instantiation provide a reply to Bader's objections to Occasional Identity and Contingent Identity.

2.6 Replying to Bader

Recall Bader's objections to Occasional Identity and Contingent Identity, respectively:

3.1. $\forall x \forall y \forall z \forall t[($ at $t : x = y \wedge$ at t: $y = z) \rightarrow$ at $t : x = z]$ (assumption for reductio).

3.2. at $t_1 : a = c \wedge$ at t_1: $c = e \wedge$ at $t_1 : a \neq e$ (from the case)

3.3. (at $t_1 : a = c \wedge$ at t_1: $c = e) \rightarrow$ at $t_1 : a = e$ (instance of 3.1).

3.4. at $t_1 : a = e \wedge$ at $t_1 : a \neq e$ (from 3.2 and 3.3, a contradiction).

3.5. $\neg \forall x \forall y \forall z \forall t[($ at $t : x = y \wedge$ at t: $y = z) \rightarrow$ at $t : x = z]$ (the negation of Transitivity of Identity$_t$).

and

4.1. $\forall x \forall y \forall z \forall w[($ at $w : x = y \land$ at w: $y = z) \rightarrow$ at $w : x = z]$ (assumption for reductio).

4.2. at $w_1 : a = c \land$ at w_1: $c = e \land$ at $w_1 : a \neq e$ (from the case).

4.3. (at w_1: $a = c \land$ at w_1: $c = e) \rightarrow$ at $w_1 : a = e$ (instance of 4.1).

4.4. at $w_1 : a = e \land$ at w_1: $a \neq e$ (from 4.2 and 4.3, a contradiction).

4.5. $\neg \forall x \forall y \forall z \forall w[($ at $w : x = y \land$ at w: $y = z) \rightarrow$ at $w : x = z]$ (the negation of Transitivity of Identity$_w$).

Here they are formulated with Transitivity of Identity$_{te*}$ and Transitivity of Identity$_{we*}$ and the expanded five-place instantiation relation.

3.1* $\forall x \forall y \forall z \forall t[\exists x_1 \exists y_1 \exists z_1[I(x, x_1, y, y_1, =, t, t) \land I(y, y_1, z, z_1, =, t, t)] \rightarrow$
$\exists x_2 \exists z_2 I(x, x_2, z, z_2, =, t, t)]$ (assumption for reductio).

3.2* $I(a, b, c, b, =, t_1, t_1) \land I(c, d, e, d, =, t_1, t_1) \land \neg \exists x \exists z I(a, x, e, z, =, t_1, t_1)$ (from the case).

3.3* $\exists x_1 \exists y_1 \exists z_1[I(a, x_1, c, y_1, =, t_1, t_1) \land I(c, y_1, e, z_1, =, t_1, t_1)] \rightarrow$
$\exists x_2 \exists z_2 I(a, x_2, e, z_2, =, t_1, t_1)$ (an instance of 3.1*).

3.4* $\exists x \exists z I(a, x, e, z, =, t_1, t_1) \land \neg \exists x \exists z I(a, x, e, z, =, t_1, t_1)$ (from 3.2* and 3.3*, a contradiction).

3.5* $\neg \forall x \forall y \forall z \forall t[\exists x_1 \exists y_1 \exists z_1[I(x, x_1, y, y_1, =, t, t) \land I(y, y_1, z, z_1, =, t, t)] \rightarrow$
$\exists x_2 \exists z_2 I(x, x_2, z, z_2, =, t, t)]$ (the negation of Transitivity of Identity$_{te*}$).

and

4.1* $\forall x \forall y \forall z \forall w [\exists x_1 \exists y_1 \exists z_1 [I(x, x_1, y, y_1, =, w, w) \land I(y, y_1, z, z_1, =, w, w)] \rightarrow$

$\exists x_2 \exists z_2 I(x, x_2, z, z_2, =, w, w)]$ (assumption for reductio).

4.2* $I(a, b, c, b, =, w_1, w_1) \land I(c, d, e, d, =, w_1, w_1) \land \neg \exists x \exists z I(a, x, e, z, =, w_1, w_1)$ (from

the case).

4.3* $\exists x_1 \exists y_1 \exists z_1 [I(a, x_1, c, y_1, =, w_1, w_1) \land I(c, y_1, e, z_1, =, w_1, w_1)] \rightarrow$

$\exists x_2 \exists z_2 I(a, x_2, e, z_2, =, w_1, w_1)$ (an instance of 4.1*).

4.4* $\exists x \exists z I(a, x, e, z, =, w_1, w_1) \land \neg \exists x \exists z I(a, x, e, z, =, w_1, w_1)$ (from 4.2* and 4.3*, a

contradiction)

4.5* $\neg \forall x \forall y \forall z \forall w [\exists x_1 \exists y_1 \exists z_1 [I(x, x_1, y, y_1, =, w, w) \land I(y, y_1, z, z_1, =, w, w)] \rightarrow$

$\exists x_2 \exists z_2 I(x, x_2, z, z_2, =, w, w)]$ (the negation of Transitivity of Identity$_{we*}$.)

The arguments with the reformulated versions of the Transitivity of Identity are
not valid. In particular, the inference from lines 2 and 3 to line 4 in each is not valid.
This is because the first two conjuncts in lines 2 do not make the antecedent in line
3 true. This is because b and d are not the same at t_1 or w_1, and thereby cannot
thereby satisfy the variable y_1 bound by the second existential quantifier in line 3.
Here are lines 3.2* and 4.2* repeated with the distinct objects b and b bolded to show
that they cannot satisfy the variable y_1:

3.2* $I(a, b, c, \mathbf{b}, =, t_1, t_1) \land I(c, \mathbf{d}, e, d, =, t_1, t_1) \land \neg \exists x \exists z I(a, x, e, z, =, t_1, t_1)$

4.2* $I(a, b, c, \mathbf{b}, =, w_1, w_1) \land I(c, \mathbf{d}, e, d, =, w_1, w_1) \land \neg \exists x \exists z I(a, x, e, z, =, w_1, w_1)$

While the second conjunct in each line 4 is true, the first is not.

The second simply follows from the case in which we assume there are no objects x and z such that the instantiation relation holds between a, x, e, z, identity, t_1 or w_1, and t_1 or w_1. Roughly, there are no objects in virtue of which a and e are identical at t_1 or w_2.

The first says that there are objects x and z such that the instantiation relation holds between a, x, e, z, identity, t_1 or w_1, and t_1 or w_1. But as we have seen, we cannot infer this from instances of Transitivity of Identity$_{te*}$ and Transitivity of Identity$_{we*}$ because the antecedents of those conditionals are not satisfied. So, no contradictions are derived.

The reformulations expose how Bader's objections worked. They trade one identity in the first conjunct of the antecedents in transitivity principles for another identity in the second conjunct. These formulations force the identities to be the same.

To respond to Bader's objections, defenders of Occasional Identity and Contingent Identity should adopt the reformulations of Transitivity of Identity I have proposed.[32] Reformulating Principles of Identity is consistent with the strategy that Gallois has already employed to respond to objections to his view. Further, they are formulated in light of his own views about property instantiation and about temporally and modally indexed properties. Bader is right to point out that the formulations of transitivity that he considers are inadequate given the possibility of simultaneous fissions and fusion. However, he has failed to show that Occasional Identity and Contingent

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[32] Moreover, they ought to, in light of the discussion of *is to the right of*, formulate all transitivity principles using the expanded notion of instantiation.

Identity theorists cannot provide adequate reformulations of the Transitivity of Identity. Arguably, there are many theoretical costs for adopting Occasional Identity and Contingent Identity, but inadequacy of reformulating Transitivity of Identity is not among them.

Chapter 3:   Indeterminate Identity and Ghost Ships

Recall that Indeterminate Identity is the view that it is possible that it is indeterminate that the identity relation holds of some objects (see Chapter 1, §1.2.2). As explained earlier (see Chapter 1, §1.5.1), Indeterminate Identity has been advanced as a view that provides a solution to classic puzzles about identity like SHIP OF THESEUS. The solution is a Principle-Rejecting Strategy. In §3.1, I present how proponents of Indeterminate Identity solve the puzzle. In §3.2, I present an overlooked consequence of the solution. In §3.3, I argue that this consequence leads to unintuitive results.

3.1   Solving SHIP OF THESEUS

3.1.1   SHIP OF THESEUS

SHIP OF THESEUS, introduced in Chapter 1, §1.5.1, is a puzzle about identity when parts are replaced. For simplicity, we can imagine that every part of a ship, called ORIGINAL SHIP, is a plank and that planks are replaced one each day until the ship is made entirely of replacement planks. This ship was named REPLACEMENT SHIP. Further, the case has us imagine that a distinct ship was constructed from the original planks. This ship was called REASSEMBLY SHIP.

The puzzle is generated by accepting the following intuitions:

`Replacement Survival`   Objects like a ship can survive the replacement of a single part. That is, by replacing one part, there is not a distinct object that comes into existence.

`Reassembly Survival`   Objects like a ship can survive the disassembling and re-assembling of their parts. That is, by rearranging the parts of an object and putting them back into their original arrangement, a new object does not come into existence.[1,2]

These cannot both be true, because ORIGINAL SHIP cannot simultaneously be identical to two distinct ships at the end.

Alternatively, one might have the intuition that there is no good answer to the question: which ship is ORIGINAL SHIP identical to? It is this intuition that Terence Parsons and Peter Woodruff think that they capture by proposing both that it is indeterminate that ORIGINAL SHIP is identical to REASSEMBLY SHIP and that it is

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[1] There is a question about what to say of the object after disassembly, but before reassembly. I think that one could say at least two things. One thing to say is that the object goes out of existence and later comes back into existence. Another thing to say is that the object exists as a scattered object.

When presented by Parsons (2000, §1), these intuitions are classified as judgements that we tend to make about these types of cases. Later Parsons presents a methodological constraint on the Indeterminate Identity project. He says that he will "begin with ordinary beliefs, which I will reject only if some reason is found to challenge them" (p. 6). It is unclear if rejecting the intuitions I have identified necessarily runs up against this methodological constraint. The reason is that, if the Indeterminate Identity solution to the puzzle is true, then one might not be required to reject them in a strong sense. That is, one might think that it is indeterminate that the intuitions are true, even if one thinks that they are not determinately true.

[2] By saying that ORIGINAL SHIP is identical to the REASSEMBLY SHIP and distinct from REPLACE-MENT SHIP, one accepts Reassembly Survival and rejects Replacement Survival. By saying that ORIGINAL SHIP is identical to the ship REPLACEMENT SHIP and distinct from REASSEMBLY SHIP, one accepts Replacement Survival and rejects Reassembly Survival. By saying that ORIGINAL SHIP is distinct from both ships, one rejects both intuitions. This last position might be motivated by thinking that there is no reason to prefer one intuition over the other.

is indeterminate that ORIGINAL SHIP is identical to REASSEMBLY SHIP (Woodruff and Parsons 1995, p. 172). SHIP OF THESEUS is one of several puzzles for which they think that the view can provide solutions.[3] In the following subsections, I briefly present the logic that accompanies their defense of Indeterminate Identity before showing their solution to the puzzle.

3.1.2 Indeterminate Identity

Indeterminate Identity (at least the view advanced by Parsons and Woodruff)[4] is a view on which the world is such that it might be indeterminate that some object is identical to another.[5] The view is also committed to the following claims:

`Indeterminate States of Affairs`   Possibly there is a state of affairs such that it is indeterminate that the state of affairs holds.

`Indeterminate Instantiation`   Possibly there is an object and a property such that it is indeterminate that the object instantiates the property.[6]

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[3]   See Parsons (2000, §1.4) for a list of puzzles.

[4]   The view is first defended by Parsons (1987). Subsequent defenses of the view are given by Woodruff and Parsons (1995, 1997, 1999). Later, Parsons (2000) gives the most extensive defense of the view. Because it is the most recent and thorough defense, most references will be to the version of Indeterminate Identity articulated there.

[5]   It is not the view that explains all indeterminacy about identity in terms of our epistemic position as to whether or not some things are identical (Parsons 2000, §2.7). The indeterminacy is metaphysical, not merely epistemic.

[6]   Additionally, Parsons argues that his account of Indeterminate Identity ought to be contrasted with views on which identity is vague. He gives several reasons for this (Parsons 2000, §2.7). Some of these reasons suggest that the distinction is useful only insofar as it prevents others from attributing to him claims commonly associated with vagueness. Here, I do not address the question as to whether there is a substantive or merely verbal distinction to be made.

