Philosophers' Imprint

VOLUME 22, NO. 22
DECEMBER 2022

Essentialist Non-Reductivism

Taylor-Grey Edward Miller

Brigham Young University

DOI: 10.3998/phimp.1205

The world, as many contemporary metaphysicians would tell you, is rife with structure. Reality comes in layers, with facts at each level playing a role in fixing the facts in the levels above. One strong motivation for doing our metaphysical theorizing in terms of grounding is its promise to satisfactorily explicate the idea of reality having a layered structure. On this view, the layered structure of reality is given by a specification of which facts ground others. However, a difficulty emerges when one combines the layered structure view with the view that higher-level facts are not reducible to lower-level facts. As we will see, the difficulty stems from the fact that grounding explanations that capture the relationships of metaphysical determination between reality's layers are implicitly general, and the generality associated with claims of ground apparently fails to mesh with non-reductivism.

This tension emerges from two problems. The first problem arises from thinking that grounding exhibits the kind of generality captured by the determination constraint.[1] The determination constraint says, roughly, that corresponding to every true grounding claim is a true universal generalization. In order to satisfy the determination constraint, we will face serious pressure to make sure the entities involved in the grounded facts are appropriately connected to the entities involved in the grounding facts; otherwise, the generalizations associated with those grounding claims will come out false. We will call this the *variable coordination problem*.

The solution to the variable coordination problem is straightforward in isolation but raises another, more difficult problem. Ensuring the appropriate connections seemingly leaves no way for the non-reductivist to fully squeeze out reference to higher-level entities as we descend the levels of ground. This threatens the result that some higher-level facts must be taken as fundamental, thereby violating core tenets of non-reductivism. Call this the *explanatory role problem*.

In what follows, I'll argue that we can solve both problems by taking the connections at issue to be *essentially* true. This will enable us to

1. deRosset [2010], Rosen [2010], von Solodkoff [2012], Audi [2012].

satisfy a restricted version of the determination constraint and solve the variable coordination problem. Moreover, the essentialist truths have a special status that prevents the explanatory role problem from arising. We can call this view *essentialist non-reductivism*. One significant upshot of the argument is that we can see not only that essentialist non-reductivism successfully reconciles non-reductivism with the determination constraint but also that in principle no better solution could be offered.

1. Ground, Generality, and the Connection Problem

1.1 The Determination Constraint

We will take grounding claims to have the following form:

$$\phi_0, \phi_1, \ldots < \psi$$

Here ground is expressed by means of a sentential operator with a collection of sentences to the left and exactly one sentence to the right. We will take "<" to designate full ground, and we make the standard assumptions about the nature of full ground.[2] The clauses to the left of our grounding operator express the grounds which explain the facts expressed by the clause to the right. We will refer to the clauses designated by $\phi_0, \phi_1, \ldots$ as *explaining clauses* of a grounding explanation. The clause designated by ψ we will refer to as the *explained clause*. Grounding explanations give rise to a certain kind of generality. We can see this by considering particular grounding claims like

> (1) Rachel scored a passing grade on the NY bar < Rachel is a duly licensed NY attorney.

As it turns out, (1) is false. To see this, consider Mike, a skilled test taker who corruptly charges struggling prospective lawyers to score passing grades on their behalf. Mike is not a law student himself and in fact has never attended law school. Mike has scored passing grades on the NY bar exam (never under his own name), but Mike is not a duly licensed attorney. So, being a duly licensed attorney depends on more than having a passing grade on the bar. The passing grade partly grounds but needs supplementation. Here it is easy to see how to complete the grounding explanation. We need to add the requirement that the individual graduates from a bar-approved law school. This will yield:

> (2) Rachel scored a passing grade on the NY bar & graduated from Columbia Law < Rachel is a duly licensed NY attorney.

There is something significant about (2) insofar as it is complete and correct. It seems to follow that anyone who, like Rachel, has passed the bar and graduated from Columbia (or any bar-approved law school for that matter) would, like Rachel, be a licensed NY attorney. In other words, if (2) is correct, so is

> (3) Helen scored a passing grade on the NY bar & graduated from Columbia Law < Helen is a duly licensed NY attorney.

That is, assuming Helen in fact attended Columbia and passed the bar. This suggests that the quality of a grounding explanation is preserved under uniform substitution of singular terms.[3] This is confirmed by our general practice of offering and evaluating grounding explanations. Suppose someone proposed the following three grounding claims:

> (4) Act A maximizes utility < Act A is morally right.
>
> (5) Ethyl alcohol contains a hydroxyl group < Ethyl alcohol is miscible.
>
> (6) Joe has physical properties $P_0, P_1, \ldots$ < Joe is conscious.[4]

2. In particular that it is asymmetric, transitive, irreflexive, and well founded. We thus obtain a well-founded partial ordering over the domain of facts. I note the standard assumptions here to help the reader gain a sense of what grounding is supposed to be, although nothing I say in what follows hangs on these assumptions being wholly vindicated across all instances of grounding.

3. deRosset [2010], Rosen [2010], von Solodkoff [2012], Audi [2012].

4. Presumably there aren't any actual zombies. So, here, it seems, we get a *possible* confounding case. Assuming that ground necessitates, this will be enough. I will not argue for necessitation here (see, e.g., Leuenberger [2014]

We could evaluate these grounding claims in the following way. For (4) we might look for an act that maximized utility but was, contrary to the proposal, morally wrong—perhaps acts that result in worlds with extravagant population sizes but that contain only "muzak and potatoes."[5] For (5) we would look for a molecular compound containing a hydroxyl group that is not miscible in water. And, as the chemists say, we need look no further than polyester. For (6) we might try to find an individual who could share all of Joe's physical properties but fail to be conscious, in which case we might go on a zombie hunt.[6] If there is such a case, then that would spell trouble for (6). In short, given a proposed grounding claim, we can determine if the grounding claim is true by trying to identify an individual that when appropriately substituted for the relevant individuals in the grounding claim under consideration generates a false grounding claim. Call such cases *confounding cases*. We may then introduce an apparent necessary condition for the truth of a putative grounding claim. A grounding claim is true only if it has no confounding cases. We will call this the *determination constraint*.[7]

Louis deRosset offers the following regimentation of the determination constraint:

> DC: if $\phi_0, \phi_1, \ldots <$ ψ then $\forall x_0, x_1, \ldots$ $(\Phi(x_0, x_1, \ldots) \rightarrow \psi(x_0, x_1, \ldots))$.

