

Identity and Ground

Erica Shumener

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With good identity criteria, we can make progress in a variety of philosophical debates. With a criterion for event identity, we can approach the question of whether mental events are identical with or distinct from physical events, knowing what types of features would render them identical or distinct. A diachronic identity criterion for persons can tell us whether you would survive a journey through a transporter machine that disassembles your atoms completely and then puts them back together again. And when considering entities at a single time, we want to know whether distinct objects can share the same qualitative properties: can two objects be alike in every respect except for the fact that there are two of them? A synchronic identity criterion for objects (a criterion for the identity of objects *at a time*) would address this question.

This chapter concerns the nature of identity criteria and the relationship between ground and facts of identity or distinctness. After some preliminaries in section I, we turn to formulations of identity criteria in terms of ground in section II. Section III explores reasons for and against taking identity and distinctness facts to be fundamental. Section IV tackles specific proposals for grounding identity and distinctness facts.

I. Preliminaries

Identity facts are ones like World War I = World War I, and distinctness facts are ones like The Louvre ≠ The Prado. Most identity facts discussed here take the form

of ‘ $x = y$ ’ (where x and y are objects). Facts of the form ‘ $\sim x = y$ ’ (often written as $x \neq y$) counts as a distinctness fact for our purposes. In what follows, I discuss proposals for grounding both identity and distinctness facts. It is controversial whether we should always group identity and distinctness facts together: we may take certain distinctness facts to be grounded while taking identity facts to be ungrounded (or *vice versa*). Or we may take both identity and distinctness facts to be grounded, but in radically different ways. I will highlight points where a separate treatment of identity and distinctness facts may be desirable.

I make a series of assumptions that, while not necessary, help streamline the discussion below. I employ a fact-based account of ground where ground is taken to be a relation holding among facts. I also assume the grounding relation is transitive, asymmetric and (hence) irreflexive and that ground is factive (see Thompson’s contribution to this volume for further discussion).

I primarily discuss two varieties of identity and distinctness facts.

1. *General (or Quantificational)* identity and distinctness facts: These involve quantification over entities. Examples include, $(\forall x)(x = x)$, $(\exists x)(x = \text{Angela Merkel})$, and $(\exists x)(\exists y)(x \neq y)$.

And

2. *Individual* identity and distinctness facts: These concern the identity or distinctness of individual entities (they can be objects, properties, relations, etc.). Examples include, $\text{Angela Merkel} = \text{Angela Merkel}$, and $\text{Angela Merkel} \neq \text{Emmanuel Macron}$.

II. Identity criteria and ground.

We often provide identity criteria in terms of necessary and sufficient conditions: $x = y$ if and only if condition P obtains. Following Kit Fine (2016), we call identity

criteria of this form, “material criteria.”ⁱ Fine (2016) formulates identity criteria in terms of ground as well: if $x = y$, then some fact P grounds $x = y$. We call identity criteria of this form, “grounding criteria”. An example will help us see the difference between material and grounding criteria. Let’s consider a material criterion for set identity. For sets x and y :

Set-Identity_{mat}: $x = y$ iff $(\forall z)(z \in x \equiv z \in y)$

In other words, set x is identical with set y *if and only if* x and y have exactly the same members. We can also formulate a grounding criterion for set-identity:

Set-Identity_g: if $x = y$, then $x = y$ is fully grounded in the fact: $(\forall z)(z \in x \equiv z \in y)$.

Fine (2016) maintains that we should seek grounding criteria if we want to pinpoint *in virtue of* what entities are identical or distinct. Since *in virtue of* is plausibly an asymmetric notion, material criteria cannot tell us in virtue of what objects are identical or distinct. Material criteria do not establish any direction of dependence. Set-Identity_{mat} merely tells us that if $(\forall z)(z \in x \equiv z \in y)$ obtains then $x = y$, and if $x = y$, then $(\forall z)(z \in x \equiv z \in y)$ obtains. Alternatively, since ground strives to capture a metaphysical notion of *in virtue of*, it is better suited for capturing asymmetric dependence. If ground is an asymmetric relation, Set-Identity_g tells us that if $x = y$, $(\forall z)(z \in x \equiv z \in y)$ grounds $x = y$, in which case $x = y$ does not ground $(\forall z)(z \in x \equiv z \in y)$.