Following Parsons, '!' is the determinate operator and '∇' is the indeterminate operator.[7] Where Φ is a sentence expressing a proposition:

'!Φ' expresses that it is determinate that Φ,

'!$\neg\Phi$' expresses that it is determinate that not Φ, and

'$\nabla\Phi$' expresses that it is indeterminate that Φ.

Indeterminacy can be defined in terms of determinacy.

$\nabla\Phi =_{df} \neg!\Phi \wedge \neg!\neg\Phi$ (read "it is indeterminate that Φ just in case it is neither determinate that Φ nor determinate that not Φ.")

And with objects a and b:

'!$(a = b)$' expresses that it is determinate that a is identical to b,

'!$\neg(a = b)$' expresses that it is determinate that a and b are distinct, and

'$\nabla(a = b)$' expresses that it is indeterminate that a is identical to b.

The form of Leibniz's Law accepted by Indeterminate Identity theorists is the following biconditional:

$!(a = b) \leftrightarrow \forall F!(Fa \leftrightarrow Fb)$.[8]

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[7] What follows is adapted from the logic and semantics for Indeterminate Identity given by Parsons (2000, Chap. 2).

[8] This presentation departs somewhat from Parsons's presentation. He reserves the term 'Leibniz's Law' for the related substitution rule in the left-to-right direction of the biconditional (Parsons 2000, Chap. 2, §6). However, he accepts this biconditional as a definition of determinate identity (Parsons 2000, Chap. 2, §3).

That is, Indeterminate Identity theorists claim that two objects are determinately identical just in case, for all properties, it is determinate that one object has that property exactly when the other does.

Given the semantics for conditionals, it will be the case that two objects are indeterminately identical just in case it is indeterminate that they share the same properties.[9] As I mentioned in Chapter 1, §1.4.1, the coherence of Indeterminate Identity has been debated. While here I assume the view is coherent, I raise concerns about its empirical adequacy.

3.1.3 The Solution

The solution that Parsons (2000, pp. 42–3) presents is the following:

1. $!\neg$(Replacement Ship = Reassembly Ship)

2. ∇(Replacement Ship = Original Ship)

3. ∇(Original Ship = Reassembly Ship)

According to 1, Replacement Ship and Reassembly Ship are determinately distinct. According to 2, it is indeterminate that Original Ship is identical to

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[9] It is more precise to say: It is indeterminate that two objects are identical just in case it is indeterminate that they share and lack the same properties. For example, when, for objects A and B, (i) they have all the same properties, except for property P, (ii) A has P, and (iii) it is indeterminate that B does, they are indeterminately identical. Similarly, when, for objects A and B, (i) they have all the same properties, except for property P, (ii) A lacks P, (iii) and it is indeterminate that B does, they are indeterminately identical. For readability, in what follows I will take 'indeterminately identical' to mean 'it is indeterminate that two objects are identical', and 'indeterminate that they share the same properties' to mean 'indeterminate that they share and lack the same properties'. See Parsons 2000, Chap. 3 for a thorough presentation of the Indeterminate Identity theorist's version of Leibniz's Law. See Parsons 2000, Chap. 2, §4 for the semantics of the conditional.

Replacement Ship. According to 3, it is indeterminate that Original Ship is identical to Reassembly Ship. Here I grant that this is a coherent solution to the puzzle.

I note two things about the solution before moving on to the argument regarding, what I will call, the Ghost Ships.

First, the Indeterminate Identity theorist reformulates Transitivity of Identity. According to the Indeterminate Identity theorist, the following principle is true:

$$\forall x \forall y \forall z [(!(x = y) \wedge !(y = z)) \rightarrow !(x = z)]$$

That is, they hold that, for all objects, if it is determinate that one object is identical to a second and it is determinate that the second object is identical to a third object, then it is determinate that the first object is identical to the third. But the Indeterminate Identity theorist does not think the following principle holds:

$$\forall x \forall y \forall z [(\nabla(x = y) \wedge \nabla(y = z)) \rightarrow \nabla(x = z)]$$

That is, they do not hold that, for all objects, if it is indeterminate that one object is identical to second and it is indeterminate that the second object is identical a third object, then it is indeterminate that the first object is identical to the third object. Otherwise 2 and 3 would imply that it is indeterminate that Replacement Ship is identical to Reassembly Ship. This would contradict 1.[10]

Second, there are no planks with respect to which Original Ship and Replacement Ship determinately differ. Although this might strike some as obviously false,

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[10] See Parsons 2000, p. 37, pp. 42–3 for more on transitivity.

it follows directly from the proposed solution to the puzzle. When things are indeterminately identical, it is indeterminate that they share all the same properties. This means that they cannot determinately differ on some property. The solution does not say that at the beginning of the replacement process, say t_0, that ORIGINAL SHIP has all the planks that are part of REPLACEMENT SHIP at the end, say at t_{1000}. Rather, it is says of ORIGINAL SHIP that, at t_{1000}, for each plank REPLACEMENT SHIP determinately has at t_{1000}, it is indeterminate that ORIGINAL SHIP has that plank. Similarly, but in reverse, for REPLACEMENT SHIP. The solution says of REPLACEMENT SHIP that, at t_0, for each plank ORIGINAL SHIP determinately has at t_0, it is indeterminate that REPLACEMENT SHIP has that plank. To claim that there exists a plank with respect to which ORIGINAL SHIP and REPLACEMENT SHIP determinately differ is to reject the solution proposed by Indeterminate Identity theorists, and perhaps to question or reject Indeterminate Identity altogether.[11]

3.2   Ghost Ships

In this section I present an overlooked implication of this solution to the puzzle. The implication is what the solution says for ships between ORIGINAL SHIP and REPLACEMENT SHIP. Let these be the ghost ships.[12]

Recall that planks are replaced one each day. For precision, let us stipulate that the ship is made of 1,000 planks. Let us rename the ships to correspond to how many

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[11]   A previous formulation of this interpreted the claim about whether the ships shared the other's planks as a case in which it was indeterminate whether they shared all of the other's planks. Thank you to Julia Jorati for identifying this error.

[12]   The name is due to Ben Caplan.

replacement planks they have as parts. So let ORIGINAL SHIP be SHIP_0 and RE-PLACEMENT SHIP be SHIP_{1000}. Thus far, the ghost ships (SHIP_1, SHIP_2, ..., SHIP_{999}) have been ignored.[13]

For pairs of ghost ships SHIP_N and SHIP_{N+1} for n between 0 and 999 we can ask if these pairs are determinately identical, determinately distinct, or indeterminately identical? I provide an argument for why Parsons should opt for the third option. I first present it informally, then I present it formally, and finally I elaborate on some steps in the argument.

Recall that one type of solution that I identified in §1.5.1 was Privileged Change Counts. There I distinguished the Indeterminate Identity solution to the puzzle from Privileged Change Counts strategies. Below I argue below that the Indeterminate Identity theorist ought to reject the existence of a privileged plank. Without a privileged plank, the identity facts for each sequential pair of ghost ships generalizes.

Without a privileged plank, it is either the case that (i) every sequential pair is determinately identical, (ii) every sequential pair is determinately distinct, or (iii) every sequential pair is indeterminately identical. If every sequential pair is determinately identical, then, by the transitivity of determinate identity, SHIP_0 and SHIP_{1000} are, contrary to the proposed solution, determinately identical.[14] If every sequential pair is determinately distinct, then, by Leibniz's Law, they differ with respect to at least one property. This would imply, as argued below, that there is at least one

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[13] This is not to say that there are 1001 numerically distinct ships involved. According to Indeterminate Identity, it is indeterminate how many ships there are. For more on counting and indeterminate identity, see Parsons 2000, Chap. 8.

[14] This is because SHIP_0 is ORIGINAL SHIP and REPLACEMENT SHIP is SHIP_{1000}, and the proposed solution is that it is indeterminate that ORIGINAL SHIP and REPLACEMENT SHIP are identical, not that it is determinate that they are identical.

property with respect to which SHIP_0 and SHIP_{1000} differ. However, this contradicts the assumption that, by the Indeterminate Identity version of Leibniz's Law, it is indeterminate that they have all properties in common. Thus, the Indeterminate Identity theorist should accept that each sequential pair is indeterminately identical. Here is a formal version of this argument:

1. $\nabla\ \text{SHIP}_0 = \text{SHIP}_{1000}$ (the Indeterminate Identity theorist's solution to the puzzle).

2. There is no privileged plank.

3. For arbitrary n between 0 and 999, either $!(\text{SHIP}_N = \text{SHIP}_{N+1})$, $!\neg(\text{SHIP}_N = \text{SHIP}_{N+1})$, or $\nabla(\text{SHIP}_N = \text{SHIP}_{N+1})$.

    4. Assume for reductio: $!(\text{SHIP}_N = \text{SHIP}_{N+1})$.

    5. By 2 and 4, every sequential pair in the series is determinately identical.

    6. By 5 and the transitivity of determinate identity, for every n, m such that $0 \leq n \leq 100$ and $0 \leq m \leq 1000$, $!(\text{SHIP}_N = \text{SHIP}_M)$. That is, every pair (sequential or not) in the series is determinately identical.

    7. By 6, $!(\text{SHIP}_0 = \text{SHIP}_{1000})$.

    8. 7 contradicts 1.

9. From 4–8, $\neg!(\text{SHIP}_N = \text{SHIP}_{N+1})$.

    10. Assume for reductio: $!\neg(\text{SHIP}_N = \text{SHIP}_{N+1})$.

11. By Leibniz's Law and 10, there is some property on which SHIP_N and $\text{SHIP}_\text{N+1}$ determinately disagree.[15]

12. From the case and 11, SHIP_N and $\text{SHIP}_\text{N+1}$ intrinsically only differ with respect to a pair of planks.

13. From 12, SHIP_N and $\text{SHIP}_\text{N+1}$ determinately differ with respect to having the pair of planks.[16]

14. From a plausible interpretation of the case[17] and 13, SHIP_0 and SHIP_{1000} also determinately differ with respect to this pair of planks.

15. From 1, there is no pair of planks on which SHIP_0 and SHIP_{1000} determinately differ.[18]

16. Contradiction between 14 and 15.

17. From 10–16, $\neg!\neg(\text{SHIP}_\text{N} = \text{SHIP}_\text{N+1})$.

18. Therefore, from 3, 9, and 17, for arbitrary n between 0 and 999, $\triangledown(\text{SHIP}_\text{N} = \text{SHIP}_\text{N+1})$.

I will now comment on the steps in the argument.

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[15] This is to say that there is some property such that either SHIP_N determinately has it and $\text{SHIP}_\text{N+1}$ determinately lacks it, or SHIP_N determinately lacks it and $\text{SHIP}_\text{N+1}$ determinately has it.

[16] That is, one of the planks is such that one ship determinately has it while the other determinately lacks it, and the other plank is such that the other ship determinately has it while the one determinately lacks it.

[17] This is articulated below.

[18] See subsection 3.1.3 above for the explanation of why this is the case.

First, at 9 and 17 the argument relies on a version of indirect proof that is valid for the non-classical logic accompanying Indeterminate Identity (Parsons 2000, p. 24).

I take 2 to be an implicit assumption of the Indeterminate Identity's solution to SHIP OF THESEUS. If there were planks that made a difference for the identity of the ship, then one could appeal to these privileged planks to explain why at some point in the replacement process Theseus has a new ship that is determinately distinct from his original ship. That is, one could provide a Privileged Change Counts solution to the puzzle. An Indeterminate Identity theorist could accept the existence of privileged planks and still appeal to Indeterminate Identity in solving the puzzle. However, this reduces the extent to which the ability to provide a solution to the puzzle justifies denying Determinacy of Identity. This is because, on this proposal, the falsity of Determinacy of Identity does not fully explain the data from SHIP OF THESEUS. It requires adopting Privileged Change Counts as well.

The truth of 3 is not obvious without reflecting on the non-classical logic accompanying the theory of Indeterminate Identity, a logic that rejects the Law of the Excluded Middle (Parsons 2000, p. 25). In classical logic, a proposition might be either true or false. But, according to Indeterminate Identity, it might have an indeterminate truth status (that is, be neither true nor false).[19] I understand 3 to be the Indeterminate Identity analog of the Law of the Excluded Middle. Because it might be indeterminate that a state of affairs holds, I take it that it is a logical truth for the Indeterminate Identity theorist that, for any state of affairs, it determinately obtains,

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[19] So strictly speaking, the logic Parsons adopts for Indeterminate Identity is bivalent; there are only two truth *values*. But, according to him, propositions might have the truth *status* of lacking a truth value. See Parsons 2000, §2.4 for more on this. Even if this distinction between truth values and statuses is illusory, I think that my contention, that Indeterminate Identity theorists ought to hold an analog of the Law of the Excluded Middle, stands.

it determinately fails to obtain, or it is indeterminate that it obtains. By eliminating two of the three possible truth statuses for a given proposition, one can validly infer the remaining status.