Here Φ is the conjunction of the explaining clauses $[\phi_0, \phi_1, \ldots]$. Where $\tau_0, \tau_1, \ldots$ are (all the) terms occurring in either Φ or ψ, ($\Phi(x_0, x_1, \ldots)$ and $\psi(x_0, x_1, \ldots)$) are the result of uniformly substituting in x_i for τ_i (for all i) in Φ and ψ.[8]

Again, the idea here is that our practice of evaluating grounding claims suggests that grounding claims are implicitly general. DC identifies that generality with a particular kind of universal generalization. We can identify a grounding claim's associated universal generalization by following deRosset's four-stage construction procedure:

> 1. Conjoin the explaining clauses in a big conjunction Φ.
>
> 2. Form the material conditional whose antecedent is Φ and whose consequent is ψ.
>
> 3. Uniformly replace all the singular terms with variables.
>
> 4. Finally, close the result by binding the variables with the appropriate quantifier phrases.[9]

If we take another look at a simplified act utilitarian account of normative explanation, we can see how this works. First, we take the grounding claim

> (7) Act A maximizes utility < A is morally right.

Applying steps 1 and 2 yields

> (8) Act A maximizes utility → A is morally right.

and Skiles [2015] for arguments to the contrary), but I will assume it in what follows. In fact, I'm committed to it, since the essentialist solution that I provide assumes that essence entails necessity (see Leech [2021] and Mackie [2020] for objections to such a view).

5. Parfit [2004] p. 148.

6. Here I take the standard view of zombies: that they are individuals physically indiscernible yet psychologically discernable from conscious human persons. See, e.g., Kripke [1980] and Chalmers [1996] and Chalmers [2009]

7. deRosset [2010], deRosset [forthcoming], von Solodkoff [2012].

8. deRosset [forthcoming] ch 8. § 2. One might worry that DC as stated is false. This stems from the way that co-referring terms affect constructing the generalizations associated with the grounding claims in which they are involved. If I take a grounding claim like [Cicero loves Tully < Tully loves himself] and generalize, I get the following: $\forall x \forall y$ (y loves x → x loves x). This formulation of DC then threatens the result of making it too easy to construct confounding cases for the considered grounding claims. There is a simple way around this worry. We assume that our language is transparent, that every individual is named by exactly one term. This allows DC as stated to be true. This corresponds to deRosset's notion of a *perspicuous articulation* of a grounding fact. In what follows we adopt this transparency convention, and all grounding claims we consider will be perspicuously articulated in deRosset's sense.

9. Ibid. ch. 8 § 2.

Further applying steps 3 and 4 yields

(9) ∀x (x maximizes utility → x is morally right).

DC predicts that we can conclude that if (9) is false, then so is (7). And this seems right for the reasons given above. The presence of confounding cases gives us conclusive evidence against the truth of a putative grounding claim, and DC helps us rightly see confounding cases as falsifying instances of universal generalizations like (9).

1.2 Non-Reductivism

Let's assume that every biological fact is grounded in some collection of physical facts. A non-reductive view of this relation would hold that although the biological facts are so grounded, some such facts are *properly biological*—that is, they are not identical to any physical fact. The reductive view, by contrast, holds that all biological facts are identical to some physical fact, and those physical facts may be grounded in a further collection of physical facts. This matters for how we think about the specification of the grounding claims for properly biological facts. The non-reductivist will hold that properly biological facts will be grounded in some collection of facts *not* involving any properly biological entities. After all, the facts grounding them are different facts, so the biological facts are not to be identified with anything in their grounding base. The physical grounds don't involve the higher-level biological entities; nevertheless, the biological facts depend on and are determined by them. However, there's nothing special about the biological facts in this regard. This can be generalized to a minimal commitment of any type of non-reductivism: all facts involving properly higher-level entities are grounded in facts *not* involving entities of that kind.

1.3 The Variable Coordination and Explanatory Role Problems

With the relevant features of non-reductivism as well as DC in place, let's see how a problem for non-reductivism arises. Recall that DC states that every true grounding claim has an associated true universal generalization. If we let ϕ_0, ϕ_1, … be the grounds for our fact about some properly biological process B, then our minimal commitment of non-reductivism will require that a grounding claim of the form

(10) ϕ_0, ϕ_1, … < B occurs in living cells.

be true (where B *cannot* be involved in any fact expressed by any ϕ_n). These facts are all properly physical, so none of the terms in ϕ_n refer to B (nor any other properly biological entity). So, when we follow our recipe for constructing the universal generalization associated with (10), the consequent clause of that material conditional will require a variable as a substitute for "B" which is distinct from any of the variables we use as substitutes for the individuals named in the explaining clause of (10). Thus, applying DC to (10) yields

(11) $\forall x_0 x_1$, …y ($\Phi(x_0 x_1, \ldots)$ → y occurs in living cells).

and now we start to see real trouble. Since ground is factive, $\Phi(\tau_0\ \tau_1, \ldots)$ is true. We can existentially generalize and get $\exists x_0 x_1$, …($\Phi(x_0 x_1, \ldots)$. Standard first-order logic then entails

(12) ∀y (y occurs in living cells).

It's hard to overstate how bad this is, given that most things fail to occur in living cells. Neither nuclear fusion nor democratic elections nor film premieres occur in living cells. If DC is the right way to understand the determination constraint, each of these will count as a confounding case for (11). The issue we now face is that it appears that no claim specifying the purely physical grounds for (10) satisfies DC. This is the *variable coordination problem*.

A straightforward solution suggests itself. What appears to have gone wrong is that if we do not somehow make explicit mention of B in the antecedent of the universal generalization associated with our grounding claim, we lack the right sort of connection between the facts expressed by the explaining clause and any facts involving B. What then is to be done? Here is a simple solution. We could add

linking facts to the antecedent of our associated generalization. For example, we may add a simple linking fact like the following:

Linking Fact: [ϕ_0, ϕ_1, … constitute the occurrence of B]

Doing so allows us to explicitly represent the connection between B and the microphysical goings on that constitute it in the generalization associated with our grounding claim. However, as Tatjana von Solodkoff has observed, DC requires treating anything mentioned in the antecedent of the grounding claim's associated generalization as something corresponding to a component of the explaining clause for our grounding claim. This means that including the linking fact in the associated generalization commits the non-reductivist to regarding it as playing the role of a partial ground for our B-involving fact.[10] Taking the linking fact to play the role of partial ground puts the non-reductivist in an untenable position. Non-reductivism demands that the properly biological facts be grounded in facts *not* involving entities of that kind. We are forced to regard linking facts that involve B as among the grounds. This makes our B-involving facts grounded in B-involving facts, thereby violating non-reductivism's minimal commitment. This is the second problem: the *explanatory role problem*.

The challenge for the non-reductivist, then, is to find a way of ensuring the connection between the grounding and grounded facts so that their associated generalization is true (thus avoiding the variable coordination problem), without incurring a commitment to the involvement of the higher-level entities in the grounding fact (thus avoiding the explanatory role problem). Some, including von Solodkoff, have expressed skepticism about the prospects for non-reductivism in the face of these worries.[11] In what follows I develop a solution. In particular, I show how to weaken or amend DC in a way that still manages to capture the role that it plays in determining the truth of grounding claims. This will open up resources to solve the variable coordination problem without exacerbating the explanatory role problem. Ultimately, we will do so by taking on certain essentialist commitments, but in order to better appreciate the form that the essentialist solution will take, it will first be useful to consider a response that fails. This will allow us to introduce constraints on a satisfactory solution which will guide the development of the essentialist account to come. What then plays the role of our dialectical foil? Enabling conditions.

