Against Purity
Penultimate Draft

Theodore Sider writes:

> I think we ought to make [the following assumption about fundamentality]—what I call "purity": *fundamental truths involve only fundamental notions*. When God was creating the world, she was not required to think in terms of nonfundamental notions like city, smile, or candy….Suppose someone claimed that even though cityhood is a nonfundamental notion, in order to tell the complete story of the world there is no way to avoid bringing in the notion of a city—certain facts involving cityhood are rock-bottom. This is the sort of view that purity says we should reject.[1]

Thus Sider claims that the fundamental truths are "pure" in the sense that they involve only fundamental notions—the fundamental truths are thus not "infected" with non-fundamental notions like city, smile, or candy.[2] The purity of the fundamental truths ensures that one can write the complete "book of the world" without mentioning cities or smiles or candy.

Sider's formulation of the purity principle presupposes that "truths" and "notions" are the primary bearers of fundamentality and derivativeness. Advocates of grounding, on the other hand, take the primary bearers of fundamentality and derivativeness to be Russellian facts or Armstrongian states of affairs and the worldly particulars, properties, and logical connectives that are their constituents.

For example, consider a concrete particular, electron e. The fact that electron e has some property F, which we can represent using square brackets as [e is F], has electron e and the property of being F as its constituents. For advocates of grounding, entities like electron e and worldly facts like [e is F], rather than linguistic items like truths and notions, are the bearers of fundamentality and derivativeness.

[1] Sider 2011, pp. 106-7. For a discussion of and an objection to Sider's purity principle see Merricks 2013, pp. 5-13.
[2] Sider 2011, pp. 144.

Just as Sider's principle prohibits derivative notions from being involved in fundamental truths, some advocates of grounding have defended an analogous prohibition against derivative entities being constituents in any fundamental fact. For example, Louis deRosset formulates and endorses the following principle:

> **CORR** "An entity *e* is fundamental if *e*'s existence or its possession of some feature is fundamental." [3]

Suppose that entity e is F. And suppose the fact that e is F, which we can represent using square brackets as [e is F], is a fundamental fact. Then CORR entails that entity e itself is a fundamental entity. More generally, deRosset's CORR principle implies that for any entity x and any property F, if [x is F] is a fundamental fact, then x is a fundamental entity.

Along the same lines, Gideon Rosen says:

> Say that a fact is fundamental (or brute) if it does not obtain in virtue of other facts, and that a *thing* is fundamental if it is a constituent of a fundamental fact. Then we might say that fundamental ontology seeks a catalog of the fundamental things.[4]

Rosen, like deRosset, endorses the purity-like claim that fundamental facts have only fundamental entities or "things" as constituents.

In the same vein, Shamik Dasgupta defends grounding-based formulations of physicalism from the "Siderean worry" that the facts about the explanatory connection between the physical and the non-physical are not themselves "purely" physical.[5] And in response to this worry,

[3] deRosset 2013, pp. 6.
[4] Rosen 2010, p. 112.
[5] See Dasgupta 2014, Section II for his development of the "Siderean worry."

Dasgupta formulates a version of physicalism according to which all the fundamental facts are purely physical, in the sense that they involve only physical phenomena.[6]

I take deRosset, Rosen, Dasgupta, and others, to all be endorsing the following non-linguistic version of Sider's purity principle:[7]

Purity: no fundamental fact contains a derivative entity as a constituent.

This version of the purity principle—henceforth just "Purity"— prohibits derivative entities from being constituents of fundamental facts. For example, Purity prohibits derivative entities like cities, smiles, and candy from being constituents in any fundamental fact. To use Sider's metaphor, Purity ensures that the complete "book of the world"—the book detailing all the fundamental facts—makes no reference to derivative entities like cities, smiles, and candy.

This paper has two main conclusions. Its first conclusion is that Purity is false. My argument is a *reductio*—I argue Purity implies a contradiction and should therefore be rejected. The paper's second conclusion concerns the so-called "grounding facts" or facts about what grounds what. Purity's falsity, so I argue, gives us reason to think that some grounding facts are fundamental rather than grounded. I close by arguing that the facts about what grounds composition's occurrence are particularly good candidates for fundamental grounding facts.

[6] Dasgupta 2014, pp. 580-592. As we shall see, Dasgupta's formulation of physicalism does permit *ungrounded* facts containing non-physical or derivative constituents. This is because Dasgupta argues that not all ungrounded facts are fundamental. For more details on Dasgupta's view, see Section II.3 below.

[7] Also see Michael Raven, who advocates the use of grounding to "purge" the non-fundamental from fundamental reality: "…A desirable application of ground [is] to purge the non-fundamental. The idea is that something can be purged from fundamental reality if the facts about it are grounded in facts not about it. Thus, we might wish to purge wars from fundamental reality by establishing that all facts about wars are grounded in facts not about wars." Raven 2015, pp. 328-9. Also see Raven 2016 for more on his "purging" requirement. Also see Bennett 2011b, p. 1.

I. Purity and Grounding Grounding

Let a *grounding fact* be any fact about what partially grounds what and any fact about what fully grounds what. For example, suppose that Socrates fully grounds {Socrates}. Then the following is a grounding fact: [Socrates fully grounds {Socrates}]. Or suppose the fact that p partially grounds [p and q]. Then the following is a grounding fact: [p partially grounds [p and q]]. And so on.

Consider the following thesis about grounding facts:

The Grounding Grounding Thesis (GGT): every grounding fact is fully grounded.

Like Purity, GGT is quite popular among grounding's advocates. It has been endorsed by, among others, Karen Bennett, Louis deRosset, Shamik Dasgupta, Kit Fine, Michael Raven, and Gideon Rosen.[8] Indeed, virtually all of those who endorse Purity also endorse GGT.[9] This is no accident. Rather, those who accept GGT generally do so *because* they accept Purity.

In a moment, I will present a version of the standard argument that Purity's truth implies GGT.[10] I have two brief clarificatory comments before we begin.

First, I shall use the term "entity" quite broadly, so that concrete particulars, abstract objects, properties, and worldly facts or Armstrongian states of affairs all count as entities. Second, I shall assume that an entity is fundamental if and only if it is ungrounded, and an entity is derivative if and only if it is fully grounded.

Here is the standard argument from Purity to GGT. Consider again the grounding fact [Socrates fully grounds {Socrates}]. This fact has the following entities among its constituents:

[8] See Bennett 2011b, Dasgupta 2014, deRosset 2013, pp. 74-80 of Fine 2012, and Section 13 of Rosen 2010.
[9] The only exception is Jon Litland 2017, who accepts Purity but denies that the grounding facts are grounded. But, it is worth noting, he also does not hold that the grounding facts are *un*grounded. Instead, he argues that the grounding facts are "zero-grounded."
[10] See Bennett 2011a, Sider 2011, and deRosset 2013.

Socrates, {Socrates}, and the full grounding relation. {Socrates} is a grounded entity. So {Socrates} is a derivative entity. Therefore, the grounding fact [Socrates fully grounds {Socrates}] has at least one derivative entity among its constituents.

Now suppose that Purity is true—no fundamental fact has any derivative entity as a constituent. The grounding fact [Socrates fully grounds {Socrates}] has a derivative constituent. So it is *not* fundamental. Instead, the grounding fact [Socrates fully grounds {Socrates}] is a derivative entity. An entity is derivative if and only if it is fully grounded. Therefore, the grounding fact [Socrates fully grounds {Socrates}] is itself fully grounded in something else.