Steps 4–9 eliminate the possibility that every sequential pair is determinately identical. The steps show that, if one assumed this, then, contrary to the proposed solution, ORIGINAL SHIP would be determinately identical to REPLACEMENT SHIP.

Steps 10–17 attempt to make explicit what I take to be a highly implausible position to hold about the puzzle. Given the assumption that there is no privileged plank, if any sequential pair in the series of ships is such that they are determinately distinct, then all sequential pairs are. It would be implausible to claim that all these pairs were determinately distinct, yet the ship at the beginning of the series was indeterminately identical to the ship at the end.[20]

To summarize, with respect to identity no plank is privileged and thus each sequential pair has structurally similar identity facts. Sequential pairs cannot be determinately identical with one another. Otherwise $SHIP_0$ and $SHIP_{1000}$ would be determinately identical by transitivity. Sequential pairs cannot be determinately distinct from one another. Otherwise it would be highly implausible to maintain that $SHIP_0$ and $SHIP_{1000}$ are indeterminately identical. Therefore, each sequential pair of ghost ships, of which there are many, must be indeterminately identical.

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[20] Abstracted away from the particulars of the case, it seems logically possible to hold this view. However, since the only intrinsic difference between sequential ships is the having of two planks (the one that is removed and the one that replaces it), the only good candidate properties on which the ships can determinately differ are the properties of possessing these planks. This is captured in the moves in 11–13. This would suggest that $SHIP_0$ and $SHIP_{1000}$ also determinately differ in this respect (this is step 14). But, according to the case, $SHIP_0$ and $SHIP_{1000}$ cannot determinately differ with respect to the planks that they have (at most it can be indeterminate that they differ). This is the contradiction between 14 and 15.

One might have assumed that the Indeterminate Identity solution presents only two pairs of ships that are indeterminately identical. In fact, there are many pairs of indeterminately identical ships that are easy to overlook. Let the fact that pairs of ghost ships (that is, the ships between $\textsc{Ship}_0$ and $\textsc{Ship}_{1000}$) are indeterminately identical be called *ghostliness*.[21]

3.3 Consequences

3.3.1 What Makes Ghost Ships Ghostly?

No reassembly required

Here I will argue that it is not necessary that the original planks be reassembled into a ship in order for the ghost ships to be indeterminately identical. Let us return to the puzzle case. Imagine that in possible world A, depicted in Figure 3.1, the case proceeds as previously described (see Chapter 1, §1.5.1), except that the ships are located in named harbors. The ship made of original planks at the beginning of the case, Original Ship, was in Original Harbor. The ship made of replacement planks at the end of the case, Replacement Ship, is in Nearby Harbor. The ship made of reassembled original planks at the end of the case, Reassembly Ship is in Faraway Harbor. Now imagine that in possible world B, depicted in Figure 3.2, the replacement process is completed, but there is no reassembly of the original planks into a ship. At most there is a scattered object that is composed of original planks

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[21] Further, I content that their ghostliness, at least partly, explains why they are overlooked in the case.
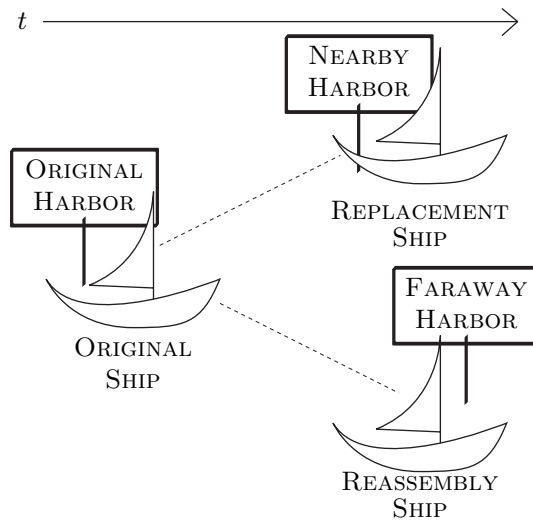
Figure 3.1: World A

that are not arranged ship-wise.[22]

I maintain that the ghostly ships in world B are just as ghostly as they are in world A. There is a temptation to understand the story in world B differently than in world A. One might argue that what makes SHIP OF THESEUS so puzzling is not necessarily the sorites-like series of plank replacements. Rather, one might argue that the case is problematic in virtue of the existence of the second ship, REASSEMBLY SHIP, made of original planks.

If this is true, then one could say that, in the absence of REASSEMBLY SHIP, ghostly ships are not ghostly after all. That is, in the absence of REASSEMBLY SHIP, the replacement of a plank makes no difference in the identity of the ships. According

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[22] The methodology I employ here is inspired by the taxonomy of puzzle cases given by Gallois (1998, Chaps. 1–2).
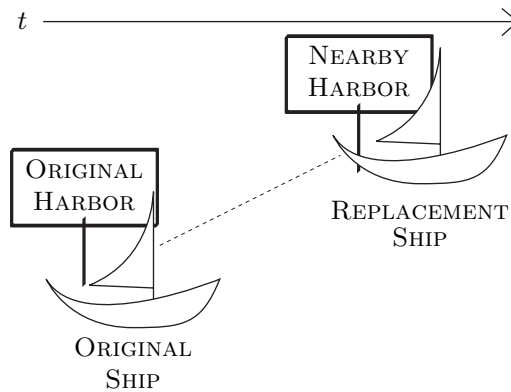
Figure 3.2: World B

to this view, any sequential pair of ships are actually determinately identical to one another. As a consequence, ORIGINAL SHIP and REPLACEMENT SHIP would be determinately identical.

The problem with this view is that it makes identity extrinsic.[23] To maintain the view, one must accept that some facts about identity are determined by facts about the existence or non-existence objects at distant times and places. It makes the facts about whether ghost ships are ghostly dependent on whether or not the original planks ever come together to make a ship.

To see the implausibility of such a proposal, imagine that world B', depicted in Figure 3.3, is like world B (the world where reassembly has not occurred) except

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[23] This diagnosis of the case also comes from Gallois (1998, pp. 50–60).

that years have passed since the replacement process. Replacement Ship is still in Nearby Harbor. Someone discovers the the original planks, now in Faraway Harbor, and decides to arrange them ship-wise. When she is done, worlds A and B are brought to congruence with respect to the identity facts about the ships. This is because it would be implausible to think that the sequential pairs of ships were identical during the time before our shipbuilder happened upon the original planks in Faraway Harbor and that, after she assembled a ship with the original planks, the identity facts about the sequential pairs changed retroactively. Not only are the ships physically separated (Replacement Ship is in Nearby Harbor and Reassembly Ship in Faraway Harbor), the reassembly of the original planks occurs years later. Why should the identity facts about ships depend on facts about the rearrangement of planks years in the future? Thus, even in world B, the ships are ghostly.

No original planks required

One might concede that it is not the existence of Reassembly Ship that makes Ship of Theseus a puzzle, but rather argue that the existence of the *planks* does. This would be to maintain that, had the original planks not been saved, sequential pairs of ghost ships would be determinately identical. In this case, as above, this would mean that Original Ship was determinately identical to Replacement Ship.

To test whether the existence of the planks is what explains the ghostliness of the ghost ships, let us imagine a world, world C (depicted in Figure 3.4), where the planks are destroyed as they are replaced. The destruction cannot merely be a scattering of the underlying matter. This is because the scattered matter could be arranged back plank-wise, and the planks could be arranged back ship-wise. This would make
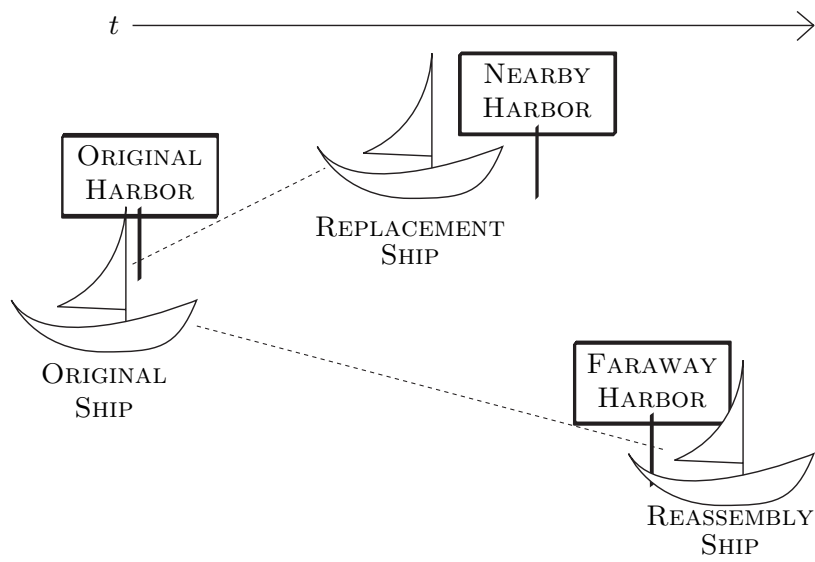
Figure 3.3: World B'
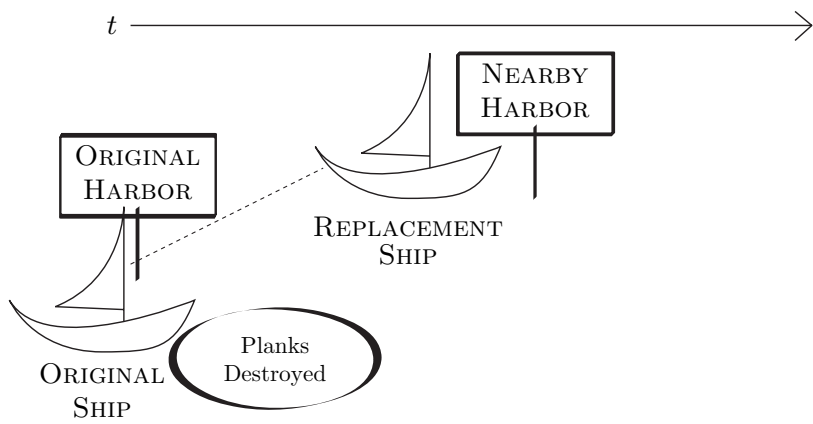
Figure 3.4: World C
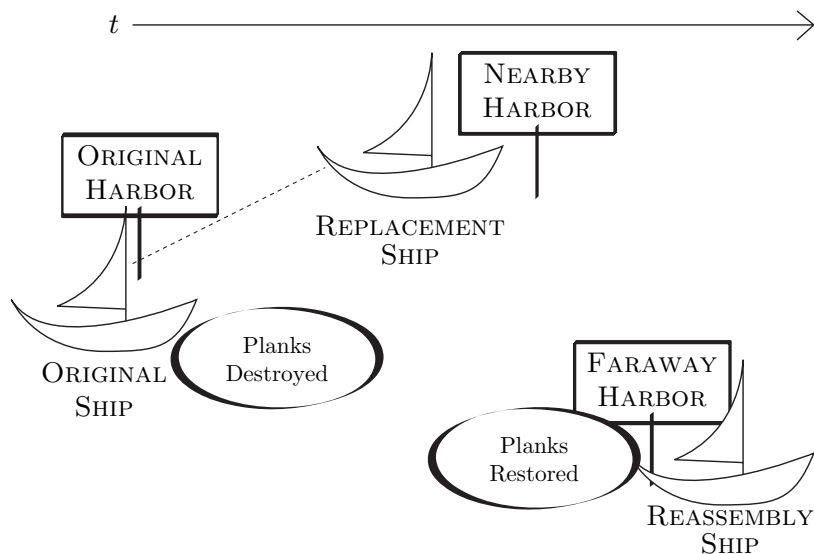
Figure 3.5: World C'

world C like world B', but with smaller ship parts. To take the suggestion that ghostliness depends on the existence of the planks, the matter needs to be destroyed as depicted in Figure 3.4. Since in world C there are no planks and none of the matter with which to reconstruct the planks, one might maintain that in this world there is nothing puzzling about replacing planks. After each replacement the ship maintains its identity through the entire replacement process.

My response is to argue that the non-existence of the planks does not actually make a difference to ghostliness. Imagine world C', depicted in Figure 3.5. World C' is like world C, except that some time has passed. Instead of a shipbuilder stumbling upon the planks and constructing a ship, God restores the original planks's existence.

It is implausible that there is a difference in ghostliness between worlds C and C'.

If there was, this would mean that the identity facts about sequential pairs depend on facts about what matter will exist in the future. So the sequential ghost ships in world C' are indeterminately identical even when the original planks cease to exist.