10. von Solodkoff [2012] pp. 396–97.

11. von Solodkoff [2012]. See also e.g., Fisher, Hong, and Perrine [2021].

2. Another Unsatisfactory Solution

In the wake of the influential work of Jonathan Dancy, appeals to enabling conditions have become increasingly popular as solutions to a variety of problems of ground.[12,13] It's easy to see why. Enabling conditions, as their advocates will point out, play a role in metaphysical determination without playing the role of ground. To warm you to this idea, most advocates point out the naturalness of appealing to enabling conditions in the case of causal explanation and then demonstrate the similarities between causal and grounding explanations.[14] Imagine a match *m* having been struck. Our enabling condition theorist would point out that striking *m* causes *m* to light, and this appears to be a fully satisfactory causal explanation. Thus, striking *m* is the sole cause of *m*'s lighting. But they would also point out that the causal success of striking *m* counterfactually depends on other factors, such as that there is sufficient oxygen in the environment. These other factors thus serve as enabling conditions for the striking to successfully cause

12. See especially Dancy [2004] sect 3.1. Dancy often talks in terms of a "resultance" relation. Significant work has been done to illuminate the nature of this relation. Berker [2018], for example, argues convincingly that this is best understood as the grounding relation. Thanks to Derek Haderlie for pointing this out to me.

13. Muñoz [2020] invokes this distinction to solve the problem of what grounds negative existentials, Moran [2018] to solve the grounding problem, and Bader [n.d.] to solve the problem of what grounds universal generalizations, just to name a few.

14. See, e.g., Schaffer [2016] and Wilson [2018] on the putative analogies between grounding and causation. See Koslicki [2016] and Bernstein [2016] for criticisms of the analogy.

the lighting.[15] So, for the enabling condition theorist, causal explanation has something like the following structure:

E: C_0, C_1, … causes P.[16]

Where C_0, C_1, … are the causes, P is the effect that they produce, and E is the collection of conditions that enable that causal relationship. I won't pursue here any considerations drawing out the similarities between causation and grounding, nor will I take up discussion as to whether the distinction between an enabler and cause (or ground for that matter) can be sustained. Instead, I turn to how this distinction might affect our understanding of the structure of grounding claims and their associated universal generalizations.

If we take there to be conditions that enable grounding explanations, then, by analogy with the causal case, we might take grounding claims to be most perspicuously stated in the following form:

E: ϕ_0, ϕ_1, … < ψ.

Where *E* states the condition(s) enabling the ϕ_ns to (collectively) make ψ the case.

Since the enabling conditions condition the grounding relation, and so are relevant to the obtaining of the grounded fact (although not via being grounds), the content of some claim expressing them ought to be incorporated into the universal generalization associated with the relevant grounding claim. Since the associated generalization is a quantified material conditional, intuitively, we should just throw the claim expressing the enabling condition into the antecedent. After all, it contributes to the generation of the grounded fact. So, we might reformulate DC as DC+E:

DC+E: if ϕ_0, ϕ_1, … < ψ then $\forall x_0 x_1$, … ($\Phi(x_0, x_1, \ldots)$ & $E(x_0, x_1, \ldots) \rightarrow \psi(x_0, x_1, \ldots)$).[17]

DC+E says that a grounding explanation is true only if the universal generalization associated with the grounding claim taken together with its enablers is true. If the enabling conditions are to help us with the variable coordination problem, they must mention the higher-level entities; otherwise, the view is a non-starter.

Recall our guiding example:

(10) ϕ_0, ϕ_1, … < biological process B occurs in living cells.

The enabling condition theorist will insist that we should revise (10) to include the relevant enabling conditions:

(13) *E*: ϕ_0, ϕ_1, … < B occurs in living cells.

We would then form the universal generalization associated with (13):

(14) $\forall x_0 x_1$, …y ($\Phi(x_0, x_1, \ldots)$ & $E(x_0, x_1, \ldots y) \rightarrow$ y occurs in living cells).

Here we must observe something odd. According to (14), we articulate the enabling condition in a way that involves mention of the higher-level entity. Now, if you look at plausible cases of enabling conditions in the literature, they often seem to lack this feature, and it will be somewhat forced to treat them as if they really do involve the higher-level entities. In the causal case mentioned previously, the natural way to represent one of the enabling conditions is something like [the container meets a certain oxygen threshold], and that won't mention the match being struck at all. Instead, the enabling condition theorist will need to insist that we should instead represent the enabling condition as [the striking of the particular match *m* occurred in a container meeting a certain oxygen threshold]. After all, if they do not, then the purportedly true grounding claims involving them will be too easily confounded. The enabling condition theorist can make this move, but

15. For discussion of this and similar arguments, see Baron-Schmitt [2021].

16. Here I separate E from the sentence expressing the casual explanation via a colon in order to underscore that the enabling conditions are not to be conflated with the causes and that they occupy a different explanatory role.

17. deRosset [forthcoming] ch. 8 § 4.

it is worth noting that it is not motivated by how the view is typically formulated. It is somewhat unclear that these off-the-shelf theoretical tools of enabling conditions really fit the job. However, if the enabling conditions theorist wants to solve the variable coordination problem, and they aren't bothered by the fact that doing so strains the theoretical tools being used to solve it, then they can muster a solution.[18]

They will insist that in the case above, the enabling conditions will concern the particular biological process B. So, the enabler *E* in DC+E will involve B, thus solving the variable coordination problem.

Such a solution avoids the unseemly consequences faced by linking facts mentioned above. Invoking linking facts, on the stronger version of DC, carried with it a commitment to including the facts involving them *among the grounds* for our biological facts. The selling point of DC+E is that we get occurrences of "B" in the antecedent of our associated generalization without this reflecting back onto the grounds for our properly biological fact. The grounds for our B-involving fact do not involve any properly biological entities. The enabling conditions do, to be sure, but enablers aren't grounds. They play a different explanatory role. So, it appears that enriching the structure of ground to include an explanatory role for enabling conditions will open up resources to address the explanatory role problem as well.

Unfortunately, appearances here are misleading. While it is true that invoking enabling conditions allows us to relocate the connecting facts to an explanatory position other than the grounds—the enabling role—the non-reductivist still cannot maintain their minimal commitments. At the end of the day, the non-reductivist wants irreducibility all the way up the grounding chain without at the same time being on the hook for regarding the irreducibles as fundamental. So it's untenable for a biological non-reductivist to hold that the biological facts are fundamental. Sadly, this seems to be what the appeal to enablers delivers.