I just argued that if Purity is true then the grounding fact [Socrates fully grounds {Socrates}] is fully grounded. Of course, that particular grounding fact was picked arbitrary. We could have run the same argument, *mutatis mutandis*, for any other grounding fact whatsoever. Given Purity, facts about what grounds the existence and properties of composite material objects, facts about what grounds conscious mental states, facts about what grounds determinable properties, and so on, all must have a full ground.

Indeed, if Purity is true then even the facts about what *partially* grounds what are themselves fully grounded. For suppose the conjunctive fact [Socrates and Plato exist] is fully grounded in Socrates and Plato, taken together, but only partially grounded in each man, taken individually. Then the grounding fact [Socrates partially grounds [Socrates and Plato exist]] has a derivative entity, [Socrates and Plato exist], as a constituent. Purity says that no fundamental fact has a derivative constituent. Therefore, the partial grounding fact [Socrates partially grounds [Socrates and Plato exist]] is itself fully grounded in something else.

I have just defended the following conditional: if Purity is true, then GGT is true. No defender of Purity should reject this conditional. For virtually every defender of Purity *already*

accepts it. Indeed, many defenders of Purity accept that conditional precisely because they are persuaded by some version of the above argument.[11] I mention this conditional's uncontroversial status because it will play a key role in my argument against Purity. Indeed, it is that argument's second premise.

The other two main premises draw the notion of a "groundmate." Let us say that a grounded entity x has an entity y as its *groundmate* just in case x is numerically distinct from y, and y is a grounded entity, and there are some entities, the zs, such that x is fully grounded in the zs and y is fully grounded in the zs. In other words, groundmates are distinct grounded entities that share at least one full ground.

I can now state my *reductio* argument against Purity:

(1) Purity is true	AS
(2) If Purity is true, then GGT is true.	PR
(3) If GGT is true, then there are groundmates.	PR
(4) If Purity is true, then there are no groundmates.	PR
(5) Therefore, if Purity is true, then there are groundmates.	HS 2, 3
(6) Therefore, there are groundmates.	MP 1,5
(7) Therefore, there are no groundmates	MP 1,4
(8) Therefore, Purity is false.	*reductio* 1, 6, 7

The argument is valid—Purity is assumed for *reductio* at line 1, from which a contradiction is validly derived at lines 6 and 7. I have already defended Premise 2. I shall defend Premise 3 and Premise 4 in Sections II and III, respectively.

II. GGT and Groundmates

Here is Premise 3:

(3) If GGT is true, then there are groundmates.

[11] Versions of this argument from Purity to GGT are scattered throughout the literature. For influential early statements of the argument, see Bennett 2011a, Sider 2011, and deRosset 2013.

My defense of Premise 3 proceeds via conditional proof—I shall suppose that Premise 3's antecedent is true and then argue from that supposition to the truth of Premise 3's consequent.

Suppose that GGT is true. Also suppose that there is at least one grounded entity, entity x, which is either partially or fully grounded in some entity y.[12] Then there is at least one grounding fact, namely, [y grounds x]. GGT says that every grounding fact is fully grounded. So the grounding fact [y grounds x] is fully grounded. Now ask: *What* fully grounds the grounding fact [y grounds x]?

There are four extant answers to this question. The first two answers, so I shall argue, straightforwardly entail that the grounding fact [y grounds x] has a groundmate. So, if either of those two answers is true, then there are groundmates (§II.1—2). I will then argue that the other two answers also lead to groundmates, albeit only in conjunction with a relatively modest first-order assumption about what grounds what (§II.3—6).

II.1 Bottom-up Particularism—Bennett and deRosset

The most popular answer to the question of what grounds the grounding facts, which I shall call *Bottom-up Particularism*, was first proposed and defended by Karen Bennett and Louis deRosset.[13] Suppose that Socrates (either partially or fully) grounds {Socrates}. According to Bottom-up Particularism, the grounding fact [Socrates grounds {Socrates}] is itself fully grounded in the particular entity at the "bottom" of the grounding fact—in this case, Socrates.

[12] No defender of Purity should deny this assumption. To do so would be to deny that there are any grounded entities at all. However, if there are no grounded entities, then Purity is a mere *vacuous* truth. Presumably Purity's defenders take that thesis to be a non-vacuous truth. Therefore, no defender of Purity should reject my first assumption.
[13] See Bennett 2011b and deRosset 2013. Korman 2015, p. 215—6 applies Bottom-Up Particularism to the so-called "grounding problem" for coincident material objects. For discussion and criticism, see Dasgupta 2014 and Carnino 2016.

More generally, according to Bottom-up Particularism, if y (either partially or fully) grounds x, then [y grounds x] is itself fully grounded in y. Notice that, in grounding the first-order grounding fact [y grounds x] in y, Bottom-up Particularism generates a second-order grounding fact, namely: [y fully grounds [y grounds x]]. What fully grounds *that* grounding fact? Bottom-Up Particularism answers—*y* fully grounds [y fully grounds [y grounds x]]. Indeed, y fully grounds the third-order grounding fact [y fully grounds [y fully grounds [y grounds x]]]. And so on, *ad infinitum*.[14]

Figure 1 represents the resulting infinite regress of grounding facts. The square brackets represent facts, the letters represent constituents of those facts, and the arrows represent the relation of full grounding:

Figure 1

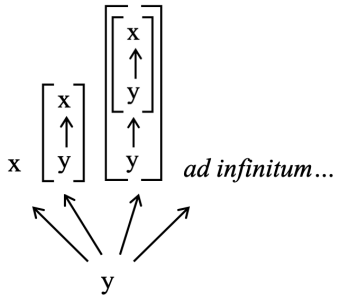

Figure 1 reveals that grounded entity x has groundmates. For instance, the grounding fact [y grounds x] is numerically distinct from grounded entity x. Yet both are fully grounded in y. So that grounding fact is grounded entity x's groundmate.[15] The second-order grounding fact [y fully grounds [y grounds x]] is also one of entity x's groundmates. Indeed, each and every one of the

[14] Bennett 2011b and deRosset 2013 both point out that Bottom-Up Particularism implies this infinitude of grounding facts, all fully grounded by the bottom entity.

[15] Figure 1 assumes that y *fully* grounds entity x. If y were a mere partial ground for grounded entity x, then grounded entity x and [y grounds x] would not be groundmates. However, [y grounds x] and [y fully grounds [y grounds x]] *would* be groundmates. So, even if y were a mere partial ground for entity x, Bottom-Up Particularism would still generate infinitely many groundmates. Similar remarks apply, *mutatis mutandis*, to Top-Down Particularism below.

higher-order grounding facts in the infinite regress is one of entity x's groundmates. So, if Bottom-Up Particularism is true, then there are groundmates.[16]

II.2 Top-down Particularism—Fine

Suppose that entity y (either partially or fully) grounds entity x. According to *Top-down Particularism*, [y grounds x] is itself fully grounded in the nature of the entity at the "top" of the grounding fact, entity y. More generally, *every* grounding fact is fully grounded in the nature of the grounded entity at the "top" of the grounding fact.

Kit Fine explains:

> …[W]hat explains the ball's being red or green in virtue of its being red is something about the nature of what it is for the ball to be red or green (and about the nature of disjunction in particular) and not something about the nature of what it is for the ball to be red. It is the fact to be grounded that 'points' to its ground and not the grounds that point to what they may ground…. Thus the asymmetry supports a top-down approach in which we start with the facts to be grounded and work our way down to their grounds, rather than the other way around.[17]

Fine goes on to give a more detailed example.[18] Fine assumes, as is standard, that existentially quantified facts are grounded in their instances. For example, the existentially quantified fact [∃xFx] is grounded in [Fa]. According to Fine, the grounding fact [[Fa] grounds [∃xFx]] is itself fully grounded in a fact about what lies in the *nature* of [∃xFx]. Specifically, that grounding fact is fully grounded in the following: [it lies in the nature of [∃xFx] that, for any x, if x is F, then the fact that x is F grounds [∃xFx]].