From these cases I have argued that the fact that sequential pairs of ghost ships are indeterminately identical, their ghostliness, depends neither on the existence of the ship made of original planks, nor on the existence of the original planks themselves. The ghost ships are ghostly regardless. Next I will argue that their ghostliness does not depend even on the replacement process.

Do the ghost ships need the replacement ship?

One might concede that what is strange about SHIP OF THESEUS is not the possibility of a ship made of the original planks in addition to the ship made of the replacement planks. Rather, it is just the sorites-like series that moves from a ship made up of one collection of planks to a ship made of entirely different planks. What I will argue is that this series, as explained by the Indeterminate Identity theorist, is actually a conjunction of instances of a more general phenomenon.

Again, world A is the world in which the replacement process proceeds as described in the puzzle.[24] Let world D, depicted in figure Figure 3.6, be just like world A except that at some point in the replacement process Theseus stops replacing planks. If what makes SHIP OF THESEUS unique is the totality of the replacement process, then we should expect that the relevant identity facts between world A and world D diverge. The most plausible proposal is that in world D the replacement of planks does not make a difference in the identity of the ship, whereas in world A it does. This would

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[24] Here the details of what happens to the original planks can be ignored.

mean that sequential pairs of ghost ships in world D are determinately identical, whereas they are indeterminately identical in world A.

However, this would imply that, at every point of replacement, the identity facts about the ship before and the ship after the replacement depend on future identity facts. Take any sequential pair of ghost ships SHIP_N and $\text{SHIP}_\text{N+1}$ in world D. They appear to individually instantiate all the same properties in D that they do in A. That is, SHIP_N in world D appears to be qualitatively identical to SHIP_N in world A. The same is true of $\text{SHIP}_\text{N+1}$. This is because the worlds are the same until some point in the future when the replacement process stops in world D but continues in world A.

But, if the identity facts about the ghost ships depend, as the present proposal suggests, on the totality of the replacement process, then there must be a difference in instantiation facts before the replacement stops in world D. This is because in world A, as I argued in section 3.2 above, the Indeterminate Identity theorist should maintain that it is indeterminate that SHIP_N and $\text{SHIP}_\text{N+1}$ are identical. This means, by Leibniz's Law, that there is at least one property on which it is indeterminate if they differ in world A. But because SHIP_N and $\text{SHIP}_\text{N+1}$ are supposedly determinately identical in world D, by Leibniz's Law, they determinately instantiate all the same properties. So the instantiation facts between world A and world D, at the time before the worlds diverge, must differ.

But what instantiation facts could be different between the worlds at this point? The only relevant difference between the worlds has to do with future identity facts. But, as we have seen in Chapter 1, §1.4.1, Indeterminate Identity theorists like Parsons rule out properties constructed from identity facts as legitimate properties. An
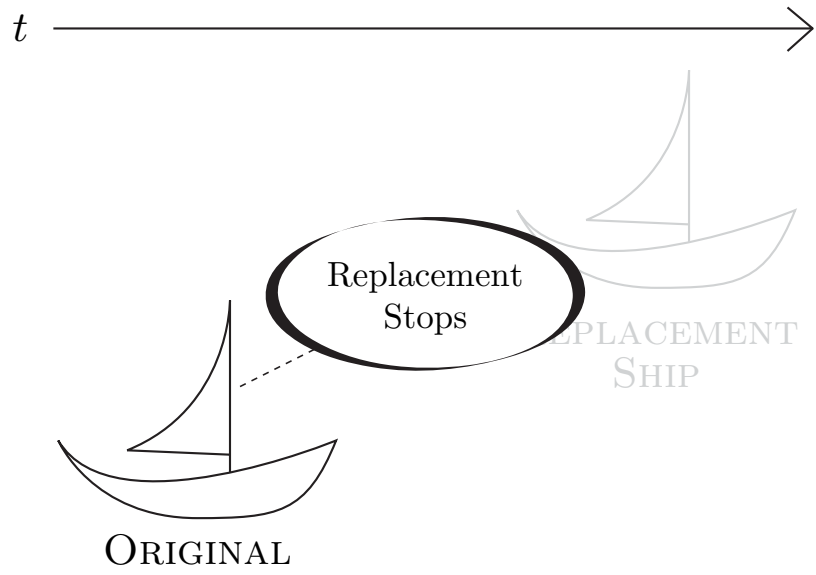
Figure 3.6: World D

Indeterminate Identity theorist cannot say in response to Evans's objection that properties like *is an x such that x is indeterminately identical to a* are illegitimate, but use them to argue that the identity facts between worlds A and D differ before the replacement stops in world D.[25]

If I am right about the consequences of the Indeterminate Identity theorist's solution, then the replacement of a single plank makes for an indeterminate difference. By this I mean that, for any sequential pair, $\textsc{Ship}_N$ and $\textsc{Ship}_{N+1}$, if they differ with respect to just one plank, then $\nabla(\textsc{Ship}_N = \textsc{Ship}_{N+1})$. Thus, the fact that the ghost ships are indeterminately identical does not depend on the nature of the entire sorites series, but on the having and lacking of individual planks.

3.3.2 Generalization

That individual planks make for an indeterminate difference generalizes to the result that, according to the Indeterminate Identity theorist, a change in a single part makes for an indeterminate difference. This is because there is nothing special about planks or ship construction that prevents one from applying the structure of SHIP OF THESEUS to other types of objects. The story could have been told about things such

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[25] In addition, on this proposal one is faced with a inter-world sorites series. World D is just one of many, at least 1000, ways in which the replacement process might have differed from the replacement process in world A. For example, world D' could be the world where only one plank was ever replaced, world D'' the world where only two planks were ever replaced, etc. There is now a question of when in that series of worlds, or classes of worlds, the identity facts diverge from world A. Once someone determines at which world in the sorites series the divergence occurs, my argument can be run substituting that world for world D in the argument. Thanks to Evan Woods for pointing out this result. See Sider 2001, Chap. 4, §9.1 for a formulation of the argument from vagueness in terms of a modal sorites series.

as cars, buildings, chairs, humans, and coffee mugs.[26] This means that for a whole host of objects, according to Indeterminate Identity, any time that there is a change in a part, the object before the change is indeterminately identical to the object after the change. But, if some basic scientific facts hold, this happens quite often with most objects. Minor physical contact between objects can make it such that some molecules are no longer parts of object or make it such that new molecules become parts of an object. According to the Indeterminate Identity theorist, what is going on in SHIP OF THESEUS is not a unique philosophical puzzle, but rather a pervasive phenomenon.

I anticipate three objections. First, it might be objected that I conflated replacement of parts with adding and losing parts. I have two replies to this.

First, even if I concede that replacement-of-part events are sufficiently different from addition-of-part or loss-of-part events, there remain many cases of replacement. For instance, I replace various parts of my bicycle periodically. If the phenomenon of ghostly ships generalizes, then by replacing my bicycle chain the bicycle before the replacement is indeterminately identical to the bicycle after the replacement. This is a surprising result and we can imagine many structurally similar cases for otherwise ordinary replacement of parts.

Second, it is not obvious how different these events actually are. Consider a loss-of-part event. While not actually a replacement-of-part event, it could be. A part could have been added to replace the lost part. In the possible world in which a replacement-of-part event occurred it would be indeterminate, if I am right, whether the resulting

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[26] An argument might be made that the identity conditions for living organisms and non-living organisms are different, even for the Indeterminate Identity theorist. Even if we restrict the generalization to non-living objects, the generalization captures lots of objects.

object is identical to the pre-replacement object or not. It would be odd if the difference between a loss-of-part and replacement-of-part made for an indeterminate difference in identity. Similarly with an addition-of-part event. While not actually a replacement-of-part event, it could be. A part could have been lost to replace the added part. In the possible world in which a replacement-of-part event occurred it would be indeterminate, if I am right, whether the resulting object is identical to the pre-replacement object or not. It would be odd if the difference between an addition-of-part event and replacement-of-part event made for an indeterminate difference in identity.[27]

The second objection is that Parsons already anticipates that instances of indeterminate identity are widespread. This is because, in the case of TIBBLES (introduced in Chapter 1, §1.5.2), he thinks that the cat is indeterminately identical to numerous cat candidates (2000, p. 43). For many ordinary objects, we have reason to think of numerous precise collections of parts such that each is a candidate for being that object. This is just to say that there is nothing particular to the furriness of cats that makes them susceptible to the general problem of TIBBLES. So, we should not be surprised to find that there are more instances of things being indeterminately identical than previously thought.

My reply is that cases like TIBBLES are synchronic cases, whereas cases of changes in parts are diachronic. This means that, although we might be surprised at the number of cases of indeterminate identity that there are for objects at one time, we have no reason to expect from this that there are also numerous cases of indeterminate identity for change over time.

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[27] Thank you to Julia Jorati for suggesting a reply like this.

The third objection is that one ought to welcome the pervasive nature of Indeterminate Identity.[28] This is because the theory explains facts, not just about puzzle cases, but about non-puzzle cases as well. Moreover, because the theory explains the facts in a similar way, the theory is unifying.

To this I return to the methodology advanced by Parsons. Parsons presents Indeterminate Identity as an attempt to preserve as many of our ordinary beliefs as possible and contrasts it with views that require rejecting ordinary beliefs. Speaking of this methodology he writes

> I begin with ordinary beliefs, which I will reject only if some reason is found to challenge them. These are my tentative data: *ordinary* beliefs—such as the belief that I have exactly one wife, that there is exactly one dog in my back yard, and that exactly one ship set sail before the problematic replacement/repair/reassembly process. I reject philosophical analyses that contradict these judgements, telling me, for example, that I actually have several dogs, or that there is not really any such thing as a dog—there are only basic particles that swarm into dog-like shapes. (Parsons 2000, p. 6)

It seems that the methodological imperative to preserve these beliefs should also apply to my belief that I when I have the same bicycle after a simple repair as I did before. To this Parsons might reply that beliefs about identity are what he classifies as "highly theoretical philosophical generalizations, such as 'nothing is indeterminate', or 'no two things can be in the same lace at once', or the opposites of such views" (Parsons 2000, p. 6). But beliefs like 'this is the same bicycle I worked on yesterday' are not themselves general beliefs about identity, nor it is obvious that they originate

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[28] Thank you to Evan Woods for raising this objection.

from "highly theoretical philosophical generalizations." I contend that my bicycle beliefs are "ordinary" in whatever sense it means for Parsons's beliefs regarding the cardinality of his wife, dogs, ships, and cats to be "ordinary beliefs." Perhaps it turns out that Indeterminate Identity is true and as a consequence bicycle maintenance makes an indeterminate difference. However, even if this is the case, the Indeterminate Identity theorist cannot ignore that many of our ordinary beliefs about replacing parts must be abandoned.

Moreover, this result for the Indeterminate Identity theorist places their solution into the same category as another solution to the puzzle: Every Change Counts. According to this strategy, any change in parts is sufficient for a change in identity between the object before the change and the object after the change. While Parsons can maintain that not every change makes for a *determinate* difference, if I am right, he must concede that every change makes for an *indeterminate* difference. Just as I think that it would be a theoretical cost of the view if its solutions to puzzle cases partly relied on the Privileged Change Counts strategy, it is a cost for it to rely on an Every Change Counts strategy. The reason is that Indeterminate Identity is being offered as a way to account for the data from Ship of Theseus. The proposal is that one ought to pay the price of adopting a unintuitive metaphysical theses, like Indeterminate States of Affairs and Indeterminate Instantiation, for the theoretical benefit of explaining cases like Ship of Theseus. But, adopting an Every Change Counts strategy already goes part way to explaining the case in the way that I argue the Indeterminate Identity must. So the relative explanatory power Indeterminate Identity offers over extant Every Change Counts strategies is less than one might have thought.

Chapter 4:   Identity Pluralism

Gottlob Frege writes that

> the relation of equality, by which I understand complete coincidence, *identity*, can only be thought of as holding for objects, not concepts. . . . although the relation of equality can only be thought of as holding for objects, there is an analogous relation for concepts. Since this is a relation between concepts I call it a second-level relation, whereas the former relation I call a first-level relation. (Frege 1892a, pp. 130–1, emphasis mine)

In this passage, Frege maintains that the identity relation holds only between objects and that it cannot hold between concepts. But he allows that an "analogous" relation, a "second-level relation," holds between concepts. To me this suggests a pluralism with respect to identity.

Whether Frege himself ought to be categorized as an identity pluralist is an interesting question, but not one addressed here. Instead, in this chapter I present what an identity pluralism might look like. I do this by reviewing in section 4.1 pluralisms with respect to other metaphysical concepts: existence and parthood. In section 4.2, I review tests recently given by an ontological pluralist, Kris McDaniel, for pluralism in general, and apply them to parthood and to identity. Finally in subsection 4.2.5, I suggest that one argument in favor of identity pluralism could generalize as a new

test for pluralism.