18. Thanks to an anonymous referee for valuable suggestions regarding how to bring out this tension.

Suppose, for illustration, that in every case in which some irreducible fact *f* involving a properly biological entity B is grounded, there is an enabling condition enabling the grounding relation which involves B. Then it will be true that some B-involving fact *g* (the enabling fact) plays a role in metaphysically determining *f*. Now we face a problem. Either *g* has grounds or it does not. If it does not, then we acquiesce to the spirit of the explanatory role problem by regarding B as involved in a fundamental fact. If *g* does have grounds, then the grounding claim expressing it either must mention B in the explaining clause or in the clause expressing its enabler. Non-reductivism will not permit it in the explaining clause. So, B must be mentioned in the clause expressing *g*'s enabler. We then reiterate the above reasoning until we have pushed down the chain of ground to a fundamental enabling fact involving B.

The problem here is not that we are required to recognize fundamental enablers.[19] Rather, the problem is that we are forced to recognize properly biological facts as among them. This problem is not tied specifically to the case of the properly biological fact. It threatens to generalize to any class of facts that the non-reductivist feels keen to consider higher level. Invoking enabling conditions does not seem to satisfactorily avoid the spirit of the explanatory role problem since it still plausibly is on the hook for regarding some fact involving the relevant higher-level irreducibles as fundamental. This all stems from the fact that in a wide range of grounding explanations, the facts that function as enablers require substantive grounds.

This shows that the explanatory role problem is only superficially about whether or not the higher-level entities are involved in the *grounds*. What really matters is whether given the relevant explanatory role of the connecting facts, a commitment to the fundamentality of the higher-level entity is brought in its wake.[20] On this refined picture

19. For a plausible account of what these might be, see, e.g., Moran [2018] and Bader [n.d.].

20. We have focused primarily on the relative fundamentality of the biological *facts*. Biological facts are less fundamental than the physical ones in roughly

of the explanatory role problem, we see that even identifying more sophisticated explanatory roles for the connecting facts to play does not guarantee that they solve the deeper issue in play.

Despite these problems, we learn something significant here about a general strategy for responding to the connection problem. We identify some facts relevant to the metaphysical determination of our target grounded fact that function in an explanatory role other than that of a partial ground but which still contains the relevant properly higher-level entity as a constituent. We then weaken DC in such a way that this additional explanatorily relevant fact gets incorporated in the universal generalization associated with the grounding claim by adding its content to the antecedent of the embedded conditional. We then secure occurrences of the higher-level entity and avoid our quantifier shifting issues without having to be committed to the higher-level entity being involved in the grounds. This solves the variable coordination problem and accounts for the connection between the grounding and grounded facts. But it appears that this strategy can succeed only to the extent that whatever facts play the additional explanatory role require no substantive grounds themselves. As we've seen above, this is quite difficult to achieve given that, inevitably, facts belonging to this class will need to involve higher-level entities like B. Despite this difficulty, our non-reductivist need not despair. In the next section, I will show that she can meet this dialectical demand by making use of a few essentialist resources.

3. Essence and the Determination Constraint

Much of the appeal of the enabling conditions view stems from how plausible it is that there is more to the story about metaphysical explanation than merely what grounds and what is grounded, and many have argued that what plays this additional explanatory role captures in some respects the connections between what grounds and what is grounded. Jonathan Schaffer, for example, argues that that ground has a tripartite structure of *source* (the grounds), *link* (that which accounts for their connection), and *result* (the grounded).[21] There are many ways of understanding what plays the role of the link. Some, including Schaffer, hold that metaphysical laws play the role of link.[22] Others hold that what accounts for the connection between the grounds and grounded are facts about the respective natures of the individuals involved in those facts.[23] On this view, the role of link is played not by some collection of metaphysical laws but by some collection of essentialist facts, and a grounding claim will be true only if there are the appropriate essentialist connections between the individuals involved in the ground and grounded facts.

If our grounding claim takes the form $\phi_0, \phi_1, \ldots < \psi$, then the relevant essentialist facts will concern the individuals involved in $\phi_0, \phi_1, \ldots$ and ψ. They will capture the essential connections between these individuals, and, as I hope to show, attending to these essentialist facts will motivate another modified version of the determination constraint which the standard non-reductivist can endorse without threatening to issue the wrong verdicts about what sorts of facts are fundamental.

To this end, it will be helpful to look at some particular cases of grounding and examine the relationships of essential dependence holding among the individuals involved in these facts. We will then use these cases to extract a modified version of the determination constraint that the non-reductivist can happily endorse. Let's start with a well-worn but simple case:

(15) Socrates exists < {Socrates} exists.

the sense that every biological fact obtains in virtue of some physical fact. There is a correlative ground-theoretic account of fundamentality for entities, due to Michael Raven [2016]: roughly an entity is fundamental if either its existence or its possession of some feature is not grounded in the existence and features of other entities. In terms of the present example, biological processes all exist and have the features they do in virtue of certain physical processes occurring. On this assumption, they are not fundamental entities.

21. Schaffer [2017].

22. See, e.g., Wilsch [2016] and Glazier [2016].

23. Rosen [2010], Fine [2012], Dasgupta [2014].

Here we will take "{Socrates}" as a name for the set whose sole member is Socrates. The universal generalization associated with (15) is

(16) ∀x∀y (x exists → y exists).

Thus, (16) generates confounding cases if we accept, as the Meinongians do, that some things don't exist.[24] If, however, we find ourselves un-enticed by the Meinongian picture and accept that everything exists, we may worry that (16) shows that the determination constraint is getting by on an unsatisfying kind of technicality. We can shift the example to avoid these kinds of difficulties. For example, we might consider the grounding claim:

(15*) Socrates is a philosopher < {Socrates} contains a philosopher.[25]

The generalization associated with this grounding claim will uncontroversially give rise to confounding cases, since the set containing the Eiffel Tower and the White House does not contain any philosophers. However, for ease of exposition, we'll develop the essentialist solution with (15) in mind, rather than (15*). Having developed the essentialist solution, it will then be clear how to extend it to treat the generalization associated with (15*).

Since we are pursuing an essentialist solution, we want our solution to lie in some facts concerning the natures of the individuals involved in (15). So, we must attend to the nature of both Socrates and {Socrates}. It should be obvious that {Socrates}'s nature depends in part upon the nature of set-formation and its application to Socrates. So, in attending to the essentialist facts involving {Socrates}, we should also attend to the essentialist facts involving set-formation on which the singleton depends.[26]

We will adopt the Finean convention of expressing essentialist claims by means of a sentential operator.[27] On this view, expressing claims about essence involves prefixing an indexed sentential operator "it is essential to x that" to a sentence. So, if we want to express the claim that Socrates is essentially human, we first form the sentence "Socrates is human" and then prefix an indexed operator "$\Box_{\text{Socrates}}$" yielding "$\Box_{\text{Socrates}}$ Socrates is human."