Figure 2 depicts the grounding of the first-order grounding fact [[Fa] grounds [∃xFx]]:

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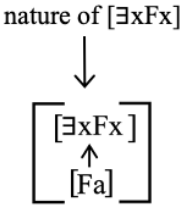
[16] Saenz MS also points out that if Bottom-up Particularism is true, then multiple, distinct facts share their full grounds.
[17] Fine 2012, p. 76.
[18] Fine 2012, p. 75. Specifically, Fine gives the example of the grounding fact [[Socrates is a philosopher] grounds [someone is a philosopher]]. I am using the equivalent symbolic formulae in order to make my discussion of second-order and third-order grounding facts more tractable.

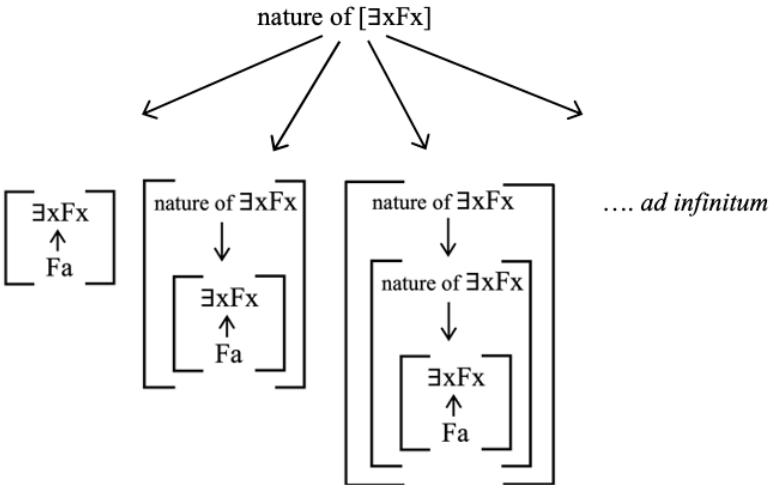
Figure 2



As Figure 2 makes clear, however, there is now a second-order grounding fact requiring a ground, namely: [[its lying in the nature of [∃xFx] that, for any x, if x is F then [Fx] grounds [∃xFx] fully grounds [[Fa] grounds [∃xFx]]].

According to Top-Down Particularism, the nature of the entity at the "top" of the original grounding fact, namely, [∃xFx], serves as the full grounds for the second-order grounding fact as well. Indeed, that fact about the nature of [∃xFx] fully grounds the resulting third-order grounding fact, the fourth-order grounding fact, and so on, *ad infinitum*. Figure 3 depicts the result:

Figure 3



As Figure 3 makes clear, Top-Down Particularism entails that some grounded entities have groundmates. For example, the first-order grounding fact [[Fa] grounds [∃xFx]] has the second-order grounding fact [[its lying in the nature of [∃xFx] that, for any x, if x is F then [Fx] grounds

[∃xFx]] fully grounds [[Fa] grounds [∃xFx]]]. For those two grounding facts are numerically distinct—one has a nature fact among its constituents, while the other does not. Nevertheless, they are both fully grounded in the same fact about what lies in the nature of [∃xFx]. Indeed, the first-order grounding fact [[Fa] grounds [∃xFx]] has infinitely many other higher-order grounding facts among its groundmates.

II.3—An Assumption

Suppose that [p] exists. According to the orthodoxy, if there are disjunctive facts, then they are fully grounded in their true disjunct(s).[19] For example, if there are disjunctive facts, then [p or q] is fully grounded in [p]. Indeed, if there are disjunctive facts, then there are infinitely many disjunctive facts fully grounded in [p]—ex. [p or r], [p or s], [p or t], and so on *ad infinitum*.

Notice that every one of the infinitely many disjunctive facts is numerically distinct from each of the other disjunctive facts. After all, no two of these facts have precisely the same constituents. Nevertheless, they share at least one full ground, namely, [p]. Thus, every one of the disjunctive facts in the series [p or q], [p or r], [p or s], [p or t], and so on, has each of the other disjunctive facts in that series as its *groundmate*. Therefore, if there are disjunctive facts, then there are groundmates.

Suppose there is at least one grounded entity *a*, such that *a* is fully grounded in some distinct entity *b*. Then the grounding fact [*b* fully grounds *a*] exists. According to the orthodoxy, if there are existentially quantified facts, then they are fully grounded in their true instances.[20] For example, if there are existentially quantified facts, then the existentially quantified fact [*b* fully grounds something] is fully grounded in [*b* fully grounds *a*]. Moreover, if there are existentially

[19] Cf. Rosen 2010, p. 117
[20] Cf. Correia and Schneider 2012 p. 18 and Fine 2010, p. 101.

quantified facts, then the existentially quantified fact [something fully grounds something] is fully grounded in [*b* fully grounds something].

As a result, if there are existentially quantified facts, then there are chains of full grounding involving those facts. For example, [*b* fully grounds *a*] fully grounds the existentially quantified fact [*b* fully grounds something], which in turn fully grounds another existentially quantified fact [something fully grounds something]. Full grounding is transitive. Thus, [*b* fully grounds *a*] fully grounds *both* [*b* fully grounds something] *and* [something fully grounds something]. Those latter two facts are numerically distinct from one another. Yet they are both fully grounded in [*b* fully grounds *a*]. So they are one another's groundmates. Therefore, if there are existentially quantified facts, then there are groundmates.

The arguments of §II.4—6 will draw upon the following modest first-order assumption: *either* there are disjunctive facts *or* there are existentially quantified facts. I shall argue that the two other accounts of what grounds the grounding facts, when conjoined with this modest first-order assumption, imply that every grounding fact has either a disjunctive fact or an existentially quantified fact (or both) among its groundmates.

II.4 Simple Generalism—Dasgupta

According to *Simple Generalism*, the grounding fact [y grounds x] is *partially* grounded in the entity at the "bottom", entity y.[21] But entity y is not the *full* grounds of that grounding fact. In addition, Simple Generalism adds a general "connecting" principle linking y-type entities to x-type entities. Shamik Dasgupta, this view's main proponent, explains:

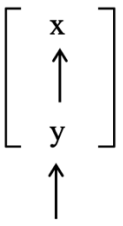
[21] Dasgupta 2014 calls his view the "connectivist" account of what grounds the grounding facts.

> …[C]onsider a particular philosophy conference, an event lasting a few days, and call the event *e*. Then, arguably, the fact that *e* is a conference is not brute, but holds in virtue of the fact that *e* contains people engaged in various conference-conducive activities (some are giving papers, others listen and ask questions, and so on). Call these kinds of activities "C-activities." Then we have:
>
> > (F) The fact that *e* contains people engaged in C-activities grounds the fact that *e* is a conference.
>
> …Our question is: What (if anything) grounds (F)?... A very natural answer has to do with the kind of thing that conferences are, in general. A conference is the kind of thing that you get when people engage in those activities; that is why, when those particular people in *e* engaged in them, the result was a conference. This is to ground (F) in a general connection between conferences and activities.[22]

Thus, where entity y grounds entity x, the grounding fact [y grounds x] is partially grounded in entity y and partially grounded in a general principle connecting y-type entities to x-type entities. Entity y and that general principle, taken together, constitute the *full* grounds of the grounding fact [y grounds x].