4.1 Pluralisms

4.1.1 Ontological Pluralism

Ontological pluralism is pluralism about existence. Here I characterize some possible ontological pluralisms. Some have explicitly held the views they describe, while some only gesture toward such views.

From Moore and Russell

Bertrand Russell and G.E. Moore have been variously "accused" of being ontological pluralists (Turner 2010, p. 5), said to have "(at least allegedly) defended" ontological pluralism (Builes 2019, p. 394), or thought to be "friends of ways of being" (McDaniel 2009, p. 290). As evidence of this, consider that Moore writes

> It is quite certain that two natural objects may exist; but it is equally certain that *two* itself does not exist and never can. Two and two *are* four. But that does not mean that either two or four exists. Yet it certainly means *something*. Two *is* somehow, although it does not exist. (Moore 1903, p. 161)

And Russell, having argued that there are universals, such as relations, contends that

> the relation 'north of' does not seem to *exist* in the same sense in which Edinburgh and London exist. (Russell 1912/2001, p. 56)

He goes on to suggest that, by not 'existing at', universals "subsist" rather than "exist." He writes

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> We shall find it convenient only to speak of things *existing* when they are in time, that is to say, when we can point to some time *at* which they exist (not excluding the possibility of their existing at all times). Thus thoughts and feelings, minds and physical objects *exist*. But universals do not exist in this sense; we shall say that they *subsist* or *have being*, where 'being' is opposed to 'existence' as being timeless. (Russell 1912/2001, p. 57, emphasis original)

As above with Frege and pluralism about identity, I am not here arguing that Moore and Russell were ontological pluralists. Rather, it is enough that the above carves out a position in logical space that is correctly classified as an ontological pluralism. Let `Ontological Pluralism`$_{\text{MR}}$ be the view according to which (i) some things *exist* in virtue of *existing at* a time, (ii) some things *subsist* in virtue of having *being* (which is timeless), (iii) nothing both exists and subsists, (iv) there is no general 'way to be' common to things that exist and subsist, and (v) everything either exists or subsists.

In addition to Ontological Pluralism$_{\text{MR}}$, there are several ontological pluralisms in the vicinity. Here are some ways of generating them. One could agree that things exist and subsist, but not explain the distinction in terms of temporality. That is, one could disagree with (i–ii). One could hold that there are some things that both exist and subsist. That is, one could disagree with (iii). One could think that there is a 'way to be' that is common to things that exist and subsist. That is, one could disagree with (iv). Additionally, one could think there are things that neither exist nor subsist. That is, one could disagree with (v).

From Meinong

Meinong provides an example of such a departure. In some respects his ontological pluralism aligns with Ontological Pluralism$_{\text{MR}}$. He thinks that there are things that are "real" and as such "exist," and that there are things that "are not a part of reality themselves" and as such "subsist" (Meinong 1904/1960, p. 79). Like Russell, he thinks that mathematical objects are paradigmatic of subsisting objects. He writes

> The form of being with which mathematics as such is occupied is never *existence*. In this respect, mathematics never transcend *subsistence*. (Meinong 1904/1960, p. 80, emphasis mine)

But he departs from Ontological Pluralism$_{\text{MR}}$ with respect to (v). He goes on to say

> our account up to now may seem to leave room for the conjecture that wherever existence is absent, it not only *can* be but *must* be replaced by subsistence. ...As we know, the figures with which geometry is concerned do not exist. Nevertheless, their properties, and hence their [having characteristics], can be established. ...the [having characteristics] of an Object is not affected by its [non-being]. The fact is sufficiently important to be explicitly formulated as the principle of independence of [having characteristics] from [being]. The area of applicability of this principle is best illustrated by consideration of the following circumstance: the principle applies, not only to Objects which do not exist in fact, but also to Objects which could not exist because they are impossible. Not only is the much heralded gold mountain made of gold, but the round square is as surely round as it is square. ...Any particular thing that isn't real must at least be capable fo serving as the Object for those judgments which grasp its [non-being]. (Meinong 1904/1960, p. 82)

I take this to mean that, according to Meinong, the categories of existence and subsistence are not exhaustive. Because there are things that have properties, and of which we can correctly say that they have particular properties, that neither exist or subsist, there are things that lack being. Let `Ontological Pluralism`$_\text{M}$ be the view that there are things that have being, which either exist or subsist, and things that lack being. And, as Caplan (2011, n. 33) suggests, one might even (and perhaps Meinong did) say that in addition to lacking being, there are distinct ways of non-being. One would be lacking being by existing if one had being. The other would be lacking being by subsisting if one had being.

In her own defense of ways of non-being, Sara Bernstein furthers this suggestion by articulating several "Meinongian" views. She writes that

> there are many available Meinongian positions in logical space available
> to the pluralist about non-being. One option is to hew very closely to the
> letter of Meinong's theory, while another option is to abandon the letter
> and remain close to the spirit. Consider the unilateral pluralist who be-
> lieves in one way of being, but two ways of non-being: one for impossible
> things and one for merely nonexistent things. This sort of pluralist shares
> a tripartite ontology of being and non-being with Meinong, as the major
> ontological joints fall in very similar, and possibly identical, places. Other
> pluralists might embrace the spirit of Meinongianism but fall farther from
> the original view. For example, some pluralists about non-being might
> take the division in nonexistent things to lie between, e.g., God and non-
> God things rather than possible and impossible things. The symmetric
> pluralist postulates joints in being in addition to those in non-being. How
> many joints there are, and where they fall, determine whether a pluralist
> is Meinongian or merely neo-Meinongian. Either way, accepting the sub-
> stantivity of non-being has a strong whiff of Meinongianism. (Bernstein
> forthcoming, p. 9)

From Kris McDaniel

In addition to defending ontological pluralism at the metametaphysical level,[1] Kris McDaniel has advanced positive arguments for particular ontological pluralisms. For example, he has proposed that "almost nothings," like holes, have "being-in" as their way of being (McDaniel 2010a) and that there are degrees of being (McDaniel 2013). Here I will focus on his view that there is a way of being had by occupants of space-time regions and distinct a way of being had by space-time regions themselves. He writes

> This hybrid view will recognize (at least) two fundamental ontological categories: the category of spacetime regions and the category of material occupants of spacetime regions. (McDaniel 2004, p. 140)

Later, McDaniel explicitly defends his division of "two fundamental ontological categories" as an ontological pluralism. He writes

> Although for a material object to be is for it to be at some region or other, this is not true of other entities. Unless a spatiotemporal region exists at itself, we should not say the same thing about them. (McDaniel 2010b, p. 704)

In fact what McDaniel (2010b, p. 704, n. 46) goes on to say about abstracta brings his ontological pluralism in alignment with Ontological Pluralism$_\mathrm{MR}$. But suppose someone thought there were only the occupants of space-times regions and space-time regions themselves, but no abstracta. Let Ontological Pluralism$_\mathrm{McD}$ be

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[1] For such defenses, see McDaniel 2009, 2010b, 2017. Additionally, Turner (2010, 2012) has defended ontological pluralism. See Spencer 2012 for an overview of the metametaphysical debate concerning ontological pluralism.

the view according to which everything exists either in virtue of being at a space-time region or in virtue of being a space-time region itself. As above, the view can be further specified by claims about whether such objects enjoy a general kind of being, or about whether there are some things that enjoy a different way of being or lack a way of being.

More Ways of Ways of Being

In the metametaphysical debate concerning ontological pluralism,[2] Trenton Merricks has argued for ontological monism. In an argument against ontological pluralism, Merricks presents two versions of Ontological Pluralism$_{\text{MR}}$. Both think that concrete objects exist$_1$, that abstract objects exist$_2$, that all objects either exist$_1$ or exist$_2$, and that there is nothing that neither exists$_1$ nor exists$_2$. However, the first kind of pluralist he considers denies that things that exist$_1$ or exist$_2$ exist generically. The second kind of pluralist he considers thinks that things that exist$_1$ and things that exist$_2$ share a generic kind of existence. He writes

> Again, our new ... pluralists think that everything generically exists. They could take generically existing to be as fundamental as existing$_1$ and existing$_2$. Or they could take generically existing to be less fundamental than (to be grounded in) existing$_1$ and existing$_2$. This second option should not be conflated with the view [some] pluralists ... according to whom some entities exist$_1$ and others exist$_2$, but none generically exist. For if no entities generically exist, then it is false that both everything generically exists and also that an entity's generically existing is less fun-

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2   Which I take to involve at least debates concerning the correct characterization(s) and coherence of ontological pluralism both generally and specifically.

damental than (is grounded in) either its existing$_1$ or its existing$_2$. (Merricks 2019, pp. 599–600)

Defenses against Merricks's objection to ontological pluralism reveal another dimension along which we can generate varieties of ontological pluralism. For example, David Builes (2019), before presenting his own objection to ontological pluralism, argues that ontological pluralists can respond to Merricks by appeal to naturalness. For example, he says that the pluralists which thinks that either exist$_1$ or exist$_2$ ought to say these ways of existence are perfectly natural, while the generic way of existence everything enjoys is less natural.

Bradley Rettler goes further to distinguish at least six views on ways of being. He presents

(WB1) There is only one way to be, and everything that exists exists in that way.

(WB2) There is only one perfectly natural way to be, and everything that exists exists in that way; there are other ways of being, but they are less natural than the one way to be such that everything exists in that way.

(WB3) There are many ways to be, and no way to be is more natural than any other.

(WB4) There are many ways to be, none of which is more natural than any other, and one way to be such that everything exists in that way, and the way to be such that everything exists in that way is less natural than every other way to be.

(WB5) There are many ways to be and one way to be such that everything exists in that way, and none of those is more natural than any other.

(WB6) There are no ways to be, or if there are, nothing exists in any of the ways to be that there are. (Rettler forthcoming, p. 3)

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Additionally, Byron Simmons posits that there are things that enjoy only a generic way of being. He writes

> And there are, I believe, entities that do not seem to enjoy any of these ways of being. For I accept universalism about composition and thus believe that there is an entity which is wholly composed of nothing but Socrates and the number 2. Yet this entity does not strike me as being either abstract or concrete. It does, however, appear to enjoy *generic existence*: the way of being that absolutely everything enjoys (where this generic way of being is not simply to be understood as a mere disjunction of the specific ways of being). (Simmons forthcoming, p. 4, emphasis in original)

With so many ways of ways of being on the table, I propose a characterization of Ontological Pluralism that (hopefully) captures these various ways of being an ontological pluralist.[3] Let `Ontological Pluralism` be the view according to which there are at least two ways of being such that there is no way of being more natural than them. This characterization is neutral with respect to how many ways of being there are, what the ways of being are, whether there is a generic way of being, whether ways of being overlap, whether naturalness comes in degrees, the relative naturalness of the most natural ways of being, and whether things can lack being.[4]

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[3] If I am right, this refutes the claim in Caplan 2011 that unifying characterizations of the varieties of ontological pluralism are not forthcoming.

[4] One might contend that there is an ontological pluralism this definition does not capture. Imagine that the world is such that "everything is a proper part of something" or, as Jonathan Schaffer (2010, p. 64) calls it, the world is "junky." In that case composition continues 'upward' so that there is no object that is not itself a proper part of a greater whole. Further, imagine that naturalness tracks the complexity of composition and that each object enjoys its own kind of existence. On this view there are infinitely many ways of being that increase in naturalness as objects get more complex. The objection is that given that there is always a more natural way of being, there is always a way of being that falsifies the part of the definition that says "there

4.1.2 Parthood Pluralism

While ontological pluralism is having what some call a "revival" (Spencer 2012; Turner 2020) or "resurgence" (Bernstein forthcoming), less has been said about parthood pluralism. Here are some parthood pluralisms that, as above, are either explicitly defended or gestured toward.[5]

van Inwagen

In contrast to his ontological monism, Peter van Inwagen is a parthood pluralist. He writes

> There is one relation called 'parthood' whose field comprises material objects ... There is another relation called 'parthood' defined on events, another still defined on stories, yet another defined on curves, and so on, through and indefinitely large class of cases. And yet it is no accident ... that we apply the same word in each case, for these applications are bound together by a "unity of analogy." ... Many philosophers, if I

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is no way of being more natural than them." I see two ways of replying to this objection.

The first is to deny the plausibility of such a view. After all, it is a combination of views all of which are themselves controversial (the commitment to a junky world, that each object enjoys its own way of being, and that naturalness follows compositional complexity). The intuition is that these taken together are highly implausible. This reply strikes me as unsatisfactory. While the view might be false (and likely so), it appears to be a coherent view someone could hold. And it certainly seems like such a view is a variety of ontological pluralism.