We can now ask which particular essentialist facts involving Socrates, set-formation, and {Socrates} articulate the connection between the facts represented in (15). As it turns out, much of the connection can be accounted for without having to attend to essentialist facts involving {Socrates} in particular. If we take the nature of Socrates, and take the nature of set-formation, much of the connection can be established. To see this, we need some grip on what is essential to set-formation. A natural thought is that it is given or exhausted by the standard ZFC axioms. We further need a way of understanding how to construct a joint or collective essence from individual essences. As is standard, we will take the collective essence of a set of individuals to include the restricted closure of the conjunction of their individual essences.[28] With these assumptions in place, it will lie in the collective essence of Socrates and set-formation that whenever Socrates exists there is a unique set that has Socrates as its sole member. So, the following will be true. Where "SETOF" is our term denoting the set-formation operation

(17) $\Box_{\text{Socrates, SETOF}}$ (Socrates exists → there is a unique set with Socrates as its sole member).

24. See Berto [2013], Berto and Priest [2014], and Zalta [1988] for helpful discussion of Meinongianism.

25. deRosset [forthcoming] ch. 8 § 4.3.

26. It is worth noting that this reasoning is incorporated into Fine and Ditter's logical systems for essence in the form of Fine's chaining principle and Ditter's CH principle. See Fine [2005] p. 249 and Ditter [2022].

27. Fine [1995b].

28. Fine [1995a], pp. 56–57 and Fine [2015] p. 298. It's worth pointing out here that the notion of consequence is a restricted notion of consequence we might call "qualitative" consequence. See Ditter [2020]. On this conception, we restrict the consequences of the set of essentialist claims to those that involve no new individuals.

Two things are worth pointing out here. The first is that the consequent of the conditional uniquely characterizes {Socrates} even though it does not mention {Socrates} explicitly. Second, it gives {Socrates}'s nature. Sets are individuated by their members, and this tells us exactly which members are had by {Socrates}, viz. Socrates alone. Since this is relevant to the metaphysical explanation captured by our grounding claim in (15), a natural thought is to incorporate this information as we form its associated generalization. Let's go through the construction procedure step-by-step.

First, we conjoin everything relevant to the metaphysical explanation of the explained clause into a grand conjunction. This will be the explaining clause of (15) as well as the essentialist facts just identified. If we let P be the property of being a set that results from applying set-formation to Socrates, then the essentialist fact can be represented $\Box_{\text{Socrates, SETOF}}$ (Socrates exists $\rightarrow \exists!x\ Px$). So, our grand conjunction will be

(18) Socrates exists & $\Box_{\text{Socrates, SETOF}}$ (Socrates exists $\rightarrow \exists!x\ Px$).

We now form the material conditional whose antecedent is our grand conjunction and whose consequent is the explained clause of (15). Letting "S" abbreviate Socrates and "SETOF" abbreviate set-formation, we form

(19) [S exists & $\Box_{\text{s, SETOF}}$ (S exists $\rightarrow \exists!x\ Px$)]$\rightarrow$ {S} exists.

We can see here that this is not going to suffice. When we take the next step, which is to generalize out all the individuals, we still have no explicit mention of {Socrates} in the antecedent. As a result, the connection problem will persist. We are, however, very close. We know given the nature of Socrates and set-formation that there is a unique individual that is the result of forming a set from Socrates. That set has Socrates as its sole member. However, we don't yet know which individual that is. This is because we haven't "named names." What we lack is a certain informative identity between {Socrates} and the set referred to by our uniquely identifying definite description. To put things somewhat impressionistically, we might say that while it flows from the nature of Socrates and set-formation that there be a unique set that has Socrates as its sole member given the existence of Socrates, nothing involving that individual in particular does. In short, we get a *de dicto* explanation of what makes it the case that some set exists, but we fail to get any *de re* explanation of what makes it the case that {Socrates} *in particular* exists. So, to supplement the essentialist connectionist fact, we need to add the following identity fact: {Socrates} is the set whose sole member is Socrates. This missing information we get by attending to the nature of {Socrates}. After all, it lies in the nature of {Socrates} to be the set whose sole member is Socrates. Incorporating this information into our grand conjunction, we would then have:

(20) S exists & $\Box_{\text{s, SETOF}}$ (S exists $\rightarrow \exists!x\ Px$) & $\Box_{\{S\}}\ \exists!x$ (Px & x ={S}).

When we form the corresponding material conditional, we get:

(21) [S exists & $\Box_{\text{s, SETOF}}$ (S exists $\rightarrow \exists!x\ Px$) & $\Box_{\{S\}}\ \exists!x$ (Px & x ={S})] $\rightarrow$ {S} exists.

We are now in a position to generalize. Again letting "SETOF" stand for the relation between a set and the members from which it is formed:

(22) $\forall x \forall y$ ([Ex & $\Box_{\text{x, SETOF}}$ (Ex $\rightarrow \exists!z(\text{SETOF}(z,x))$) & SETOF(y,x) & $\Box_{y}\ \exists!z(\text{SETOF}(z,x) \ \&\ z = y)] \rightarrow \text{Ey}$).

And (22) is true (and not merely trivially true).

Let's again impressionistically refer to the essentialist truths above as those which flow from the nature of Socrates and {Socrates}. We can then generalize and articulate a modified version of the determination constraint (DC). Call this DC+Flow. Where F is the conjunction of the propositions that flow from the nature of the individuals involved in the grounding claim:

DC+Flow: if $\phi_0, \phi_1, \ldots < \psi$ then $\forall x_0 x_1, \ldots (\Phi(x_0, x_1, \ldots) \ \& \ F(x_0, x_1, \ldots) \rightarrow \psi(x_0, x_1, \ldots))$.

DC+Flow says that a grounding explanation is true only if the universal generalization associated with the grounding claim taken together with the claims expressing the essential connections between the involved individuals is true.

DC+Flow does not over generate confounding cases and solves the variable coordination problem. As we saw in the case of (15), the F in DC+Flow will involve an essentialist truth explicitly about {Socrates}. Given that this is so, we will have occurrences of "{Socrates}" in the antecedent of our associated universal generalization effectively blocking the variable coordination problem.

DC+Flow gives us occurrences of "{Socrates}" in the antecedent of (21) without this reflecting back onto the grounds. So, by invoking the facts capturing the relations of essential connections between the individuals mentioned in the grounding claim and taking them to play an explanatory role distinct from grounds, the standard non-reductivist can endorse all their core theses as well as (a modified version of) the determination constraint. This account has promise, but more needs to be said about how DC+Flow avoids the explanatory role problem more successfully than DC+E. We will defer that question now and return to it in the next section. In what remains in this section, we will direct our attention to some cases that lack the special features of the set-theoretic cases.