Figure 4 depicts Simple Generalism's account of what fully grounds [y grounds x]:

Figure 4



y, [general essence fact about x-type entities]

What are these general connective principles that help ground the grounding facts? Dasgupta identifies these general principles with *essence* facts—specifically, facts about the

[22] Dasgupta 2014, pp. 566-568.

essence of the kind to which the entity at the "top" of the grounding fact belongs.[23] For example, consider the grounding fact [Socrates grounds {Socrates}]. That grounding fact is fully grounded in Socrates together with a general essence fact about sets. That general essence fact might look something like this: [it is essential to being a set that, for any set S, if the xs are members of S, then S is grounded in the xs].[24]

According to Dasgupta, the general essence facts are ungrounded. Nevertheless, they are not *fundamental*. Dasgupta distinguishes between *substantive* facts, which are "apt" for being grounded, and *autonomous* facts, which are "inapt" for grounding. The fundamental facts, if there are any, are all and only those ungrounded facts that are also substantive. A fact that is ungrounded but autonomous, by contrast, is neither fundamental nor derivative. The general essence facts fall into this latter category. So, even though the general essence facts are ungrounded and contain derivative entities as constituents, they do not violate Purity.[25]

My argument for the claim that Simple Generalism leads to groundmates assumes that there are disjunctive facts (§II.3). That assumption, when conjoined with Simple Generalism, generates groundmates for every grounding fact.

Suppose that there are disjunctive facts. Suppose that some fact [p] exists. The disjunctive fact [p or q] is grounded in [p] (see §II.3). Of course, [p or r] is *also* grounded in [p]. As a result, we have two numerically distinct grounding facts on our hands—[[p] grounds [p or q]], and [[p] grounds [p or r]].

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[23] Dasgupta and Sider both consider, but do not endorse, the view that the grounding facts are grounded in the "laws of metaphysics." See Dasgupta 2014, p. 12 and Sider 2011, p. 145. For more on the laws of metaphysics, see Wasserman 2014, Wilsch 2015 and 2016, Glazier 2017, Schaffer 2017, and [REDACTED].

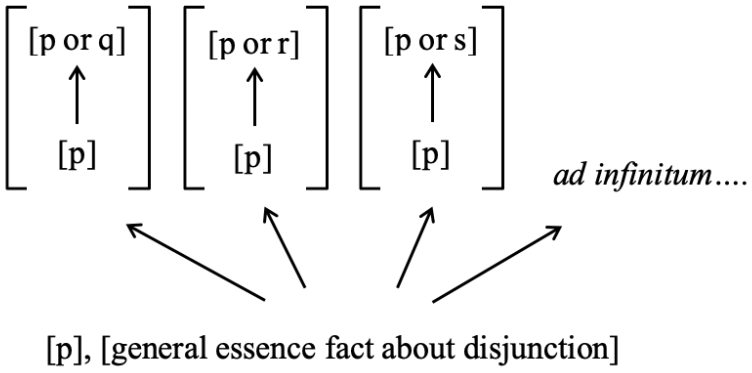
[24] Dasgupta is officially agnostic between this formulation of the essence fact, which includes information about grounding, and a mere conditional formulation that does not include information about grounding. This does not matter for our purposes, however. See Dasgupta 2014, p. 568 for discussion.

[25] See Dasgupta 2014, p. 575 and Dasgupta 2016, p. 383.

According to Simple Generalism, each of these grounding facts is fully grounded in some other fact(s). Let us take each in turn. The grounding fact [[p] grounds [p or q]] is fully grounded in the "bottom" entity, [p], together with a general essence fact about the sort of entity at the "top," such as the following: [it is essential to disjunction that every disjunctive fact is grounded in its true disjunct(s)]. Now consider [[p] grounds [p or r]]. This grounding fact has the same "bottom" entity, [p]. Moreover, the "top" entity is a disjunctive fact. As a result, the very same two entities—[p] and the general essence fact about disjunction—also serve as the full grounds for the grounding fact [[p] grounds [p or r]].

Indeed, there are infinitely many facts about what grounds the disjunctive facts with [p] as a true disjunct—[[p] grounds [p or s]], [[p] grounds [p or t]], [[p] grounds [p or u]], and so on *ad infintum*. And, in each case, Simple Generalism assigns the same full grounds, i.e. [p] and the same general essence fact about disjunction. Figure 5 depicts the result:

Figure 5



As Figure 5 makes clear, [[p] grounds [p or q]] has another grounding fact, [[p] grounds [p or r]] as its groundmate. For the former is numerically distinct from the latter. Yet there are some facts that fully ground them both. Indeed, each and every grounding fact has infinitely many distinct grounding facts as groundmates.

II.5 Complex Generalism—Rosen

Complex Generalism says that, where x grounds y, the grounding fact [x grounds y] is itself partially grounded in x and partially grounded in a general principle connecting x-type entities to y-type entities. However, unlike Simple Generalism, Complex Generalism adds one a third partial ground, namely, the particular entity at "top" of the original grounding fact, entity y.

Gideon Rosen is Complex Generalism's only advocate.[26] Rosen's illustration of Complex Generalism draws on a first-order assumption about what grounds what. Specifically, Rosen assumes that disjunctive facts of the form [p or q] are grounded in their true disjuncts. Following Rosen, then, let us assume that some fact p is true, and that the disjunctive fact, [p or q], is grounded in [p]. What grounds [[p] grounds [p or q]]? Rosen explains:

> The disjunctive fact [p ∨ q] is grounded in [p]. Why? Let's make the explanation as explicit as possible. [p ∨ q] is grounded in [p] because:
>
> (a) P is true
> (b) [p ∨ q] is a disjunctive fact with p as one of its disjuncts
> (c) In general, if p is true, then [p ∨ q] is grounded in [p].
>
> And why is (c) true? Because:
>
> (d) It lies in the essence of disjunction that, for all p, q: (if p is true, then [p ∨ q] is grounded in [p])[27]

Thus, the grounding fact [[p] grounds [p or q]] is fully grounded in the following facts, taken together: (a) the "bottom" fact, [p], (b) the fact that the "top" fact [p or q] is a disjunctive fact that has [p] as a disjunct; and then, ultimately, (c) a general fact about the essence of

[26] See Section 13 of Rosen 2010.
[27] Rosen 2010, p. 130.

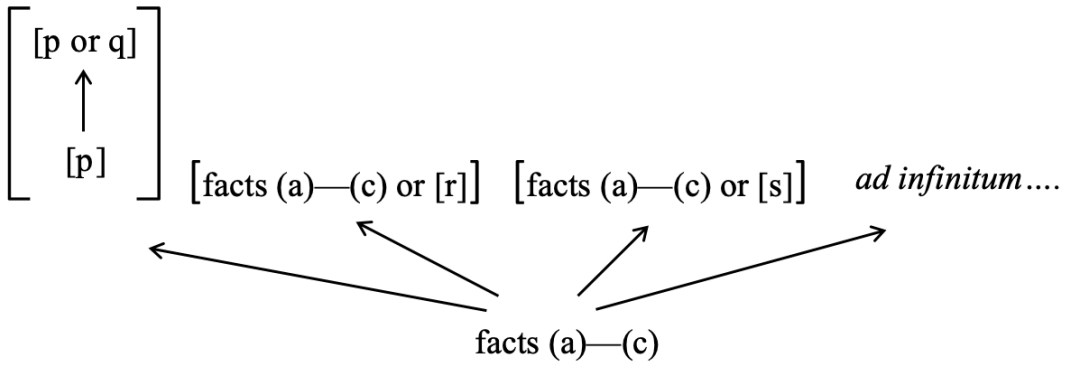
disjunction. Let "Facts (a)—(c)" be a plural referring expression that picks out facts (a), (b), and (c), collectively.