Given that the grounding theorist typically thinks that if P grounds Q then P metaphysically explains Q (see Glazier’s contribution to this volume for discussion of the connection between ground and metaphysical explanation), grounding criteria will be attractive to those who want a metaphysical explanation of why entities are identical or distinct. We often seek a metaphysical explanation when

tackling puzzling cases about identity. For instance, when encountering the thought experiment in which Man A enters a transporter and two psychological and physical duplicates of him, Man B and Man C, emerge, we want to explain in virtue of what Man A is identical with or distinct from Man B. To be fair, first we want to know *whether* Man A is identical with or distinct from Man B, and similarly for the relation between Man A and Man C. But to support our verdict, we want to know *why* Man A is identical with or distinct from Man B. We want a metaphysical explanation of this identity or distinctness fact. Thus, a grounding criterion of personal identity would be valuable for us, if we could find one.

Let's turn to the relationship between grounding and material criteria: material criteria do not entail grounding criteria as we have seen above, but do grounding criteria entail material criteria? It depends on how we formulate grounding criteria. Set-Identity_g will establish that if $x = y$ then $(\forall z)(z \in x \equiv z \in y)$, which is the necessity condition of Set-Identity_{mat} (the necessity condition follows from other principles as well, like Leibniz's Principle of the Indiscernibility of Identicals). Since Set-Identity_g states that if $x = y$, then $(\forall z)(z \in x \equiv z \in y)$ grounds $x = y$, it follows that $(\forall z)(z \in x \equiv z \in y)$ obtains if $x = y$ does. What about sufficiency? If $(\forall z)(z \in x \equiv z \in y)$, then will $x = y$ hold? The formulation of Set-Identity_g does not yield this result automatically. The criterion does not rule out that $(\forall z)(z \in x \equiv z \in y)$ obtains yet x is distinct from y . Set-Identity_g says only that *if* $x = y$, then $(\forall z)(z \in x \equiv z \in y)$ grounds $x = y$. While we antecedently believe it is metaphysically impossible for distinct sets to share all their members, the formulation of Set-Identity_g itself does not prohibit this.

However, we can construct a grounding criterion that would explicitly entail the sufficiency condition of the material criterion. One way of doing so is as follows. For sets x and y :

Set-Identity_{g2}:

(1) If $x = y$, then $x = y$ is fully grounded in the fact $(\forall z)(z \in x \equiv z \in y)$.

And

(2) If $x \neq y$, then $x \neq y$ is fully grounded in the fact $\sim(\forall z)(z \in x \equiv z \in y)$.

If $x \neq y$, then $x \neq y$ is fully grounded in $\sim(\forall z)(z \in x \equiv z \in y)$. So $\sim(\forall z)(z \in x \equiv z \in y)$ obtains if $x \neq y$ does. By contraposition and double negation elimination, if $(\forall z)(z \in x \equiv z \in y)$ then $x = y$. The sufficiency condition of $\text{Set-Identity}_{\text{mat}}$ is thereby established.

We have now examined differences between grounding criteria and material criteria. Grounding criteria capture a direction of dependence, they back metaphysical explanations, and certain formulations of grounding criteria are strong enough to entail corresponding material criteria. If we want identity criteria to back metaphysical explanations while generating both necessary and sufficient conditions for the identity of the entities in question, formulations of identity criteria with the form of $\text{Set-Identity}_{\text{g}2}$ will be preferable over formulations like $\text{Set-Identity}_{\text{g}}$ and $\text{Set-Identity}_{\text{mat}}$.

There are still other varieties of grounding identity criteria to consider. Fine (2016) discusses two. First, a grounding identity criterion may tell us, for *any* objects x and y , in virtue of what they are identical. Fine calls this a “general” criterion and describes it thusly: “[the general criterion] tells us, for any two particular objects of the sort in question, what makes them the same” (Fine, 2016, p.4). We can clarify the form of general criteria using universal quantifiers as follows:

$\text{Set-Identity}_{\text{g-general}}$: $(\forall x)(\forall y)[\text{Set}(x) \ \& \ \text{Set}(y) \ \& \ x = y \ \supset \ (x = y \text{ is fully grounded in } (\forall z)(z \in x \equiv z \in y))]$

A second alternative is to formulate identity criteria in terms of arbitrary objects. Following Fine, we call this a “generic” criterion. Instead of stating that for any sets x and y , if $x = y$ then $x = y$ is grounded in $(\forall z)(z \in x \equiv z \in y)$, we claim that for the *arbitrary sets* x and y , if $x = y$ then that fact is grounded in $(\forall z)(z \in x \equiv z \in y)$. The generic criterion for sets would then answer the question: “in virtue of what are these two sets the same, i.e., what is it about the two arbitrary sets (considered as representative individual sets, not as objects in their own right) that would make them the same?” (Fine 2016:13)

Set-Identity_{g-generic}: For arbitrary sets x and y , if $x = y$ then $x = y$ is fully grounded in the fact: $(\forall z)(z \in x \equiv z \in y)$.