Given this, I offer a second reply. The definition claims that "there are at least two ways of being." The cardinality of all of the ways of being on this account is surely greater than two (for it is infinite). For any purported way of being that is said to be more natural than any in the collection, one can simply point out that it is a member of that collection. Just because there is always a more natural way of being does not mean that there is a single way of being more natural than the infinite collection of increasingly more natural ways of being. Thank you to Ben Caplan for raising this objection.

[5]   Additionally, see Sider 2007, p. 73 for an argument against parthood pluralism.

understand them, do not see parthood like that. They see 'part of' as a transcendental or "high-category" predicate—like 'is identical with' or 'three in number', and unlike 'rising'—which can be applied to any sort of object and which always expresses the same *very* abstract relation. (van Inwagen 1990, pp. 19–20)

Let `Parthood Pluralism`$_{\texttt{vI}}$ be the view that there is, for each of an "indefinitely large class of cases," a parthood relation that objects of that kind stands in, and there is no general parthood relation that all objects stand in. The passage suggests that van Inwagen takes the kinds of objects to be mutually exclusive such that objects that are candidates for standing in one parthood relation are not candidates for standing in another parthood relation. But, as the discussion of ontological pluralism suggests, there could be someone who agrees with van Inwagen about the plurality of parthood relations, but admits of cases of overlap.

McDaniel

After introducing his ontological pluralism (what I have called Ontological Pluralism$_{\text{McD}}$), McDaniel introduces a corresponding parthood pluralism. He says that part of the larger ontological view he is defending

> will recognize two fundamentally different kinds of part-whole relations: a non-indexed part-whole relation that is restricted to the category of spacetime regions and a *spatiotemporally relativized* part-whole relation that is restricted to the category of material occupants. In other words, the part-whole relation defined on the category of material objects is such that, for any region of spacetime R, it makes sense to ask of two objects x and y whether x is a part of y relative to R. ...One way of being a compositional [or parthood] pluralist is to claim that each ontological

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category has its own parthood relation. According to this way of being a compositional [or parthood] pluralist, the relation of part to whole that obtains between, e.g., regions of space is not the same relation as the relation of part to whole that obtains between material objects. Moreover, according to this form of compositional [or parthood] pluralism, it makes no sense to say that there is a whole composed of objects from distinct ontological categories. So, for example, there is no object made out of my car and the region of space that it exactly occupies. (McDaniel 2004, pp. 140–2)[6]

McDaniel seems to follow van Inwagen's strategy of making the particular parthood relations exclusive to each ontological kind. Let `Parthood Pluralism`$_{\text{McD}}$ be the view that there is a parthood relation, relativized to space-time regions, that holds between material objects and another parthood relation, unrelativized, that holds between space-time regions.

Gilmore

Cody Gilmore has argued that parthood is neither the two-place relation it is ordinarily thought to be, nor, like McDaniel's parthood relation with respect to material objects, a three-place relation. Rather, he has argued that parthood is a four-place relation. He defines his view as follows

Four-Place Parthood (4P): Parthood$_m$ is a four-place relation that can be expressed by the predicate 'x at w is a part$_m$ of y at z'.

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[6] While McDaniel calls the view compositional pluralism, here he defines it in terms of the parthood relation. Perhaps someone has reason to think that composition is in an important sense metaphysically prior to parthood and would thus be a compositional pluralist who would take issue with conflating compositional pluralism with parthood pluralism. I do not adjudicate such a disagreement here and assume either that compositional and parthood pluralism are the same view or that whatever considerations there are in favor of one are considerations in favor of the other.

> It will be natural ... for friends of 4P to say that parthood$_m$ has one slot for a part, a second slot for a *location* of that part (e.g., a spacetime region), a third slot for a whole, and a fourth slot for a *location* of that whole (e.g., a spacetime region). (Gilmore 2009, p. 84, emphasis original)

Here, Gilmore assumes parthood monism and symbolizes the assumption by calling the parthood relation "parthood$_m$" (Gilmore 2009, p. 83). Here he means to defend the claim that his four-place parthood relation is the fundamental parthood relation that material objects stand in. However, he has argued, while assuming parthood monism, that his four-place parthood relation is also what the constituents of a proposition stand in to propositions (Gilmore 2014).

One might, as I do below, raise worries about Gilmore's assumption of parthood monism. We can imagine someone who agrees with the reasons that Gilmore gives for thinking that the parthood relation that material objects stand in is his four-place parthood relation, but think there are other parthood relations that other objects stand in. That is one might be a parthood pluralist by siding with Gilmore on the adicity of *a* parthood relation, but depart with his assumption that it is *the* parthood relation.

4.1.3 Identity Pluralism

While some has been said about ontological pluralism and less about parthood pluralism recently, even less has been said about identity pluralism. In fact, I suspect that the use of identity monism in arguments against kinds of pluralism is evidence of how widely identity monism is assumed.

Consider part of Ted Sider's argument for parthood monism. In an effort to draw

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lessons from the link between composition and identity, without joining Composition as Identity theorists in saying the relations are the same, he argues from identity monism to parthood monism. He writes that

> a single notion of identity applies to objects of diverse ontological categories (to both concrete and abstract objects, for instance). Nails and numbers are self-identical in the same sense. Likewise, a single notion of some-of applies across ontological categories. So if we are trying to cleave as much as possible to the intuitive ideas that a part is just some of a whole and that the whole just is the parts, a single notion of parthood should also apply to diverse ontological categories. (Sider 2007, p. 73)

This argument is persuasive only to those who suppose identity monism, and, on my reading, assumes that many people think identity monism is obviously true.

In what follows I attempt to carve out logical space for an identity pluralism. Let `Identity Pluralism`$_\text{dA}$ be the view that there are two identity relations, one holding between concreta and the other between abstracta, such that while there is a generic identity relation it is not more natural than these two.

4.2   Testing for Pluralism

Having staked out a possible version of Identity Pluralism, Identity Pluralism$_\text{dA}$, I will now see what, if any, reasons there might be to adopt it. First, I review tests for pluralism that have been proposed by McDaniel. I apply them to parthood to show how one might arrive at parthood pluralism. Then I return to identity to give examples of why one might have reasons to adopt Identity Pluralism$_\text{dA}$ or some other version of Identity Pluralism like it.

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4.2.1 McDaniel's Naturalness Test

In debates over whether one ought to be a Monist or Pluralist with respect to a metaphysical concept, there arises the question of what evidence counts in favor of Monism or Pluralism. Specifically when the received view is Monism, the question arises: what evidence counts in favor of Pluralism? In defending his Ontological Pluralism$_{\text{McD}}$, McDaniel (2017, chap. 2, §3) has argued that there are two cases in which Pluralism is preferable to Monism.

I will talk about these cases as tests that provide evidence for Pluralism. For metaphysical concept C, the general form of these tests is "on the assumption there is a topic-neutral C, if C has feature F, then there is evidence that Pluralism about C is true."[7]

The first qualification attempts to avoid an obfuscation of McDaniel's account. If Pluralism about C is true, then it is an open question whether or not C has F. The reason is that it might only *seem as if* C has F if it turns out that there is no general C, just the specific Cs. For example, as we have seen above, someone might claim that the general form of existence has F and that this is evidence for Ontological Pluralism. But another Ontological Pluralist might argue that, in virtue of there being no general form of existence, it only *seems as if* existence has F. On that view, F disappears when one adopts Ontological Pluralism.

Given this, I take "evidence for pluralism" talk as describing the theoretical choice a metaphysician faces when it appears that, by assuming there is a topic-neutral C,

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[7] I follow McDaniel's proposal that the relevant features in question are those that provide evidence against the naturalness of a metaphysical concept. One could argue for pluralism on grounds other than naturalism though. See Caplan 2011, §4 for a discussion of routes to pluralism other than naturalness.

C has feature F. The question the metaphysician faces is "is Monism about C true, or is Pluralism (either a version that retains the topic-neutral C or one that eliminates it) with respect to C true?"[8]

In what follows, I will talk about McDaniel providing tests for pluralism and mean that in the methodological frame just described.

4.2.2   McDaniel's Tests

Is Inside Of

To illustrate McDaniel's tests, let us start with a somewhat contrived example regarding a relation. There might be good reasons to think that the relation in question does not actually hold for some of the objects in the example, but it should help illustrate how the tests work. Think of the relation *is inside of.* Because the relation is tightly bound with facts about objects' locations and the spaces that they occupy, we can imagine a variety of inferences that we are allowed to draw from the instantiation of the relation or lack thereof. For example, if A is inside of B, then we can infer that A occupies some space (at least loosely speaking) that B occupies. Or, if A is inside of B, then we can infer that A is wherever (at least loosely speaking) B is. Let us give the latter principle a name and definition. Where *IO* is the *is inside of* relation and *AL* is the *is at the location of* relation,

Follows $\forall x \forall y (xIOy \rightarrow xALy)$

Something else we might notice about the relation is that it holds between two objects. There is the object that is inside and the object that is being, in some sense,

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occupied. That is, the relation has an adicity of two. As a general matter, there are relations between more than two objects. Additionally, relations between objects might require require some parameter or index to fully capture their instantiation. At first glance, *is inside of* does not appear to be that sort of relation.

However, we can imagine a set of objects with respect to which the *is inside of* relation starts to behave differently than we might have first thought. Think of the file system on a modern operating system. One way of organizing the data stored on a computer is to use a file-folder structure. The structure uses the metaphor of a physical filling system.[9] Just as some organizational schemes are such that physical documents are located inside of physical file folders, files on a computer are located inside of folders on a hard drive. So it appears that files on a computer drive can bear the *is inside of* relation to folders on the drive.

But this relation behaves differently with respect to computer files and folders than it does with respect to physical objects.[10] For example, we cannot draw the same inferences about objects with respect to their locations. There is some sense in which being inside a folder means that a file is located wherever the folder is. That is, within the computer's user interface, files appear to be wherever the folders they are inside of are. But, in a strict sense, being inside a computer folder does not imply the occupation of that space. In fact computer files and folders are 1s and 0s[11] on a physical hard drive. It is not as if some sets of 1s and 0s are, as they exist on the

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[9] Resistance to the contrivance of the example that was alluded to above likely comes from the fact that this system relies on a metaphor.

[10] Or perhaps more carefully, than it does to *ordinary* physical objects.

[11] Or more accurately, representations of 1s and 0s.

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hard drive, located inside of another set of 1s and 0s. Although it might be that actual instances of these file systems are such that the sets of 1s and 0s are physically nearby, they do not necessarily need to be. A file could exist miles away from the folder in which it is located.

Moreover, because of the fact that this structure is instantiated in a complex database, which folder a particular file is inside of could depend on something other than the file and the folders in question. What I mean is that we can imagine two organizational schemes for a hard drive, say S^* and S^{**}, such that the same file under scheme S^* is inside of a different folder than it is under scheme S^{**}. Although this might not happen in practice, it could be the case that *is inside of* with respect to files and folders on a computer is actually a three-place relation. That is, it might be that the way that files are inside of folders is best described as the *is inside of* relation holding between the file, the folder, and an organizational scheme. So what we thought was strictly a two-place relation above might be a three-place relation in some circumstances.

At this stage the fact that the *is inside of* relation holds between files and folders because it was constructed from a metaphor might be enough for us to think either that the relation does not actually hold or that we are actually talking about a different relation entirely. As far as the example goes, this might be right. However, the example illustrates the two tests McDaniel presents for evidence of pluralism.

When we observe that the *is inside of* relation follows different principles with respect to different kinds of objects, this, according to McDaniel (2017, p. 58) means that the relation is *systematically variably axiomatic*. While with respect to ordinary objects, *is inside of* appears to obey Follows; with respect to computer files and

folders it does not.

It is not just that the relation obeys some principles and not others; rather, it is that the difference tracks differences in the relata. When ordinary physical objects stand in the *is inside of* relation, there are certain principles that the relation obeys. But when the objects standing in the relation are these computer files and folders, the principles change. Since the difference is tied to the objects being related, the axioms associated with the *is inside of* relation vary systematically.

This, according to McDaniel, is evidence that the topic-neutral relation *is inside of* is not perfectly natural. He writes that being systematically variably axiomatic

> is a bad way for a perfectly natural relation to behave: its behavior looks disjunctive at worst, less than uniform at best. (McDaniel 2010b, p. 700)

And he suggests that this behavior serves as evidence that the relation is not in fact perfectly natural.