Suppose [[p] grounds [p or q]] is indeed fully grounded in Facts (a)—(c). Now consider the following disjunctive fact: [Facts (a)—(c) or [r]]. That disjunctive fact has Facts (a)—(c) as a true disjunct. We are assuming that disjunctive facts are fully grounded in their true disjuncts. Hence, the disjunctive fact [Facts (a)—(c) or [r]] is fully grounded in Facts (a)—(c).

So Facts (a)—(c) are doing double-duty—they jointly serve as the full grounds for [[p] grounds [p or q]] *and* they jointly serve as the full grounds for the disjunctive fact [Facts (a)—(c) or [r]]. Of course, the former fact is distinct from the latter fact. So the grounding fact [[p] grounds [p or q]] shares its full grounds with a numerically distinct grounded entity.

Figure 6 depicts the resulting grounding structure:

Figure 6



As Figure 6 makes clear, the grounding fact [[p] grounds [p or q]] has a disjunctive fact as its groundmate. Indeed, it has infinitely many disjunctive facts as its groundmates.

There is another route from Complex Generalism to groundmates that does not presuppose that there are disjunctive facts. Instead, the second route relies on the assumption that there are

existentially quantified facts (§II.3). That assumption, when conjoined with Complex Generalism, generates groundmates for every grounding fact.

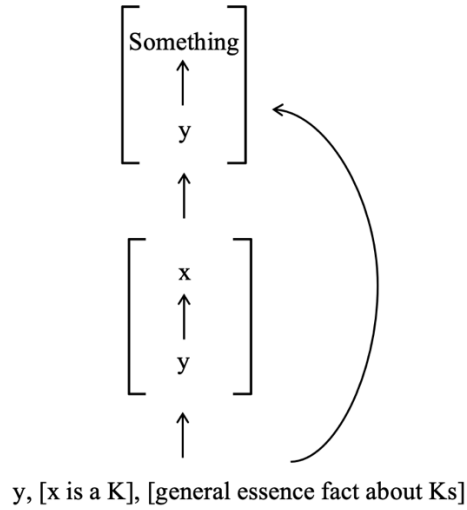
Suppose there is one grounded entity, entity x, which is grounded in entity y. Then the following grounding fact obtains: [y grounds x]. Now consider the existentially quantified fact [y grounds something]. The grounding fact [y grounds x] is an instance of [y grounds something]. Existentially quantified facts are fully grounded in their instances (§II.3) So the existentially quantified fact [y grounds something] is fully grounded in the grounding fact [y grounds x].

Now add to this that Complex Generalism's account of what grounds the grounding facts is true. Then the grounding fact [y grounds x] is itself fully grounded in entity y, [entity x belongs to kind K], and a general essence fact about Ks, taken together.

We now have a chain of full grounding—the existentially quantified fact [y grounds something] is fully grounded in the grounding fact [y grounds x], which in turn is fully grounded in entity y, [entity x belongs to kind K], and a general essence fact about Ks, taken together. Full grounding is transitive. Thus, the latter three facts fully ground the existentially quantified fact [y grounds something]. As a result, those three facts fully ground *both* a grounding fact *and* an existentially quantified fact.

Figure 7 depicts the resulting grounding structure:

Figure 7



As Figure 7 makes clear, the grounding fact [y grounds x] has the existentially quantified fact [y grounds something] as its groundmate. For the two facts are numerically distinct. Yet they share one of their full grounds.

II.6 A General Defense

I have argued that each individual account of what grounds the grounding facts generates groundmates (§II.1—5) I shall close this section by arguing that if GGT is true then, *whatever* account of what grounds the grounding facts turns out to be correct, some grounded entity has a groundmate.

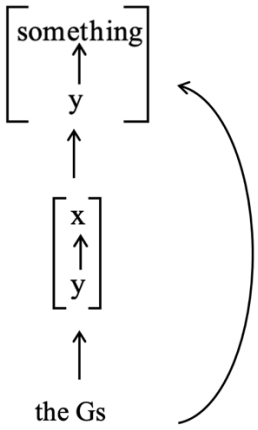
Suppose GGT is true. And suppose that y grounds x. Then the grounding fact [y grounds x], like every other grounding fact, is itself fully grounded. Let "the Gs" be that entity or those entities, whatever they are, that jointly fully ground [y grounds x]. Perhaps one of the above four views gives the correct account of the Gs. Or perhaps none of them is correct and the Gs are something else entirely. The only thing that matters is that the Gs, whatever they are, fully ground the grounding fact [y grounds x].

Consider the existentially quantified fact [y grounds something]. The fact [y grounds something] is fully grounded in each of its instances. The grounding fact [y grounds x] is an instance of the existentially quantified fact [y grounds something]. Therefore, [y grounds something] is itself fully grounded in [y grounds x].

So [y grounds something] is fully grounded in [y grounds x], and [y grounds x] is fully grounded in the Gs. Full grounding is transitive. It follows that [y grounds something] is fully grounded in the Gs. Of course, [y grounds something] is numerically distinct from [y grounds x]. Therefore, the Gs fully ground two, numerically distinct facts—both [y grounds x] and [y grounds something].

This situation is illustrated in Figure 8 below:

Figure 8



As Figure 8 makes clear, [y grounds x] and [y grounds something] are groundmates Therefore, *if* there are existentially quantified facts, *then* GGT's truth implies the existence of groundmates.

III. Purity and Groundmates

Here is Premise 4:

(4) If Purity is true, then there are no groundmates.

I shall defend Premise 4 by arguing for its contrapositive, i.e. that if there are groundmates then Purity is false.[28] I will begin with the necessary setup—a new piece of terminology and two substantive assumptions— before stating the argument.

First, the new piece of terminology. Let a *groundmate differentiating fact* (or *GMD fact*) be any fact of the form [x is φ] such that (i) x is a grounded entity, (ii) x has at least one distinct grounded entity y as its groundmate, (iii) x has property F, and yet (iv) y lacks property F.

For example, suppose that Socrates fully grounds two numerically distinct grounded entities— the singleton set {Socrates}, on the one hand, and the existential fact [Socrates exists], on the other. Then {Socrates} and [Socrates exists] are groundmates. Of course, {Socrates} has the property *being a set* while [Socrates exists] lacks that property. Therefore, [{Socrates} is a set] is a GMD fact about {Socrates}. Other GMD facts about {Socrates} include [{Socrates} has a member], [{Socrates} is identical with {Socrates}], and so on.[29]

By contrast, consider the following fact about {Socrates}: [{Socrates} is fully grounded in Socrates]. This fact, unlike [{Socrates} is a set], is *not* a GMD fact about {Socrates}. For {Socrates}'s groundmate, [Socrates exists], is *also* fully grounded in Socrates. So {Socrates}'s exemplifying the property *being fully grounded in Socrates* does not distinguish {Socrates} from its groundmate, [Socrates exists].

[28] I defend a longer version of the argument from the existence of groundmates to the falsity of Purity in [REDACTED]. However, that version of the argument differs from this one in a couple of important ways. First, that version relies on a different principle, the Property Fixing Thesis (PFT), which makes no appearance here. Second, the main conclusion of the paper in which that version of the argument appears is that grounded entities are not ontologically innocent relative to their full grounds.

[29] Note that some GMD facts about grounded entity x are qualitative facts, but others are non-qualitative facts.

More generally, there is at least one GMD fact about *any* grounded entity with a groundmate. After all, one grounded entity is another's groundmate only if the former and the latter are numerically distinct. And if two entities are numerically distinct, then there must be at least one property F such that one of the entities is F and the other is not F.[30] Therefore, for any grounded entity x with a groundmate, there is at least one GMD fact about x.