We can only get so far contemplating toy cases like that of {Socrates} and Socrates. Non-reductivists are typically non-reductivists about multiply realizable phenomena.[29] The set case is easy. There is exactly one way to generate a singleton set; it has exactly one realizer. Perhaps it is this feature that is making everything work out so nicely? Does the essentialist account on offer here extend to cases of multiple realizability that a non-reductivist might take to motivate their view? If the non-reductivist is to be fully confident in the essentialist solution, they need to see how DC+Flow fares when applied to cases of this sort.

Let's look at a simple case. Suppose that the particular dog Fido's existence grounds the existence of the species Dog.[30] But we can't identify the facts about the species Dog with the facts about Fido, since the species Dog exists in worlds where Fido does not (perhaps worlds where Spot exists). In other words, facts about the species Dog are multiply realizable. Given that Fido's existence grounds the existence of the species Dog, we should be able to endorse the following claim. Where "*d*" is a name for the species Dog:

(23) Fido is a dog & Fido exists $<$ *d* exists.

Given (23), it now behooves the non-reductivist to identify appropriate essentialist facts which articulate the connection between Fido and *d* which are explicitly about *d*. It would be natural to hold that there is some metaphysical generative operation that takes collections of particular dogs as inputs and outputs the species corresponding to that collection. As such, it will be essential to *d* that it be the output of such a generative operation. Let R be this relation that *d* bears to the class of particular dogs. We may then specify our essentialist facts as follows:

(24) $\Box_d \forall x$ (x is a dog & x exists $\rightarrow$ R(*d*, x)).

We then conjoin this proposition with the explaining clause in (23) to obtain

(25) Fido is a dog & Fido exists & $\Box_d \forall x$ (x is a dog & x exists $\rightarrow$ R(*d*, x)).

Then we form the material conditional with (25) as its antecedent and the explained clause in (23) as its consequent, yielding

(26) [Fido is a dog & Fido exists & $\Box_d \forall x$ (x is a dog & x exists $\rightarrow$ R(*d*, x))] $\rightarrow$ *d* exists.

29. See, e.g., Fodor [1974], LePore and Loewer [1989], and Block [1990] for arguments to the effect that multiple realizability motivates non-reductivism.

30. This case is an adaptation of Fine's in Fine [2012] p. 76.

Final application of DC+Flow then yields the following generalization:

(27) ∀y∀z [y is a dog & y exists & $\Box_z$ ∀x (x is a dog & x exists → R(z, x))) → z exists.

This likewise avoids the variable coordination problem. What's more, since *d* is multiply realizable, the fact that it exists can't be reduced to facts merely involving the existence of Fido. After all, *d* can exist when Fido does not. This shows that the essentialist account is positioned well to deal with exactly the kinds of cases that drive the non-reductivist's core commitments (*mutatis mutandis* for the case of our biological process).

The essentialist solution offered here can accommodate the range of cases of interest to the non-reductivist, and DC+Flow yields the right results in the range of cases in which it is applied. So, the non-reductivist should be happy to endorse the weakening of DC to DC+Flow.

This also gives us good reason to prefer the essentialist solution to the enabling condition solution. In order for the enabling condition account to be fully satisfactory, it also must be fully general; that is, for every true grounding claim, there must be a condition corresponding to the facts that stand in that grounding relation which enables that relation to hold. While this might be plausible, in restricting our attention to the moral cases, there is a wide variety of grounding claims for which no enabling condition seems needed.[31] For example, if it turned out to be the case that there were in fact zombies, then we would have a confounding case for the grounding claim

(6) Joe has physical properties P_0, P_1, … < Joe is conscious.

It would seem quite unmotivated for a physicalist to try to defend (6) in the face of a zombie on the grounds that some enabling condition failed to obtain. However, we never run into this issue on the essentialist solution. It's part and parcel of the essentialist framework that for every individual there is *what it is to be* that individual. Regardless of how one is inclined to give an account of what that is (whether it is spelled out in modal or non-modal terms), we simply won't have to worry about grounding claims involving individuals for which there are no relevant essentialist facts.

Perhaps the enabling condition theorist has a satisfying response. Even so, the essentialist solution will fare at least as well as the enabling condition view as it concerns the variable coordination problem. But what of the explanatory role problem? Recall that the more serious concern facing the enabling condition view was that each enabling fact involves the relevant higher-level entity, and for many of these enabling facts, they require grounding. If the grounding explanations given for those enabling facts are to abide by the (weakened) determination constraint, then we seem forced at some stage to recognize some fundamental enabler involving the relevant higher-level entity. This forces the non-reductivist to regard the higher-level entity as fundamental.

A distinctive advantage of the essentialist proposal is that it avoids this problem. As I hope to show in the next section, there is good reason to believe that unlike enabling conditions (and facts that play similar explanatory roles), essentialist facts simply don't require substantive explanations.

4. Essence and the End of the Explanatory Road

Essentialist facts, as many have observed, are explanatorily distinctive. They are "metaphysically ultimate" and appear to mark the "end of the explanatory road."[32] In other words, when one arrives in the course of an explanation at some essentialist fact, it seems like a perfectly good place to stop. To borrow an example from Martin Glazier, we may ask why water contains hydrogen. We may then be inclined to answer, "It is in the very nature of water to contain hydrogen. That is just what water is!"[33] And this kind of explanation seems fully satisfy-

31. deRosset [forthcoming] ch. 8 § 4.

32. I borrow this terminology from Glazier [2017].

33. Ibid. pp. 2872–73.

ing, not only in the sense of giving an answer to the question posed about water but also in providing a metaphysical backstop to making further explanatory demands.[34]

A number of different accounts have been offered as to what it means to say that essentialist facts are metaphysically ultimate or explanatorily distinctive in this way. Some including Shamik Dasgupta and Kit Fine have argued that essentialist facts are metaphysically ultimate on account of their role in constraining worldly features without themselves being determined by any worldly features. Fine writes, "Objects enter the world with their identity predetermined, as it were, and there is nothing in how things are that can have any bearing on what they are."[35] In expression of a similar view, Dasgupta claims, "essentialist facts concern what [objects] are in the first place. It is not that there is some independently given domain and the essentialist facts are certain facts about what properties they have. It is rather that the essentialist facts specify what the domain is in the first place."[36] Following Michael Raven, let's call this the *domain-fixing* conception of metaphysical ultimacy.[37] What's significant about the domain-fixing conception is that it takes essentialist facts to play a significant role in determining the basic structural features of the world and identifies this feature as that which enables them to serve as explanation stoppers. However, what is particularly striking is that the features had by domain-fixing facts fail to neatly overlap with the features had by fundamental facts.