Fine favors generic criteria over general criteria.ⁱⁱ General criteria demonstrate how to ground individual identity and distinctness facts, the instances of the universal generalization. Fine thinks the question of what grounds the fact that individual sets are identical with themselves is just a “pseudo-problem—one that we cannot take seriously as answering to any real issue about the identity of sets.” (Fine 2016, p.12) When providing a metaphysical explanation of set-identity, we do not care about explaining in virtue of what is it the case that $\{\text{Socrates}\}$ is identical with $\{\text{Socrates}\}$. We do not care about $\{\text{Socrates}\}$ in particular. Instead, we want a generic criterion that will tell us in virtue of what any two arbitrary sets are identical. For further discussion of generic identity criteria and its appeal, see Fine (2016), and for further discussion of arbitrary objects, see Fine (1985).

III. When (if ever) are identity or distinctness facts fundamental?

Is it truly just a pseudo-problem to consider in virtue of what $\{\text{Socrates}\}$ is identical with itself? If such facts do not hold in virtue of other facts, are we pressured to take them to be fundamental? In this section, we turn to identity and distinctness facts that do not involve arbitrary objects. We will examine three sources of

motivation for taking at least some identity and distinctness facts of this form to be fundamental.

One may take the identity or distinctness of objects to serve as a “precondition” of their standing in other kinds of relations to each other. The distinctness of The Louvre and The Prado, for example, is a precondition for their being spatially separated from one another. Fiocco (forthcoming) articulates an idea in this vicinity, and he maintains that the “individuation of a thing is inexplicable” (although it is not clear that Fiocco himself would conclude from this that identity and distinctness facts are metaphysically fundamental).

We need to better understand what it is for one fact to be a “precondition” of another to see whether this inclines us to take identity and distinctness facts to be metaphysically ungrounded. One option is to characterize preconditions modally: a fact Φ is a precondition of another fact Ψ when Φ is a necessary condition of Ψ . On this characterization, Φ may still be metaphysically grounded—and even metaphysically grounded in Ψ . The conjunctive fact, $2 + 2 = 4 \ \& \ 3 + 3 = 6$, is a modal precondition of $2 + 2 = 4$: It is necessary that the former obtains in order for the latter to obtain. Nevertheless, $2 + 2 = 4$ grounds the conjunctive fact. Thus, it cannot be identity and distinctness facts serving as modal preconditions for other facts which establishes that identity and distinctness facts are metaphysically ungrounded.

The lesson may be that we cannot think of preconditions purely modally. We can import a notion of ground, essence, or real definition into our characterization of a precondition to see if that will help. I will appeal to ground. Let’s assess whether identity and distinctness facts serve as “grounding preconditions” for other facts—where a fact Φ is a grounding precondition of fact Ψ iff whenever Ψ obtains, Φ partially grounds Ψ . Perhaps the fact that objects x and y are distinct serves as a grounding precondition for x and y ’s standing in other relations. For example, the

fact that a is distinct from b may be a grounding precondition of the fact that a is more massive than b.

This is one point at which we may wish to treat identity and distinctness facts separately: Perhaps only distinctness facts serve as grounding preconditions in this way. It is odd, for example, to claim that $a = a$ is a grounding precondition of the fact that a is as massive as a, especially since distinct objects can be as massive as each other. Nevertheless, I will continue to package identity and distinctness facts together for ease of exposition.

Even if identity and distinctness facts are grounding preconditions for objects standing in polyadic relations, this does not establish that they are ungrounded. Identity and distinctness facts may still be grounded in objects' instantiating certain monadic properties. In response, we can broaden the proposal: maybe identity and distinctness facts are grounding preconditions for objects instantiating any properties/standing in any relations whatsoever (other than the identity and distinctness relations themselves). Identity and distinctness facts may then be ungrounded: we are running out of facts to potentially ground them!