My first assumption is that no GMD fact about a given grounded entity can be fully grounded in non-GMD facts. More formally, where φ is a GMD fact about grounded entity x, I shall assume that if φ is fully grounded in a collection of fact(s), Δ, then all the fact(s) in Δ must also be GMD facts about grounded entity x.

In defense of this assumption, suppose for *reductio* that the GMD fact [{Socrates} is a set] is fully grounded in the non-GMD fact [{Socrates} is fully grounded in Socrates]. The full grounding relation is *general* in the following sense: for any entities x and y, if [x is F] is fully grounded in [x is G], then if entity y is G then y is also F.[31] So *any* entity that is fully grounded in Socrates is also a set. Of course, {Socrates}'s groundmate [Socrates exists] is fully grounded in Socrates. It follows that [Socrates exists] is a set. But [Socrates exists] is *not* a set. Contradiction. Therefore, what we assumed for *reductio*—that the GMD fact [{Socrates} is a set] is fully grounded in the non-GMD fact [{Socrates} is fully grounded in Socrates]—is false.

The above reasoning generalizes. Let x be any arbitrary grounded entity with at least one groundmate, entity y. Consider an arbitrary GMD fact about entity x, [x is F], and an arbitrary non-

[30] This inference does *not* assume that numerically distinct entities always differ qualitatively. Rather, this inference makes the uncontroversial assumption that numerical distinctness suffices for *either* qualitative difference *or* non-qualitative difference. For all I have said so far, the property F with respect to which groundmates x and y differ is a non-qualitative property like *being identical with {Socrates}* rather than a qualitative property like *being a set*. More generally, nothing I say in this section commits me to Leibniz's Law or any other controversial thesis about the relationship between numerical identity and qualitative sameness.

[31] See deRosset 2010 for discussion and defense of the generality of grounding

GMD fact about entity x, [x is G]. Since [x is F] is a GMD fact about entity x, entity y is *not* F. By contrast, since [x is G] is a non-GMD fact about entity x, entity y *is* G.

Now suppose, for *reductio*, that the GMD fact [x is F] is fully grounded in the non-GMD fact [x is G]. Full grounding is general: for any entities x and y, if [x is F] is fully grounded in [x is G], then if entity y is G then y is also F. Thus, any *other* entity is that is G is also F. Entity y is G. So entity y is F. But entity y is *not* F. Contradiction. Therefore, what we assumed for *reductio*—that our arbitrary GMD fact about x is fully grounded in an arbitrary non-GMD fact about x—is false.

My second assumption is that the following weak version of metaphysical foundationalism is true:

> **Weak Foundationalism** (WF): for any derivative entity x, there is at least one fundamental entity y such that y either directly or indirectly fully grounds x.[32]

As Scott Dixon has recently argued, WF is *not* equivalent to more controversial versions of "metaphysical" foundationalism.[33] For example, unlike other versions of metaphysical foundationalism, WF is *not* incompatible with the possibility—or even actuality—of infinitely descending chains of full metaphysical grounding.[34] Instead, WF merely requires that every chain of full grounding *either* terminates in a fundamental entity *or*, if it does not terminate, that there

[32] Dixon 2016, p. 466 and Rabern and Rabin 2016.
[33] See Dixon's discussion of "fully pedestaled" chains of full grounding in section 6 of Dixon 2016.
[34] For example, WF is compatible with the sorts of infinitely descending chains of full ground generated by the assumption that composite objects are grounded in their proper parts together with the possibility of "gunky" worlds, i.e. worlds containing composite objects with "infinitely divisible" proper parts. For discussion of mereological gunk and infinite descent, see Schaffer 2010, pp. 61—65.

be at least one fundamental entity "outside" the chain that serves as an "overdetermining" full ground of each of the infinitely many grounded entities.

Here is Premise 4's contrapositive:

(4*) If there are groundmates, then Purity is false.

I will begin by supposing that Premise 4*'s antecedent is true. I will then argue that, given the two assumptions discussed above, Premise 4*'s consequent follows.

Suppose that there are groundmates. I shall work with the example of {Socrates} and [Socrates exists]. However, as we shall see later, nothing of substance turns on this particular choice of groundmates—the reasoning to follow generalizes, *mutatis mutandis*, to any other groundmate pair.

Consider any GMD fact about {Socrates}. For example, consider [{Socrates} is a set]. There are only two options with respect to [{Socrates} is a set]—either it is fundamental, or else it is fully grounded in some other fact(s). Let us consider each option in turn.

First suppose that [{Socrates} is a set] is a fundamental fact. Now, [{Socrates} is a set] has a grounded entity, {Socrates}, as a constituent. Hence, there is at least one fundamental fact with a derivative entity as a constituent. Therefore, Purity is false.

Second, suppose instead that [{Socrates} is a set] is fully grounded in some other fact(s). Recall that [{Socrates} is a set] is a GMD fact about {Socrates}. As I argued earlier, however, a GMD fact about a given grounded entity is fully grounded in some other fact(s) *only if* those latter fact(s) are also GMD facts about that grounded entity. As a result, there are other GMD fact(s) about {Socrates} that serves as the fully grounds for [{Socrates} is a set]. Suppose, for example, that [{Socrates} has members] is a GMD fact about {Socrates} and that [{Socrates} has members] fully grounds [{Socrates} is a set].

Now consider the GMD fact [{Socrates} has members]. There are only two options. Either [{Socrates} is a set] is fundamental, or else [{Socrates} is has members] is fully grounded in some further fact(s).

If [{Socrates} is has members] is fundamental, then there is a fundamental fact with a derivative constituent. So Purity is false. If [{Socrates} is has members] is fully grounded, then there must be some further GMD fact(s) about {Socrates} that serve as its full grounds. For example, suppose that [it is part of the essence of {Socrates} that it has members] is a GMD fact about {Socrates}, and that it fully grounds [{Socrates} has members].

Now consider the GMD fact [it is part of the essence of {Socrates} that it has members]. The same two options arise—either [it is part of the essence of {Socrates} that it has members] is fundamental, in which case Purity is false, or else [it is part of the essence of {Socrates} that it has members] is fully grounded in some still further GMD fact(s) about {Socrates}.

Indeed, these two options will arise again and again at each increasingly more fundamental level of GMD facts about {Socrates}. Let "the GMD series" be the resulting chain of GMD facts about {Socrates}—thus, the GMD series begins with [{Socrates} is a set], which is fully grounded in [{Socrates} has members], which is fully grounded in [it is part of the essence of {Socrates} that it has members], and so on.

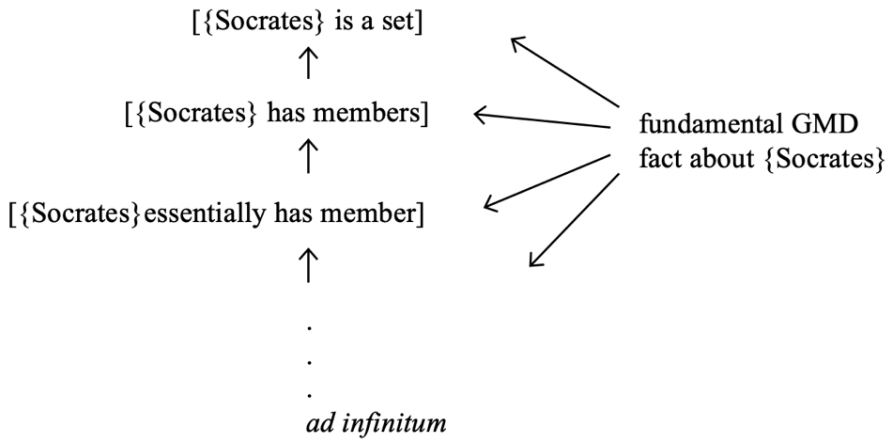
The GMD series is either infinitely long, or else it terminates. Either way, Purity is false. If the GMD series terminates, then there must be at least one absolutely fundamental GMD fact about {Socrates} that either directly or indirectly serves as the full ground for each of the higher-level GMD facts in the series. That fundamental GMD fact, whatever else it is like, must have {Socrates} as a constituent. Thus, there is at least one fundamental fact that has a derivative entity as a constituent. So Purity is false.