Relatedly, with respect to ordinary objects, the *is inside of* relation is assumed to be a two-place relation. There is not some third object needed to instantiate the relation, nor is there a need for some parameter or index. But the example of computer files and folders shows that this is not necessarily the case with different kinds of objects. Although *is inside of* might be two-place in these cases, it could be three-place. If it was, then the relation would be, according to McDaniel (2017, p. 57), *systematically variably polyadic.* The difference in the relation's adicity is due to the difference in the relata. The possibility that the *is inside of* relation might be three-place arises only when the objects are computer files and folders.

Like systematic variable axiomaticity, systematic variable adicity is, according to McDaniel, evidence that a relation is not perfectly natural. He writes

I am not necessarily suspicious of variably polyadic natural relations in general. Rather, the thought is this: when you have a highly topic-neutral feature that behaves in a fundamentally different way when applied to objects from different ontological categories, but behaves uniformly within single ontological categories, it is not unreasonable to suspect that the more natural features are the topic-specific features defined on individual categories. (McDaniel 2010b, p. 699)

To generalize, I take McDaniel to be providing tests for naturalness. Let us call these the Variably Axiomatic Test and the Variably Polyadic Test. Where C is a metaphysical concept (like a property, relation, or existence itself),

Variably Axiomatic Test If C is systematically variably axiomatic, then this counts as evidence against C's naturalness.

Variably Polyadic Test If C is systematically variably polyadic, then this counts as evidence against C's naturalness.

The step toward Pluralism requires the existence of more natural, topic-specific versions of C. I take it that the evidence against C's naturalness is also evidence in favor of the existence of topic-specific versions of C that are more natural than C. This, together with the broad characterization of Pluralism, counts as evidence for pluralism. Let us call these steps More Natural Specifications and Evidence for Pluralism, respectively. Where C′ and C″ are topic-specific versions of the topic neutral C,

More Natural Specifications If there is evidence, from either the Variably Axiomatic Test or the Variably Polyadic Test, against the naturalness of C, then

there is evidence in favor of the existence of at least C′ and C″ such that C′ and C″ are topic-specific versions of C that are more natural than C.

Evidence for Pluralism If C′ and C″ are more natural than C, then this is evidence for pluralism with respect to C.

I illustrate these tests with respect to parthood in the next section.

4.2.3 Testing for Parthood Pluralism

In this section I apply McDaniel's tests for naturalness to Gilmore's theory of parthood. Recall from subsubsection 4.1.2 that Gilmore thinks that Parthood Monism is true and that the parthood relation is four-place. Specifically, he thinks that the relation holds between a part, the location of that part, a whole, and the location of that whole.

Assume that Gilmore is right about parthood with respect to concrete composite objects. That is, for concrete composite objects, such objects have parts if and only if the parthood relation holds between each of its parts, the location of that part, the whole, and the location of the whole. Further, suppose that the following principle about parthood and locations hold. Where L is the property *is a location*, and P is Gilmore's four-place parthood relation,

Location of Location Parts $\forall x \forall x_1 \forall y \forall y_1 (Lx \land P(x, x_1, y, y_1) \rightarrow x = x_1)$

That is, if a location ever stands in the parthood relation as a part to some whole, then its location as a part is itself. This follows from what I take to be the plausible assumption that locations, if they are ever located, are located only at themselves.

If, on Gilmore's parthood relation, locations are parts of wholes, then they stand in the parthood relation at locations.

However, there are circumstances when, on Gilmore's own theory, Location of Location Parts fails. According to Gilmore (2014), propositions have their constituents as parts and the locations of propositions and their parts are at non-spatiotemporal slots. For any location there are doubtless propositions concerning it. So, each location is such that it is a part of countless propositions. But the locations at which locations are parts of propositions are slots. While slots are locations, when locations are located at slots, they are then located at a place distinct from themselves. This is easy to see in the case of spatiotemporal locations. When located at themselves, they are at a place in space and time, not at a slot in a proposition. So when located at a slot, they are at a location distinct from themselves. It is less obvious in the case of slots themselves. While we might be able to construct propositions where the slots that are constituents of the propositions are at themselves, this is not always the case.[12] Say the particular slot we are talking about is the slot for a particular property F. Whenever we say that slot has or does not have properties other than F, the slot, as a constituent of that proposition, is a located at a different slot. So, when the composite objects are propositions, Location of Location Parts fails.

I do not intend the argument to be decisive. Rather, it demonstrates what one might take as evidence for Parthood Pluralism. If Location of Location Parts is true with respect to concrete composites, but not with respect to propositions, then this provides, via the Variably Axiomatic Test, evidence against the naturalness of the topic-neutral parthood relation. From More Natural Specifications, this is evidence

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[12] I am even skeptical of the existence of a such a proposition.

that there is a more natural parthood relation for concrete objects and another more natural parthood relation for propositions. By Evidence for Pluralism, this is evidence for Parthood Pluralism.

4.2.4 Testing for Identity Pluralism

Now we turn to identity. Here are some reasons, given McDaniel's tests for naturalness, that one might that think Identity Pluralism is true.

Contingent Identity

Here is an argument that, if Contingent Identity were true, then there would be evidence for Identity Pluralism.

Necessity of Identity is the principle that says that, for all objects, if those objects are identical, then they are necessarily identical. Contingent Identity is the view that says that Necessity of Identity is false.

1. Assume that Contingent Identity is true.

2. From 1, possibly some objects are such that, if they are identical, then they could be distinct.

3. There are some kinds of objects that are identical could not be distinct.

4. From 1–3, if Contingent Identity is true, then the identity relation is systematically variably axiomatic.

5. From the Variably Axiomatic Test and 4, there is evidence against the naturalness of the identity relation.

6. From More Natural Specifications and 5, there are topic-specific identity relations that are more natural than the topic-neutral identity relation.

7. From 6 and Evidence for Pluralism, there is evidence for Identity Pluralism.

Assuming that Contingent Identity is true, 2 is true. Contingent Identity is just the claim that there are some objects such that it is possible that they are identical, but might have been distinct. For a purported case of Contingent Identity recall GOLIATH and LUMP$_1$ from Chapter 1, §1.5.2. There is reason to think that GOLIATH and LUMP$_1$ are actually identical, but because LUMP$_1$ might survive in circumstances that would destroy GOLIATH, there is reason to think that they could be distinct.

Here is the argument for 3. Assume that Contingent Identity is true. Let W be the actual world. Assume for reductio that numbers A and B are identical in W but could have been distinct in some world W'. By Leibniz's Law, this means that, in world W, A and B have all the same properties. And, by Leibniz's Law, in world W' A differs from B with respect to some property. From this, in the actual world W, A and B have all the same properties but could possibly differ in their properties in virtue of having different properties in W'.

One reason to reject the assumption that numbers A and B are contingently identical is thinking that numbers cannot have their intrinsic properties contingently.[13] Even if it is true that some objects are such that they have their intrinsic properties contingently, it would be surprising if numbers were such objects. What would it mean for a number to have properties contingently? Let us consider mathematical properties of numbers. Assume A is such that it is evenly divisible by 3. It seems

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[13] Extrinsic properties are discussed below.

implausible for A to actually be divisible by 3 but not divisible by 3 in another world in which it exists. I assume that this generalizes for many mathematical properties.

But for the sake of argument, let us suppose that there is some mathematical property P that A has in the actual world but that it does not have in W'. Could it be the case that B, which is identical to A in W, has P in W, but unlike A, still has P in W'? One could argue that the following cannot all be true: (i) A and B are identical in the actual world, (ii) in virtue of that identity, A and B have the same contingent mathematical property P, and (iii) it is the case that, in some world W', B still has the property P, while A does not have the property P.

But perhaps the property on which they possibly differ is, not P, but some non-mathematical property. What non-mathematical properties might numbers have that differ across worlds? A plausible candidate seems to be extrinsic properties that they have in virtue of their relation objects that are not themselves numbers. Perhaps A and B have the property *is the cardinality of the set of Justices on the United States Supreme Court.*[14] Let us call this property Q. Q is had by numbers contingently. Barring some stringent views on the identity of the Supreme Court across possible worlds, this property could be had by numbers other than the one that actually has it. In fact, different numbers have had it in the actual world.

So it seems that there are some properties that numbers have but might not have had. Could A and B possibly differ with respect to non-mathematical properties like Q? For this to be the case, we have to imagine that (i) A and B are identical in

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[14] Or more carefully, the set of Justices presently serving on the United States Supreme Court. See Uzquiano 2004 for reasons to think that the Supreme Court is not identical to this set of Justices. I assume that we can talk about sets whose membership is dynamic, but if not, I assume that there are properties related to cardinalities that are dynamic that would be suitable substitutes in the example.

the actual world, (ii) in virtue of that identity, A and B have the same contingent non-mathematical property Q, and (iii) it be the case that, in some world W', B still has the property Q, while A does not have the property Q. As with mathematical properties, one could argue that (i)–(iii) cannot all be true, even with respect to non-mathematical properties.

Therefore, even if Contingent Identity is true, there are some objects, namely numbers, such that, if they are identical, then they could not be distinct.

If 2–4 are true on the assumption that Contingent Identity is true, then if Contingent Identity is true, there is evidence, from the Variably Axiomatic Test, against the naturalness of the identity relation (line 5). Applying More Natural Specifications (line 6) and Evidence for Pluralism, there is evidence for Identity Pluralism (line 7).

As with the argument for Parthood Pluralism, I do not present the argument as decisive. Rather, it demonstrates what one might take as evidence for Identity Pluralism. It seems that one has reasons to think that Necessity of Identity might be true of some objects, but not of others (that is, that Contingent Identity is true, but only in for some objects). Applying tests suggested by McDaniel, these reasons could serve as evidence for Identity Pluralism. Additionally, this could serve as part of a larger argument for Identity Pluralism$_{dA}$. If one could show that the reasons to think that numbers cannot be contingently identical apply to abstracta more generally, then the general form of the argument could provide evidence for Identity Pluralism$_{dA}$.

Indeterminate Identity

Here is the argument that, if Indeterminate Identity is true, then there is evidence for Identity Pluralism:

1. Assume that Indeterminate Identity is true.

2. From 1, possibly some objects are such that it is indeterminate that they are identical.

3. There are some kinds of objects such that they cannot be indeterminately identical to anything.

4. From 1–3, if Indeterminate Identity is true, then the identity relation is systematically variably axiomatic.

5. From the Variably Axiomatic Test and 4, there is evidence against the naturalness of the identity relation.

6. From More Natural Specifications and 5, there are topic-specific identity relations that are more natural than the topic-neutral identity relation.

7. From 6 and Evidence for Pluralism, there is evidence for Identity Pluralism.

Assuming that Indeterminate Identity is true, 2 is true. Indeterminate Identity just is the claim that there are some objects such that it it indeterminate that they are identical. For example a purported case of Indeterminate Identity, recall the Ship of Theseus from Chapter 1, §1.5.1. Parsons's solution to the puzzle is to say both that Original Ship is indeterminately identical to Replacement Ship and that Original Ship is indeterminately identical to Reassembly Ship.

Here is an argument for 3. Someone might think that, while the world of the concrete might admit of the indeterminacy that makes it possible for objects to be indeterminately identical to other objects, the world of the abstract resists this indeterminacy. Such a person might be Russell. He writes that

the world of universals, therefore, may also be described as the world of being. The world of being is unchangeable, rigid, exact, delightful to the mathematician, the logician, the builder of metaphysical systems, and all who love perfection more than life. The world of existence is fleeting, vague, without sharp boundaries, without any clear plan or arrangement. (Russell 1912/2001, p. 57)

Someone could adopt Russell's distinction between the world of the abstract and the world of the concrete to argue that it is only objects "without sharp boundaries" (namely, concrete objects), and never the "exact" objects (namely, the abstract objects), that might ever be indeterminately identical.

Some have argued that there are vague abstracta, which are vague in virtue of having vague properties, like vague locations.[15] Even if we admit vague abstracta in this sense, one might still think that abstract objects are never indeterminately identical to anything.

What would it mean for abstract objects to be indeterminately identical? We know from the version of Leibniz's Law accepted by Indeterminate Identity theorists that indeterminately identical objects must be such that it can be indeterminate of them that they have a property. But, what is more, it must be the case that it is indeterminate of one of these abstract objects that it has a particular property that the other either determinately has or determinately lacks. One might think that, even if we encounter abstracta such that it is indeterminate that they have a particular property, it is unlikely that there would be an abstract object having all of the other properties but determinately having or determinately lacking that particular property. Moreover, as we saw in Chapter 3, Indeterminate Identity is advanced as a

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[15] See, for example, Goodman 2003, 2007.

theory to explain puzzle cases. Even those who argue that abstracta can have vague properties admit that these sort of puzzles do not seem to be prevalent for abstracta. For example, Jeffrey Goodman says

> it is not obvious how one would construct a sorites paradox appealing to [abstract] entities such as fictional characters, sets of concreta, teams and their locations in the way that it is obvious how to construct such a paradox when making an appeal to grains of sand and heap-formation or hairs on heads and baldness; the locations of such entities likewise do not seem to obviously admit of borderline cases in the way that there are borderline cases of heaps and bald people. (Goodman 2007, p. 91)

Therefore, even if Indeterminate Identity is true, one might think that there are some objects, namely abstracta, such that they could never be indeterminately identical to anything.