However, this suggestion leads to our treating many intuitively metaphysically fundamental facts as non-fundamental; such facts will have identity/distinctness facts as grounding preconditions. For instance, if $e = e$ (where e is an electron) is a grounding precondition of e 's having -1 charge, then we cannot claim that the fact that e has -1 charge is ungrounded. It is also not clear what the full grounds of e has -1 charge would be if $e = e$ serves as a partial (but not full) ground of that fact. This issue arises for every fact involving objects instantiating intuitively fundamental physical properties/relations.

A second motivation for taking certain identity and distinctness facts to be fundamental arises if you think that identity is "joint-carving." Theodore Sider (2011) takes certain quantificational identity and distinctness facts or truths to be

fundamental; although, he does not understand fundamentality in terms of ground (See Tahko's "Structure" in this volume for more on Sider's notion of fundamentality and joint-carvingness). Sider treats the following notions as joint-carving: "first-order quantification theory (with identity), plus a predicate symbol \in for set-membership, plus predicates adequate for fundamental physics, plus the notion of structure." (2011: 292-3) Sider characterizes facts as fundamental when they involve purely joint-carving notions. Fundamental facts will include ones like $(\exists x)Rx$, $(\exists x)(Rx \vee Lx)$, etc. where R and L are joint-carving predicates, and \exists is a joint-carving existential quantifier. Since the identity predicate appears to be joint-carving, identity and distinctness facts like $(\exists x)(\exists y)(x = y)$, $(\exists x)(\exists y)(x \neq y)$ and $(\exists x)(\exists y)((Px \ \& \ Qy) \ \& \ (x \neq y))$ will count as fundamental if P and Q are joint-carving predicates and \exists is a joint-carving existential quantifier.

Does the grounding theorist also have this basis for treating these identity facts as fundamental? Grounding theorists typically ground logically complex facts in their simpler components. For instance, grounding theorists do not commonly take disjunctions, conjunctions, or existential generalizations to be fundamental. Conjunctions and disjunctions are grounded in their conjuncts and disjuncts, respectively. Existential generalizations are commonly grounded in their instances (see McSweeney's and Poggiolessi's entries in this volume for further discussion). Sider's rationale for treating certain identity and distinctness facts as fundamental carries does not straightforwardly carry over into a grounding context. The identity and distinctness facts Sider treats as fundamental, such as $(\exists x)(\exists y)(x \neq y)$ and $(\exists x)(\exists y)(x = y)$, will be non-fundamental for the grounding theorist who claims these facts are grounded in their instances, $a \neq b$ and $a = a$, respectively. Thus, even if facts contain only joint-carving notions in Sider's sense, the grounding theorist may still ground them.

Of course, the grounding theorist can reject that quantificational facts are grounded in their instances, in which case she may be more sympathetic to Sider's view.ⁱⁱⁱ

But if the grounding theorist is not willing to go this route, the question becomes: do we have good reasons to treat individual identity and distinctness facts, like $a \neq b$ and $a = a$ —the ones which ground $(\exists x)(\exists y)(x \neq y)$ and $(\exists x)(\exists y)(x = y)$ —as fundamental?

There are different options here. A grounding theorist sympathetic with Sider's perspective may maintain that identity and distinctness facts involving intuitively non-fundamental objects are non-fundamental but ones involving intuitively fundamental objects are fundamental. This would be a mixed view upon which some individual identity and distinctness facts are grounded and others are ungrounded. We may like such a view if we think there should be no fundamental facts involving non-fundamental objects but we have no problem with taking identity and distinctness facts involving only fundamental objects to be fundamental. A second option would be to take all individual identity and distinctness facts to be fundamental, and a third option would be to take them all to be grounded. We will explore this third option in the next section.

A third reason to posit at least some fundamental distinctness facts (this reasoning does not necessarily extend to identity facts) is to account for certain kinds of metaphysical possibilities. For example, we will consider a scenario popularized by Max Black (1952), the "sphere world." The sphere world contains two qualitatively identical spheres, Castor and Pollux, in an otherwise empty universe. It is difficult to determine on what basis Castor and Pollux are distinct. They are both silver, they both have a mass of 5kg, they are both 10 meters from each other, and so on.