So far, we've been operating with a fairly standard conception of fundamentality. A fact is fundamental when it occupies the terminal position in a chain of ground. In other words, a fact is fundamental just in case it is ungrounded. We can better understand the features constitutive of an ungrounded fact by thinking of ground on the model of a fact-generating machine. On this view, ground is analogous to a machine that generates facts from other facts.[38] The machine is fed facts and spits out facts grounded in the facts the machine has been fed. On this picture, a fact is ungrounded (and so fundamental) if the machine does not spit the fact out.[39]

To incorporate the standard theological metaphor, let's imagine God about to create the world. What does God have to do? Some facts are fundamental. Other facts are grounded in these facts. Since grounds necessitate the grounded, it would seem that all God has to do is select some fundamental facts to feed into the machine, and an important consequence of this widespread way of thinking is that God has quite a bit of flexibility with respect to what's fundamental. On this picture, the fundamental facts are subject to wide variation as we go from possible world to possible world. After all, since they are never the outputs of the grounding machine, all that remains to be decided is whether or not they are selected as inputs. So, God as it were, in choosing which possible world to make actual, makes a decision regarding what set of fundamental facts to feed into our grounding machine. By feeding in one set as opposed to another, God introduces different constitutive facts which result in different worlds being produced by the machine. The resulting view is that what is fundamental can exhibit a large degree of modal flexibility.

This is not so with the domain-fixing facts. Fine, for example, argues that we should think of the domain-fixing facts as constituting the invariable framework within which cross-world variation takes place. God cannot do anything to guarantee the domain-fixing facts. These are the facts that provide the framework in which God makes generative decisions, not the facts yet to be decided.[40] Similarly, Frank Hofmann argues that recombination can occur only after the essences of things have "set up the stage on which recombination is supposed

34. See ibid. p. 2872 and Dasgupta [2016] p. 383.

35. Fine [2005] p. 349.

36. Dasgupta [2016] p. 389.

37. Raven [2021].

38. This analogy is due to Fine [2012] and Litland [2017].

39. Fine [2012].

40. Fine [2005] pp. 325–26.

to operate."[41] The thrust of this view is that the essentialist facts, in playing the role of domain fixers, exhibit no modal flexibility. They are world-to-world invariant and serve as constraints on the facts that might play the role of a fundamental fact by means of constraining how facts are generated.

Interestingly, while these features fail to overlap with the features of ungrounded facts, they overlap quite nicely with the features constitutive of what are called *zero-grounded* facts. Whereas in terms of the machine picture an ungrounded fact is a fact never output by the grounding machine, a zero-grounded fact is a fact that is produced by the machine given no input. When the machine is fed no input, it rumbles along generating various outputs.[42] If the machine spits out ϕ given no input, we represent the relevant grounding claim as $\emptyset < \phi$ and say that ϕ is *zero grounded*. Again, to incorporate another metaphor, when God decides to feed some set of facts into the grounding machine, the machine will have *already* spit out the set of zero-grounded facts. Thus, a crucial feature of the zero-grounded facts is that they will be invariant from world to world and will play an important role in structuring the possible facts the worlds comprise. If the machine has already output ϕ given no input, then no fact incompossible with ϕ could be given as an input.[43]

While certainly not decisive, these considerations give us some good reason to think that the essentialist facts are zero grounded. Contra Dasgupta, it also suggests that simply because the essentialist facts play a domain-fixing role, they need not be regarded as *autonomous* or not apt to be grounded.[44] It further allows us to rebut the worries that Glazier raises for the zero-ground account. Glazier's chief concern stems from it seeming unmotivated from the perspective of the machine picture of grounding to think that the machine would generate the essentialist facts given no input.[45] But as we have seen, given the conceptual connection between the zero-grounded and domain-fixing facts, the very reasons to think that the essentialist facts play a domain-fixing role are reasons for thinking they are zero grounded. Furthermore, Glazier worries that having an empty ground undermines the intuition that essentialist facts are good explanation stoppers. After all, on this account they have a further explanation.[46] While it's true that they have a further explanation, the correct reply to the question "why does any essentialist fact obtain?" is quite literally "Nothing!" It seems perfectly fine to consider one's self at the end of the explanatory road when one pushes up against facts which hold by default.

We've seen that the zero-grounding account is plausible. Showing whether it is ultimately true lies beyond the scope of this present paper. However, given its plausibility, we can see that there is good reason to regard the essentialist facts as explanation stoppers. They play a domain-fixing role, and what plays a domain-fixing role should not be considered fundamental. So, we have shown that from within the essentialist framework, it is well motivated to see essentialist facts as both ends of metaphysical explanation (on account of their holding by default) and as non-fundamental facts. This satisfactorily solves the explanatory role problem. No facts involving the relevant higher-level entities are fundamental.

5. Conclusion

We've raised two problems facing non-reductive accounts of the layered conception of reality. The first problem arises as a result of the demand that true grounding claims respect the determination constraint. In solving this problem, non-reductivists are forced to acknowledge facts involving higher-level entities that play some role in grounding those very higher-level facts. This threatened to bring a commitment

41. Hofmann [2006] p. 427.

42. Litland [2017].

43. For further productive discussion of the differential modal import of being fundamental/ungrounded and being zero grounded, see De Rizzo [2020].

44. Dasgupta [2014].

45. Glazier [2017] p. 2883.

46. Ibid p. 2883.

to the fundamentality of the relevant higher-level entities in its wake. We showed that no connecting facts that play the role of grounds or enablers were adequately positioned to address this worry. We did, however, see that taking the connecting facts to hold essentially not only enabled us to square non-reductivism with the determination constraint (and so solve the variable coordination problem) but avoid the explanatory role problem as well. They are domain-fixing facts and so hold of necessity and by default. Therefore, they can serve as appropriate ends of explanation without being fundamental.

It's hard to imagine the standard non-reductivist doing better than this. There may be other classes of facts playing explanatory roles which correspond to weakenings of the determination constraint that manage just as well as our essentialist account in avoiding the variable coordination problem. We've already seen one (DC+E). But it's much harder to imagine some other class of facts not reducible to or interestingly connected to the essentialist facts that not only plays some explanatorily relevant role that is not a ground but also do not require substantive grounds. If there is, it's likely because this class of facts plays some kind of domain-fixing role, thereby trading on the same virtues possessed by the essentialist account offered here. So, if for whatever reason our non-reductivist rejects the invitation to theorize in terms of essences, it's still clear how they ought to solve the connection problem. First, identify a class of facts relevant to grounding explanations that play a broadly domain-fixing role. Second, weaken the determination constraint to incorporate connecting facts of this sort, and finally appeal to their domain-fixing status to avoid the commitment to the fundamentality of the relevant higher-level facts. I submit, then, that essentialist non-reductivism is not only a satisfactory way for the non-reductivist to square up with (some version of) the determination constraint, but that in principle, it's as good as any successful account that can be given.[47]

47. Many thanks to Louis deRosset, Jon Litland, Josh Dever, Rob Koons, David Sosa, Derek Haderlie, Matthew Vermaire, Alex Rausch, Laurenz Casser, Brendan Learnihan-Sylvester, and two anonymous referees at *Philosophers' Imprint* whose comments helped substantively improve this manuscript.