If the GMD series is infinitely long, then it does not *terminate* in an absolutely fundamental GMD fact about {Socrates}. Instead, the GMD series amounts to an "infinitely descending" chain of full ground, such that every GMD fact in the series is fully grounded in some subsequent GMD fact in the series.

WF is true. So there must nevertheless be at least one absolutely fundamental fact "outside" the series, which serves as an overdetermining full ground of each of the infinitely many derivative GMD facts in the series. Moreover, no GMD fact can be fully grounded in a non-GMD facts. It follows that the the fundamental fact that is "outside" the GMD series that is serving as the full ground of each GMD fact in the series must itself be a GMD fact about {Socrates}.

Figure 9 depicts the resulting grounding structure, with the infinitely descending GMD series on the left-hand side and the fundamental GMD fact on the right-hand side:

Figure 9



As Figure 9 makes clear, it is both the case that the GMD series is infinitely long *and* it is also the case that there is a fundamental GMD fact about {Socrates}. That fundamental GMD fact,

whatever else it is like, has {Socrates} as a constituent. So there is at least one fundamental fact that contains a derivative constitutent. Therefore, Purity is false.

Here is a brief recap of the above argument. Suppose some grounded entity x has a groundmate, grounded entity z. Consider an arbitrary GMD fact about x, ex. [x is F]. That GMD fact is either fundamental or fully grounded. If the former, then Purity is false. If the latter, then there is a series of GMD facts about grounded entity x. That series of GMD facts is either finite or infinite. Either way, WF implies that there is at least one fundamental GMD fact about grounded entity x. Therefore, either way, Purity is false.

Therefore, if there are groundmates, then Purity is false. So Premise 4* is true. By contraposition, so is Premise 4. I have now defended the three substantive premises of my argument against Purity. I conclude that Purity is false—there is at least one fundamental fact about some grounded entity.

IV. Grounding Ungrounded

The falsity of Purity is an important conclusion in its own right. But Purity's demise spells trouble for a second grounding piety, namely, GGT. In this section I shall argue that, without Purity, there is no good motivation for GGT. I will then argue that parsimony considerations, together with GGT's lack of motivation, constitute a positive reason to *reject* GGT.

As I noted in Section I, GGT's actual defenders generally cite Purity as their main motivation for taking every grounding fact to be itself grounded.[35] So the falsity of Purity, which

[35] Consider the following modal recombination principle:

> **Modal Recombination** (MR): if entity x is a contingent and fundamental entity then, for any distinct contingent and fundamental entity y, it is possible for x to exist without y.

is this paper's first conclusion, undermines the motivation that GGT's actual defenders have offered.

But there is a second, more substantive way to see that the falsity of Purity leaves GGT unmotivated. Suppose that Purity is false, that there is some fundamental fact containing a derivative or grounded entity as a constituent. For example, suppose that x grounds y. And suppose you know that the following is a fundamental fact about derivative entity y: [y is F].

Now consider a different fact about derivative entity y: [y is G]. Imagine you are asked, based only on what you know so far, whether [y is G] is itself a fundamental fact. Clearly it would be unmotivated of you to insist, without any further argument, that [y is G] is derivative rather than fundamental fact. After all, you know that at least one other fact about entity y, [y is F,] is a fundamental fact. In the absence of any further argument, you should simply withhold judgment.

More generally, once you learn that there is at least one fundamental fact containing derivative entity y as a constituent, you cannot simply assume every single fact about entity y is going to be derivative rather than fundamental. For any fact about derivative entity y, in the absence of further argument, you should simply withhold judgment about that fact's status as fundamental or derivative.

Karen Bennett has argued that MR implies GGT (Bennett 2011a and Bennett 2017, pp. 190—91). Nevertheless, MR provides no *independent* motivation for GGT, separate and apart from Purity. For if Purity is false, then MR is false as well. Suppose there is some contingent fact that violates Purity. For example, suppose that grounded entity x is F, and yet [x is F] is a fundamental fact. Weak Foundationalism demands that there be some fundamental entity that serves as the ultimate grounds for every grounded entity (Section II). The fundamental fact [x is F] cannot be grounded entity x's ultimate fundamental grounds. For entity x is a *constituent* of the fact [x is F]. So there must be some distinct entity, entity y, that serves as the ultimate fundamental grounds of entity x. Moreover, entity y must be contingent rather than necessary. If entity y were necessary, then whatever it fully grounded would also exist necessarily. Yet grounded entity x, which entity y fully grounds, is contingent. So entity y is also contingent. Finally, note that full grounding is necessitating—if *a* fully grounds *b* then, necessarily, if *a* exists then *b* exists. It follows that, necessarily, if entity y exists then entity x exists as well. Therefore, there are two contingent fundamental entities, entity x and entity y, which are *not* modally recombinable in the way that MR demands. I conclude that if Purity is false, then so is MR.

Now consider another fact containing derivative entity y as a constituent: [x grounds y]. Imagine you are asked whether *this* fact is fundamental or derivative. Just as before, it would be unmotivated of you to insist, without any further argument, that [x grounds y] is itself a derivative fact. After all, you know that there is at least one other fact about entity y, [y is F] that is fundamental. In the absence of a further argument, you should simply withhold judgment.

Of course, you might come across a good reason to think that some fact about derivative entity y is itself derivative rather than fundamental. For example, consider the conjunctive fact [y is F and x is G]. And suppose you have good reason to think that, in general, conjunctive facts are grounded in their conjuncts. This would give you reason to think that every conjunctive fact, including [y is F and x is G], is derivative. It is motivated for you to conclude that [y is F and x is G], though, *only* insofar as you have some further reason for thinking that every conjunctive fact is derivative.

If Purity is false, then there are some fundamental facts containing derivative entities as constituents. Grounding facts, facts about what grounds what, contain derivative entities as constituents. So, if Purity is false, it would be unmotivated of us to insist that no grounding fact is fundamental. That is, it would be unmotivated to insist that each and every grounding fact is itself grounded. Thus, if Purity is false then accepting GGT is unmotivated.

At the very least, we should be agnostic about the truth of any unmotivated philosophical thesis. So, at the very least, we should be agnostic about the truth of GGT. However, we sometimes have good reason to reject an unmotivated philosophical thesis. And GGT is one such unmotivated thesis. Or so I shall argue below.

Let us begin by considering a different, but equally unmotivated, philosophical thesis—*Homuncular Dualism*. Homuncular Dualism (HD) is the conjunction of two theses. First, a person

x is consciously thinking that p just in case there is some distinct, smaller person y inside x's head who is thinking that x is thinking that p. Second, every conscious mental fact—every fact of the form [x is in conscious mental state M]—is a fundamental fact.

I assume that you, like me, reject HD. You probably have many reasons for rejecting HD. For example, you probably know that it is empirically false that people have other, smaller people living inside their heads. Perhaps you also endorse some form of physicalism about the mental, and therefore have reason to reject HD's claim that every conscious mental fact is a fundamental fact. However, even if you were neither a physicalist nor empirically informed, you would still have sufficient reason to reject HD.