If we take distinctness facts to be fundamental, we can sidestep the question of what makes Castor distinct from Pollux. They just *are* distinct; it is a brute fact. We can posit a fundamental distinctness fact in the sphere world to accommodate this. Shamik Dasgupta (2009) recommends this approach. The fundamental distinctness fact in the sphere world could take the following form:

$(\exists x)(\exists y)((Px \ \& \ Py) \ \& \ x \neq y)$

where P is a predicate that picks out the full qualitative profile of each of the spheres. The fan of individual identity and distinctness facts could also adapt his proposal and posit a fundamental distinctness fact of the form: Castor \neq Pollux.

The attractiveness of taking facts like Castor \neq Pollux to be fundamental hinges on the idea that we have no basis upon which to distinguish the spheres in Max Black's famous scenario. It also relies upon the idea that we do not always need grounding criteria of identity: We do not need grounding criteria for the distinctness of material objects like spheres on this proposal. In the next section, we consider opposing proposals. We will investigate grounding criteria which attempt to distinguish Castor and Pollux.

IV. Proposals for grounding identity and distinctness facts.

We have looked at three sources of motivation for treating at least some identity and distinctness as fundamental as well as issues potentially undermining these motivations. Now we will consider four options for taking identity and distinctness facts to be grounded. I focus on grounding criteria for object identity and distinctness as this has been the most discussed in the literature. Burgess (2012), Donaldson (2015), and Fine (2012) all discuss proposals for grounding individual identity facts involving objects. It is a substantive question which (if any) of these grounding proposals can be extended to accommodate the identity of entities in other ontological categories (such as properties, relations, facts, etc.).

While I discuss grounding identity and distinctness facts involving objects in general, we may only try to ground *certain* identity and distinctness facts involving objects. For instance, as mentioned above, we may take identity and distinctness facts involving non-fundamental objects to be grounded, and ones involving only

fundamental objects to be ungrounded. If one believes that only identity and distinctness facts involving certain objects (say, the non-fundamental objects) should be grounded, then grounding criteria like those below will not be desirable.

One way to ground identity and distinctness facts is by appealing to the properties objects share. More specifically, we can appeal to one half of Leibniz's Law, the Principle of the Identity of Indiscernibles, in order to offer a metaphysical explanation of identity and distinctness facts (see Della Rocca (2005)). While this proposal has trouble accommodating the sphere world from the previous section, it will be worthwhile to examine it more closely to see why it is problematic.

The Properties Proposal:

- (1) If $x = y$, then $x = y$ is fully grounded in the fact that $(\forall F)(Fx \equiv Fy)$. And,
- (2) If $x \neq y$, $x \neq y$ is fully grounded in the fact $(\exists F)(Fx \ \& \ \sim Fy) \vee (\exists F)(\sim Fx \ \& \ Fy)$

$\forall F$ ranges over properties. We should restrict the class of properties to qualitative ones—properties that do not involve the identities of individual objects. If we invoke facts involving non-qualitative properties (properties like *is identical with b* or *is distinct from a*) to ground individual identity and distinctness facts, we could ground the fact that $a \neq b$ in the fact that b has the monadic property *is identical with b* while a does not have that property. This would render the account trivial. We will also violate irreflexivity if the fact that b has the monadic property *is identical with b* is grounded in b 's standing in the binary identity relation to b .

While we can just restrict the class of properties to “qualitative” ones that do not involve the identities of particular objects, this is problematic: The resulting proposal cannot accommodate the metaphysical possibility of distinct yet qualitatively identical objects in an otherwise empty world, i.e., the sphere world discussed in the previous section. We lack the grounds for the distinctness of the

two qualitatively identical spheres. In fact, since $(\forall F)(F(\text{Castor}) \equiv F(\text{Pollux}))$ obtains, the grounds for $\text{Castor} = \text{Pollux}$ obtains. And if we accept a grounding necessitation principle (See Skiles' entry), this should establish that $\text{Castor} = \text{Pollux}$, which conflicts with the set-up of the scenario.

A second proposal appeals to facts about the existence of objects in order to ground identity and distinctness facts. Burgess (2012: 90) suggests that identity facts at first “seem to be nothing over and above the relevant existential facts.” Epstein (2015:169-181) expresses sympathy for this proposal. Perhaps we can ground identity and distinctness facts in the existence of objects.

The Existence Proposal:

(1) If $x = y$, then $x = y$ is fully grounded in the fact x exists.

And

(2) If $x \neq y$, $x \neq y$ is fully grounded in the plurality of facts: x exists, y exists.