References

Audi, Paul. "Grounding: Toward a theory of the *in-virtue-of* relation." *The Journal of Philosophy* 109, no. 12 (2012): 685–711.

Bader, Ralf M. "Conditional grounding." Manuscript draft, n.d.

Baron-Schmitt, Nathaniel. "Contingent grounding." *Synthese* 199, no. 1/2 (2021): 4561–4580.

Berker, Selim. "The unity of grounding." *Mind* 127, no. 507 (2018): 729–777.

Bernstein, Sara. "Grounding is not causation." *Philosophical Perspectives* 30, no. 1 (2016): 21–38.

Berto, Francesco. *Existence as a real property: The ontology of Meinongianism*. Vol. 356. Synthese Library. Springer, 2013.

Berto, Francesco, and Graham Priest. "Modal Meinongianism and characterization." *Grazer Philosophische Studien* 90, no. 1 (2014): 183–200.

Block, Ned. "Can the mind change the world?" In George S. Boolos (ed.), *Meaning and method: Essays in honor of Hilary Putnam*, pp. 137–170. Cambridge University Press, 1990.

Chalmers, David J. *The conscious mind: In search of a fundamental theory*. Oxford University Press, 1996.

——. "The two-dimensional argument against materialism." In Brian McLaughlin (ed.), *The Oxford handbook of philosophy of mind*, pp. 313–336. Oxford University Press, 2009.

Dancy, Jonathan. *Ethics without principles*. Clarendon Press, 2004.

Dasgupta, Shamik. "The possibility of physicalism." *The Journal of Philosophy* 111, no. 9/10 (2014): 557–592.

——. "Metaphysical rationalism." *Noûs* 50, no. 2 (2016): 379–418.

De Rizzo, Julio. "Grounding grounds necessity." *Analysis* 80, no. 4 (2020): 639–647.

deRosset, Louis. "Getting priority straight." *Philosophical Studies* 149, no. 1 (2010): 73–97.

——. *Fundamental things: Theory and application of grounding*. Oxford University Press, forthcoming.

Ditter, Andreas. "The reduction of necessity to essence." *Mind* 129, no. 514 (2020): 351–380.

——. "Essence and necessity." *Journal of Philosophical Logic* 51, no. 3 (2022): 653–690.

Fine, Kit. "Senses of essence." In Walter Sinnott-Armstrong, Diana Raffman & Nicholas Asher (eds.), *Modality, morality and belief: Essays in honor of Ruth Barcan Marcus*, pp. 53–73. Cambridge University Press, 1995a.

——. "The logic of essence." *Journal of Philosophical Logic* 24, no. 3 (1995b): 241–273.

——. "Necessity and non-existence." In *Modality and tense: Philosophical papers*, pp. 321–354. Oxford University Press, 2005.

——. "Guide to ground." In Fabrice Correia & Benjamin Schnieder (eds.), *Metaphysical grounding: Understanding the structure of reality*, pp. 37–80. Cambridge University Press, 2012.

——. "Unified foundations for essence and ground." *Journal of the American Philosophical Association* 1, no. 2 (2015): 296–311.

Fisher, David, Hao Hong, and Timothy Perrine. "A challenge to the new metaphysics: deRosset, Priority, and explanation." *Synthese* 198 (2021): 6403–6433.

Fodor, Jerry A. "Special sciences (or: The disunity of science as a working hypothesis)." *Synthese* 28, no. 2 (1974): 97–115.

Glazier, Martin. "Laws and the completeness of the fundamental." In Mark Jago (ed.), *Reality making*, pp. 11–37. Oxford University Press, 2016.

——. "Essentialist explanation." *Philosophical Studies* 174, no. 11 (2017): 2871–2889.

Hofmann, Frank. "Truthmaking, recombination, and facts ontology." *Philosophical Studies* 128, no. 2 (2006): 409–440.

Koslicki, Kathrin. "Where grounding and causation part ways: Comments on Schaffer." *Philosophical Studies* 173, no. 1 (2016): 101–112.

Kripke, Saul A. *Naming and necessity*. Blackwell, 1980. (Revised and enlarged version of "Naming and necessity," in Donald Davidson & Gilbert Harman (eds.), *Semantics of natural language* [D. Reidel, 1972].)

Leech, Jessica. "From essence to necessity via identity." *Mind* 130, no. 519 (2021): 887–908.

LePore, Ernest, and Barry Loewer. "More on making mind matter." *Philosophical Topics* 17, no. 1 (1989): 175–191.

Leuenberger, Stephan. "Grounding and necessity." *Inquiry: An Interdisciplinary Journal of Philosophy* 57, no. 2 (2014): 151–174.

Litland, Jon Erling. "Grounding ground." In Karen Bennett & Dean W. Zimmerman (eds.), *Oxford studies in metaphysics*, vol. 10, pp. 279–316. Oxford University Press, 2017.

Mackie, Penelope. "Can metaphysical modality be based on essence?" In Mircea Dumitru (ed.), *Metaphysics, meaning, and modality: Themes from Kit Fine*, pp. 247–264. Oxford University Press, 2020.

Moran, Alex. "Kind-dependent grounding." *Analytic Philosophy* 59, no. 3 (2018): 359–390.

Muñoz, Daniel. "Grounding nonexistence." *Inquiry* 63, no. 2 (2020): 209–229.

Parfit, Derek. "Overpopulation and the quality of life." In Jesper Ryberg & Torbjörn Tännsjö (eds.), *The repugnant conclusion: Essays on population ethics*, pp. 7–22. Kluwer, 2004.

Raven, Michael J. "Fundamentality without foundations." *Philosophy and Phenomenological Research* 98, no. 3 (2016): 607–626.

——. "Explaining essences." *Philosophical Studies* 178 (2021): 1043–1064.

Rosen, Gideon. "Metaphysical dependence: Grounding and reduction." In Bob Hale & Aviv Hoffmann (eds.), *Modality: Metaphysics, logic, and epistemology* (2010): 109–136.

Schaffer, Jonathan. "Grounding in the image of causation." *Philosophical Studies* 173, no. 1 (2016): 49–100.

——. "Laws for metaphysical explanation." *Philosophical Issues* 27, no. 1 (2017): 302–321.

Skiles, Alexander. "Against grounding necessitarianism." *Erkenntnis* 80, no. 4 (2015): 717–751.

von Solodkoff, Tatjana. "Straightening priority out." *Philosophical Studies* 161, no. 3 (2012): 391–401.

Wilsch, Tobias. "The deductive-nomological account of metaphysical explanation." *Australasian Journal of Philosophy* 94, no. 1 (2016): 1–23.

Wilson, Alastair. "Metaphysical causation." *Noûs* 52, no. 4 (2018): 723–751.

Zalta, Edward N. *Intensional logic and the metaphysics of intentionality*. MIT Press, 1988.