If 2–4 are true on the assumption that Indeterminate Identity is true, then if Indeterminate Identity is true, there is evidence, from the Variably Axiomatic Test, against the naturalness of the identity relation (line 5). Applying More Natural Specifications (line 6) and Evidence for Pluralism, there is evidence for Identity Pluralism (line 7).

As above, I do not present the argument as decisive. Rather, it demonstrates what one might take as evidence for Identity Pluralism. It seems that one has reasons to think that Determinacy of Identity might be true of some kinds of objects, but not others (that is, that Indeterminate Identity is true of some kinds of objects and not others). Applying tests suggested by McDaniel, these reasons could serve as evidence for Identity Pluralism. Additionally, this could serve as an additional part of a larger argument for Identity Pluralism$_{dA}$.

Composition as Identity

Recently, some have argued that the composition and identity relations are importantly similar.[16] The intuition driving the view is that a complex whole is, in some sense, "nothing over and above its parts" (Lewis 1991, p. 80).[17] The strong version of this view is that the identity relation *is* the composition relation.

On this view, the identity relation does not merely relate single objects together; rather, it also relates pluralities to single objects. That is, the identity relation can hold between a collection of objects (pluralities) and a single object.[18] While this might seem unintuitive, defenders have offered that the parts of a whole are seen as pluralities only under particular conceptualizations (Bøhn 2009) or partitions (Cotnoir 2013) of reality, while under different ones they are seen as a single object.

On the assumption that composition just is identity, we should ask, as we have with Contingent Identity and Indeterminate Identity above, if the relation behaves differently for different categories of objects. If so, then this is evidence for Identity Pluralism

Here is the argument that, if Composition as Identity is true, then there is evidence

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[16] See Wallace 2011a,b for an overview of the view and Cotnoir and Baxter 2014 for recent discussion.

[17] See, for example, Sider 2015 and Smid 2017 for discussion of this phrase, which van Inwagen (1994, p. 210) calls "slippery."

[18] More controversially, Donald Baxter (1988, 2014) has argued that the identity relation holds between individual parts and a whole. For example, he argues that in the case of SIX PACK, an individual bottle is, in some sense, identical to the whole six pack. Here, I assume that Composition as Identity is the view that pluralities can be *collectively* identical to single objects, but not the view that parts are *individually* or *distributively* identical to a whole. Moreover, I ignore the question of whether pluralities stand in the identity relation to pluralities. One possibility is that that pluralities stand in *the* identity relation to pluralities. Another is that pluralities stand in *an* identity relation to pluralities. Additionally, there is the further question about the naturalness of that identity relation.

for Identity Pluralism:

1. Assume Composition as Identity is true.

2. From 1, when some objects stand in the composition relation to an object, those objects are collectively identical to that object.[19]

3. There are some kinds of objects such that, when they stand in the composition relation to an object, those objects are not collectively identical to that object.

4. From 1–3, if Composition as Identity is true, then the identity relation is systematically variably axiomatic.

5. From the Variably Axiomatic Test and 4, there is evidence against the naturalness of the identity relation.

6. From More Natural Specifications and 5, there are topic-specific identity relations that are more natural than the topic-neutral identity relation.

7. From 6 and Pluralism, there is evidence for Identity Pluralism.

Assuming that Composition as Identity is true, 2 is true. Composition as Identity just is the claim that the composition relation is the identity relation. Recall the cases of PARCELS and SIX PACK from Chapter 1, §1.5.2 for motivation for Composition as Identity. In those cases, proponents of Composition as Identity argue that the individual parcels of land are collectively identical to the single parcel that they compose and that the individual bottles are collectively identical to the single six pack that they compose.

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[19] See footnote 18 for the distinction between collective and individual (or distributive) identity.

Here is a reason to think 3 is true.

Consider the principle `Uniqueness of Composition`, which David Lewis (1991, p. 74) defines as the claim that "it never happens that the same things have two different fusions."[20] Uniqueness of Composition seems to follow from the strong version of Composition as Identity. This is because, whenever the same collection of objects compose, they are identical to what they compose. So it can never be the case that the same objects compose two different things.

But it seems that some abstract objects are such that there are distinct composite objects composed of exactly the same parts. For example, distinct complex properties might be made up of the same parts arranged differently. The complex property *is green but is not round* seems to have the same parts as the property *is round but is not green*, but these properties are not identical. Not only are their intensions different, but their actual extensions are different.

Similarly, distinct propositions can be made up of the exact same constituents. The proposition that arabica coffee is better than robusta coffee seems to have the same parts as the proposition that robusta coffee is better than arabica coffee. However those propositions are distinct. They mean different things and, in the opinion of many, the former is true and the latter is false.

This suggests that if composition is identity (the strong version of Composition as Identity), then it might be that Uniqueness of Composition is a principle that varies with respect to kinds of objects. Perhaps it is true only of concrete objects, but not

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[20] Fusions, as defined by Lewis, are the wholes to which parts collectively stand in the composition relation. He defines something as "a *fusion* of some things iff it has all of them as parts and has no part that is distinct from each of them," where by "distinct" he does not mean non-identity, but rather disjoint. That is having no overlap (Lewis 1991, p. 73).

of abstract objects.

Further, it suggests that, at least for certain abstract objects, composition cannot be identity. On the assumption that Composition as Identity theorists think some formulation of Transitivity of Identity is true, then it cannot be the case that, with respect to some abstract objects, the same parts compose distinct wholes. This is because, on the strong version of Composition as Identity, the parts are collectively identical to two distinct things. But by transitivity and symmetry, those distinct things are identical.

Someone might argue that while not strictly passing the Variably Axiomatic Test, there is a way in which, assuming the strong version of Composition as Identity is true, the topic-neutral identity relation exhibits systematic variable behavior with respect to an axiom.

Some have argued that the composition does not hold across concrete and abstract objects such that there are objects with at least one concrete part and at least one abstract part. Of the view that says that any objects whatsoever compose, Peter van Inwagen says

> According to [such a view], for example, if there are such things as the color blue and the key of C-sharp and I, then there is an object that has the color blue and the key of C-sharp and me as parts. I do not understand [such a view] because, though I think that the color blue and the key of C-Sharp and I all exist, I am unable to conceive of an object that has these three rather diverse things as parts. (van Inwagen 1994, p. 74)

Similarly, Peter Simons objects to such objects, which he calls "transcategorial sums." He says, "a transcategorial sum is odd because it has parts in different categories, so either it itself belongs to one of these categories, or it does not." He goes

on to say that it is arbitrary to which category such an object belongs (Simons 2003, p. 237).

Lorraine Keller echos this worry by writing

> One problem with transcategorial sums is that it is not clear what category they belong to: does the sum of an abstract object and a concrete particular belong to the category *abstract object* or *concrete particular* (or, more plausibly, neither)? (Keller 2014, p. 662)

Even we take seriously the claim that there are no transcategorial sums, that does not mean that composition cannot be identity restricted to ontological categories. To explain, consider the strong version of Composition as Identity formulated as a principle with universal quantification where C is the composition relation:

Composition as Identity $\forall xx \forall y(xxCy \leftrightarrow xx = y)$

If van Inwagen, Simons, and Keller are right, then the quantifiers cannot range over both abstract and concrete objects. However, their worries do not rule out the possibility that the principle is true when the quantification is restricted to ontological categories. That is, it could be true of concrete objects that a plurality composes a whole if and only if they are collectively identical to the whole. And it could be true of abstract objects that a plurality composes a whole if and only if they are collectively identical to the whole. The above worries only rule out the principle being true when the quantifiers are, so to speak, wide open with respect to ontological categories.[21]

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[21] It could be argued that an unrestricted formulation of Composition as Identity could be true even if there are no transcategorial sums. This would be done by conditionalizing the principle to pluralities that are either concrete or abstract. Here is such a formulation: $\forall xx \forall y[(Concrete(xx) \lor Abstract(yy)) \rightarrow (xxCy \leftrightarrow xx = y)]$. I think the right response to

To me, this seems like systematically variable behavior similar to what McDaniel called systematically variably axiomatic behavior. However, it is not the case that the principle is true with respect to some kinds of objects and false with respect to other kinds of objects. Instead, the principle is true with respect to kinds of objects in a restricted sense, but not unrestricted across all objects.[22]

I propose that we call this feature *systematic axiomatic restriction.* A metaphysical concept C is said to be systematically axiomatically restricted when axioms regarding C are true when their application is restricted to kinds of objects, but false when unrestricted. We can then add another test of naturalness of a metaphysical concept.

`Variably Restricted Test` If C is systematically axiomatically restricted, then this counts as evidence against C's naturalness.

However, it should be noted that those who oppose transcategorial sums might, if they were Composition as Identity theorists, have reason to think that identity is systematically variably axiomatic. That is, they might think that there are principles that are true with respect to some kinds of objects and not others. For example, Keller goes on to say

> There are other mereological problems generated by transcategorial sums, however. Cosider the mereological principle Theodore Sider calls 'inheri-

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this proposal is to point out that such conditionalizations are actually evidence of a topic-neutral principle behaving differently for different kinds of objects specified in the conditional. Additionally, such conditionalizations could be used to reformulate topic-neutral principles so they yield different verdicts on McDaniel's own tests. If such a reformulation is a problem for the test I am proposing here, then it is a problem for McDaniel's tests too. Thank you to Ben Caplan for raising this point.

[22] Thank you to Ben Caplan for suggesting this possibility.

tance of location', according to which 'an object is located wherever any of its parts are located' (2007, 2, 20). According to inheritance of location, the proposition *John runs* is located wherever John is. But since John changes location, the proposition changes location as well. So acceptance of this uncontroversial principle has the absurd consequence that some propositions move. (Keller 2014, p. 663, italics in the original)

As above, I do not present the argument as decisive. Rather, it demonstrates what one might take as evidence for Identity Pluralism. It seems that one has reasons to think that One-to-Oneness of Identity might be true of some kinds of objects, but not others (that is, that Composition as Identity is true of some kinds of objects and not others). Applying the new test I, inspired by McDaniel's tests, have proposed, these reasons could serve as evidence for Identity Pluralism. Additionally, this could serve as an additional part of a larger argument for Identity Pluralism$_{dA}$.

4.2.5   A New Test

Another upshot of the previous subsection is that those who adopt Non-Standard View of Identity have reasons to adopt Identity Pluralism. I suggest a further result. Considerations about how identity possibly behaves in these metaphysical theories tells us something about the abstract–concrete distinction as well as identity.

The reason that identity varies with respect to abstract and concrete objects is not explained by how the Non-Standard View of Identity departed from the Standard View of Identity. One view said identity was contingent, one said it was indeterminate, and another claimed it was identical to composition. What these views have in common is that they deny one of the Metaphysical Principles of Identity. But the possibility that, on each view, Identity Pluralism is true is not explained by

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this shared feature. The common feature in each's plausible path to pluralism is the concrete–abstract divide. This suggests that a topic-neutral identity relation's possible unnaturalness is explained by the ontological divide between abstracta and concreta.

That the topic-neutral identity relation might behave differently for abstracta and concreta independent of which Metaphysical Principles of Identity are true of it suggests that the *possibility* of a metaphysical concept behaving differently with respect to kinds of objects is another source of evidence of unnaturalness. In light of this suggestion, I propose to add a new test for pluralism. Where C is a metaphysical concept (like a property or relation, or existence itself),

`Possible Variable Behavior` If C is possibly either systematically variably ax-
iomatic, systematically variably polyadic, or systematically axiomatically re-
stricted, then this counts as evidence against C's naturalness.

If, like the tests above, this test serves as a guide to the naturalness of metaphysical concepts, then one could use the arguments sketched in subsection 4.2.4 and others like it, to defend a pluralism like Identity Pluralism$_{dA}$ where there are distinct identity relations for abstracta and concreta and those relations are more natural than a general identity relation.

4.3 Conclusion

I have advanced the discussion of pluralism in two directions. First, I have proposed two new tests for pluralism to add to McDaniel's. Second, I have proposed kinds of arguments one might give to defend Identity Pluralism.

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