One advantage of the Existence Proposal over the Properties Proposal is that the former accounts for the distinctness of the Max Black spheres. In the possible world where only Castor and Pollux exist, $\text{Castor} \neq \text{Pollux}$ is grounded in the two facts: Castor exists, Pollux exists. $\text{Castor} = \text{Castor}$ is grounded in the single fact, Castor exists.

Burgess (2012) explores a version of The Existence Proposal and points out a troubling feature. If the fact that Castor exists has the logical form $(\exists x)(x = \text{Castor})$ then $\text{Castor} = \text{Castor}$ is fully grounded in the fact that $(\exists x)(x = \text{Castor})$. And if existentially quantified facts are grounded in their instances, $(\exists x)(x = \text{Castor})$ is grounded in $\text{Castor} = \text{Castor}$, yielding a violation of irreflexivity.

The proponent of the Existence Proposal can avoid this result in a few ways: 1. They can deny the transitivity or irreflexivity of ground (See Thompson's “Partial Order” for discussion), 2. They can deny that existential generalizations are

grounded in their instances (see essays in this volume by McSweeney, Poggiolesi, and Krämer for discussion of options in line with 2), or 3. They can deny that existence facts are always existential generalizations.

I will set aside options 1 and 2 and explore option 3. Instead of treating existence quantificationally, we can understand existence as a monadic property of objects. In this case, Castor exists will have the form of an atomic fact, $E(\text{Castor})$. As we have no reason to think $E(\text{Castor})$ will be grounded in the fact that $\text{Castor} = \text{Castor}$, we can avoid a potential violation of circularity by claiming that identity facts like $\text{Castor} = \text{Castor}$ are grounded in facts like $E(\text{Castor})$.

The advocate of this alternative should say more about the grounds of facts like $E(\text{Castor})$. After all, if $E(\text{Castor})$ is at least partially grounded in $(\exists x)(x = \text{Castor})$ we will face the same circularity. If $E(\text{Castor})$ is not grounded in this way, we should explain how existential-property facts and existential generalizations relate to one another (see Fine (2012) for discussion).

The Existence Proposal faces another issue: it cannot accommodate identity and distinctness facts (if there are any) involving non-existent entities. You may think that Santa Claus is identical with Santa Claus even though Santa Claus does not exist. If left unrestricted, the Existence Proposal predicts that if ‘Santa Claus = Santa Claus’ picks out a genuine identity fact, the ground of $\text{Santa Claus} = \text{Santa Claus}$ is the existence of Santa Claus. But Santa Claus does not exist.

The proponent of the Existence Proposal should presumably deny that there are identity facts involving non-existent objects. The plausibility of this may depend upon whether one has a fact-based or sentential operator-based account of ground. We can deny that $\text{Santa Claus} = \text{Santa Claus}$ picks out a genuine identity fact on a fact-based account of ground, especially if we take facts of the form $a = a$ to involve objects instantiating properties/relations. We would presumably deny that $\text{Santa Claus} = \text{Santa Claus}$ picks out a genuine fact on this view because there is no object

to stand in the identity relation. However, if we have a sentential-operator account of ground, we may want to uphold that ‘Santa Claus = Santa Claus’ is a true sentence (even if it does not correspond to a worldly fact). Thus, it is not clear what a proponent of the Existence Proposal who subscribes to the sentential-operator approach should say about the grounds of ‘Santa Claus = Santa Claus’.

A third alternative is to ground identity and distinctness facts in facts concerning parthood (see Burgess 2012^{iv}). Perhaps x is identical with y when x is part of y and y is part of x . This approach requires us to take the notion of part to be more fundamental than that of identity. Here is one way to formulate the parthood proposal, where the predicate P picks out the relation *is part of*.

The Parthood Proposal:

(1) If $x = y$, $x = y$ is fully grounded in the plurality of facts: Pxy, Pyx .

And

(2) If $x \neq y$ then $x \neq y$ is fully grounded in the fact $\sim Pxy$, or $x \neq y$ is grounded in the fact $\sim Pyx$.

When x is part of y and y is part of x , then x is what is often called an “improper part” of y . One common way to understand the *improper parthood* relation is in terms of identity: x is an improper part of y iff x is identical to y . We contrast the *improper parthood* relation with the more intuitive *proper parthood* relation, where x stands in the proper parthood relation to z when x is part of z and x is not identical to z . To avoid circularity, it is important that we do not define P in terms of improper parthood, and then define improper parthood in terms of identity. For example, we cannot think of P as picking out the relation *is an improper part of* or the disjunctive relation, *is either a proper part of or an improper part of* and then go on to define *improper parthood* in terms of *being identical with*. Instead, the proponent of the Parthood Proposal would more likely leave the *is part of* relation undefined or primitive.^v

This proposal can distinguish everyday objects we encounter: the Coca Cola bottle is distinct from the cheeseburger because neither is part of the other. They do not even share any parts in common. And the fact that the cheeseburger is an improper part of itself will ground the fact the cheeseburger is identical with itself. While the bottle and the cheeseburger are intuitively mereological fusions made up of proper parts, the Parthood Proposal is supposed to work for mereological atoms as well. While mereological atoms have no proper parts, they have themselves as improper parts. This proposal can also distinguish Castor and Pollux in the sphere world: Castor is not a proper or improper part of Pollux nor is Pollux a proper or improper part of Castor.

The Parthood Proposal is not for everyone. Sider resists defining identity in terms of parthood. While he does not discuss ground, his concerns may carry over into a discussion of grounding criteria. Sider states:

“[C]onsider the objection that adopting parthood in fundamental theories allows the elimination of identity from ideology via the definition “ $x = y =_{df} x$ is part of y and y is part of x ”. The savings in ideological parsimony would be outweighed by increased complexity in the laws, which I take to include laws of logic and metaphysics. The logical laws governing ‘=’ must now be rewritten in terms of the proposed definition, making them more complex; and further, the laws of mereology will be needed.” (Sider 2013: fn. 10)

Sider thinks if we understand identity in terms of parthood, we must rewrite the logical laws in terms of mereological notions, and this revision will be much more complex than the versions we have involving identity. This added complexity is problematic if we favor simpler theories.

The Parthood Proposal will also face resistance from some (but not all) mereological nihilists.

The mereological nihilist denies that objects have proper parts. Under one version of mereological nihilism, only mereological atoms exist, and they are improper parts of themselves. This view appears to be compatible with the Parthood Proposal: every atom is an improper part of itself and not a part of any distinct atoms. Other versions of mereological nihilism cannot accept the Parthood Proposal. Consider a version of mereological nihilism which denies the existence of parthood relations from the outset. This mereological nihilist will also claim that the only objects that exist, fundamentally speaking, are mereological atoms; yet, they will deny that the atoms are parts of themselves because they deny that anything stands in the parthood relation. The proponent of this version of mereological nihilism cannot use The Parthood Proposal to generate the correct verdicts about identity and distinctness. Finally, the Parthood Proposal may be too limited in scope if we are seeking a general account of object-identity. Insofar as there are objects that do not stand in any parthood relations—such as abstract objects, like numbers—the Parthood Proposal cannot ground identity and distinctness facts concerning them.^{vi}

The fourth and final proposal we will consider is whether identity and distinctness facts are zero-grounded. A fact is zero-grounded when it is not grounded in further facts, but it is not ungrounded either. Fine describes the distinction between being ungrounded and being zero-grounded:

“There is a...distinction to be drawn between being zero-grounded and ungrounded. In the one case, the truth in question simply disappears from the world, so to speak. What generates it... is its zero-ground. But in the case of an ungrounded truth...the truth is not even generated.” (Fine (2012: 48))

Fine then considers taking identity facts to be zero-grounded:

“But in other cases—as with Socrates being identical to Socrates or with Socrates belonging to singleton Socrates—it is not so clear what the contingent truths might be; and a plausible alternative is to suppose that they are somehow grounded in nothing at all.” (Fine (2012: 48))

Tom Donaldson (2017) explores taking certain mathematical identity facts to be zero-grounded as well. We can formulate a version of the Zero-Ground Proposal as follows:

The Zero-Ground Proposal₁:

- (1) If $x = y$, then $x = y$ is zero-grounded.

Identity facts are grounded on this proposal even though there are no facts which ground them. The distinction between being ungrounded and being zero-grounded is significant because, were we to take identity facts to be ungrounded, we would be pressured to treat them as fundamental. Since the Zero-Ground Proposal₁ maintains that identity facts are grounded, they are non-fundamental.

This is another point in which our treatment of identity and distinctness facts may come apart: it is not clear that distinctness facts should be zero-grounded as well. While Fine and Donaldson are primarily concerned with grounding identity facts, we could try to extend the Zero-Ground Proposal₁ to accommodate distinctness facts as follows.

The Zero-Ground Proposal₂:

- (1) If $x = y$, then $x = y$ is zero-grounded.
- (2) If $x \neq y$, then $x \neq y$ is zero-grounded.

With the added clause for distinctness, the Zero-Ground Proposal₂ can accommodate the sphere world. $\text{Castor} \neq \text{Pollux}$ is zero-grounded. Unlike the other proposals, the Zero-Ground Proposal₂ maintains that identity facts and distinctness facts have the same grounds. $\text{Castor} = \text{Castor}$ and $\text{Pollux} = \text{Pollux}$ are also zero-grounded. This is not necessarily problematic, but it is not yet clear that this proposal yields a satisfactory metaphysical explanation of why objects are distinct. If we are looking for a basis upon which to distinguish objects like Castor and Pollux, then I am not sure the Zero-Grounding Proposal₂ provides it. The distinctness of Castor and Pollux is metaphysically explained on the Zero-Grounding Proposal₂—but not on the basis of any facts.

This proposal maintains that distinctness facts are grounded in the same way identity facts are grounded: they have the null ground. Perhaps different kinds of facts should admit of different grounds. For example, Dasgupta (2014) objects to grounding facts in their grounds because it would render “ P grounds $P \vee P$ ” as grounded in the same way as “ P grounds $P \ \& \ P$ ”. (Both would be grounded in P). He thinks there should be a difference in the grounds of “ P grounds $P \vee P$ ” and “ P grounds $P \ \& \ P$ ”: the former fact concerns disjunction whereas the latter concerns conjunction. The grounds should reflect this difference, so the thought goes. Likewise, we may object to the Zero-Ground Proposal₂ because it is implausible that identity and distinctness facts would have exactly the same grounds. It is strange for facts of the form $x = y$ and of the form $\sim x = y$ to have exactly the same grounds.

All of these proposals for grounding identity and distinctness facts have issues in need of further examination. There is a lot of philosophical room left to explore when questioning whether and how to ground identity and distinctness facts. The aim in this chapter is not to advocate formulating identity criteria in terms of ground, nor is it to convince the reader that identity and distinctness facts must be grounded. Instead, I hope to have provided an array of options open for

investigation and that the reader has gained a sense of which avenues she can pursue.

ⁱ We also often witness a modal analogue of material criteria: $\Box[x = y \text{ if and only if condition } P \text{ obtains}]$. We will only discuss non-modal material criteria in what follows.

ⁱⁱ As a presentational note: I have not taken a stand as to whether Set-Identity_g Set-Identity_{g2}, and Set-Identity_{mat} should be understood generally or generically, and I leave further formulations of grounding criteria similarly ambiguous.

ⁱⁱⁱ See Rosen (2010) for discussion of reasons to take certain universal generalizations as fundamental.

^{iv} See Smid (2017) as well; although, he is not concerned with ground in his paper.

^v We should note that if we adopt extensional mereology with a strong supplementation principle, we cannot have distinct objects with the same proper parts on this view.

^{vi} However, some philosophers argue that entities other than concrete objects stand in parthood relations. See Paul (2002) and Fine (2010).

Cross-References

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Recommended Papers/Books

French, Steven. (1989) "Identity and Individuality in Classical and Quantum Physics." *Australasian Journal of Philosophy* 67.4 432 – 46. (This contains further discussion the identity of indiscernibles in the context of contemporary physics)

Hawley, Katherine. (2009) "Identity and Indiscernibility." *Mind* 118.469 101 - 19. (This contains further discussion the identity of indiscernibles in the context of contemporary physics and metaphysics)

Lowe, E.J. (1998) *The Possibility of Metaphysics: Substance, Identity, and Time*. Clarendon Press: Oxford. (This book contains helpful discussion of identity criteria in metaphysics)

Quine, W. V. "Grades of Discriminability." *Journal of Philosophy* 73.5 (1976): 113-16. (This article contains discussion of different kinds of distinguishability)

Williamson, Timothy. (1990) *Identity and Discrimination*. Wiley Blackwell: Oxford. (This book discusses the relationship between identity, understood as a metaphysical notion, and discrimination, understood as an epistemological notion).

Biographical Note:

Erica Shumener is an assistant professor in the philosophy department at the University of Pittsburgh in the United States.