To see this, first note that the truth of HD immediately leads to an infinite regress. Suppose that person x is thinking that p. HD says that inside the head of every person x thinking that p there is a distinct homuncular person thinking that x is thinking that p. Thus, there is some homunculus y that is thinking that person x is thinking that p. Moreover, there is yet another homunculus z inside homunculus y's head, thinking that homunculus y is thinking that person x is thinking that p. And so on, *ad infinitum.*

Next note that HD's infinite regress of ever smaller homunculi is accompanied by another regress of infinitely many fundamental facts. First, there is the fundamental fact that person x is thinking that p. Second, there is the fundamental fact that homunculus y is thinking that x is thinking that p. Third, there is the fundamental fact that homunculus z is thinking that homunculus y is thinking that x is thinking that p. And so on, *ad infinitum*.

So HD's truth entails that there are infinitely many fundamental facts. Moreover, HD is completely unmotivated—you have no good reason to believe it. As a result, I think it would be

epistemically irresponsible of you to merely remain agnostic about HD's truth. Instead, you have good reason to regard HD as false.

More generally, I think you should regard as false *any* completely unmotivated philosophical thesis whose truth implies the existence of infinitely many fundamental facts.[36] That is, I endorse the following principle:

> **Principle**: for any philosophical thesis T, we should reject T if (1) we have no good reason to believe that T is true and (2) if T's truth would imply the existence of infinitely many new fundamental facts.

My argument against the Grounding Grounding Thesis, like my argument against HD, relies on the truth of Principle. Before getting to that argument, though, I want to note what Principle does *not* say.

Principle does not say that we should reject *any* philosophical thesis whose truth implies the existence of an infinite regress of facts. For example, consider the T-schema, according to which p if and only if it is true that p. It is well-known that the T-schema implies infinitely many facts. Suppose that p. Thus, assuming the T-schema, it is true that p. Thus, it is true that it is true that p. Thus, it is true that it is true that it is true that p. And so on, ad infinitum.

The truth of the T-schema leads to an infinite regress of facts. However, Principle does not instruct us to reject the T-schema. After all, the T-schema is not completely unmotivated. We have good reason to believe it. And Principle instructs us only to reject *unmotivated* theses whose truth would lead to an infinite regress of facts.[37]

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[36] See [REDACTED].

[37] Principle is similar to Daniel Nolan account of the difference between vicious and benign infinite regresses in Nolan 2001. Commitment to any infinite regress, Nolan argues, entails infinitely many new quantitative ontological commitments. Thus every infinite regress is theoretically costly. A regress is vicious, he argues, when this cost is not worth paying. Likewise, Principle instructs us only to reject those unmotivated theses that lead to an infinite regress

As Karen Bennett has argued, GGT implies the existence of infinitely many, numerically distinct grounding facts.[38] To see this, consider the following grounding fact: [x grounds y]. If GGT is true, then [x grounds y] is itself grounded in something, z. Thus we have another grounding fact: [z grounds [x grounds y]]. And, if GGT is true, that latter grounding fact is also grounded in something, z*. Thus we have another grounding fact: [z* grounds [z grounds [x grounds y]]]. And so on, *ad infinitum*.

Note that the infinite regress of grounding facts follows regardless of which specific account of what grounds the grounding facts is correct. After all, our starting assumption in the last paragraph was that [x grounds y] is grounded in something, z. For all I said, z could be the entity at the "bottom" of the grounding fact, x. Or it could be the entity at the "top" of the grounding fact. Or it could be the bottom entity together with a general connective principle. Regardless of what z is, the infinite regress of grounding facts follows.

Every defender of GGT recognizes that GGT implies an infinite regress of grounding facts. Nevertheless, GGT's defenders are not generally bothered by this implication. For, as Bennett points out, each and every one of the infinitely many grounding facts in the regress is *grounded* rather than fundamental. And, she argues, while the postulation of infinitely many *fundamental* facts may be objectionable, the postulation of infinitely many new grounded facts is not objectionable.[39]

Contra Bennett, however, the infinite regress of grounding facts is *not* harmless. To see this, first recall that, as I argued in Section II.6, GGT's truth entails that some grounded entity has

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of fundamental facts. Principle does not require us to reject a well-motivated thesis whose truth implies such a regress of fundamental facts.

[38] See Bennett 2011b, pp. 30-31.

[39] Bennett 2011b, pp. 32-35. And see Bennett 2017, pp. 196-8 for an updated discussion of her position in Bennett 2011b.

a groundmate. My defense of that claim began by considering some arbitrary grounding fact, [x grounds y]. I then supposed that, per GGT, every grounding fact is grounded. If every grounding fact is grounded then, so I argued, the grounding fact [x grounds y] has a groundmate. I concluded that if GGT is true then some grounded entity has a groundmate.

But I chose the grounding fact [x grounds y] arbitrarily. So I now conclude that if GGT is true then *every* grounding fact has a groundmate. Moreover, as I argued in Section III above, there is a fundamental fact about every grounded entity with at least one groundmate. Therefore, I now conclude, if GGT is true then there is a fundamental fact about every grounding fact.

In light of this, return to the infinite regress of grounding fact generated by GGT. It is true that each of these infinitely many grounding facts, per GGT, is itself grounded rather than fundamental. However, if GGT is true then there is a fundamental fact about every grounding fact. Thus, for each grounding fact in the infinite regress, there is a fundamental fact about that grounding fact. Since there are infinitely many grounding facts, there also are infinitely many fundamental facts accompanying them.

Therefore, if GGT is true then there are infinitely many fundamental facts, one for each grounding fact in the infinite regress of grounding facts. We have already seen that GGT is unmotivated. And Principle instructs us to reject any philosophical thesis that is both (1) unmotivated and (2) whose truth implies the existence of infinitely many new fundamental facts. Thus Principle instructs us to reject GGT. So I conclude that the Grounding Grounding Thesis is false—some grounding facts are fundamental.

V. Fundamental Composition Grounding Facts

Some grounding facts are fundamental. So there are two options. Either *all* grounding facts are fundamental, or else some grounding facts are fundamental while others are grounded. I hope to discuss these options more thoroughly in future work. I will close this paper arguing that one's stance on certain first-order metaphysical dispute can and should inform which grounding facts one takes to be fundamental. [40]

Here is Peter van Inwagen's famous question about composition:

> **The Special Composition Question** (SCQ): for any things, the xs, what necessary and jointly sufficient conditions must the xs meet in order to jointly compose a y?[41]

SCQ has an *answer* just in case there is some perfectly general, non-disjunctive condition C the meeting of which by some xs is necessary and sufficient for their composing a further object y.[42] Let *criterialism* be the view that SCQ has a true answer. And let *anti-criterialism* be the view that SCQ has no true answer.

Unrestricted composition is the thesis that, for any xs whatsoever, there is an object composed of the xs.[43] If composition is unrestricted, then criterialism is true. Restricted composition is the thesis that some xs compose a further object while others do not. Many—though not all—versions of restricted composition entail that anti-criterialism is true.[44]

Here is a different question about composition:

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[40] Thanks to [REDACTED] for helpful discussion.
[41] See van Inwagen 1990.
[42] To avoid circularity, those conditions must also be *non-mereological*. See van Inwagen 1990.
[43] Defenders of unrestricted composition include Lewis 1986, Rea 1998, and Sider 2001.
[44] Peter van Inwagen's "life" answer to SCQ, according to which some xs compose a further object if and only if their activities constitute a biological life, is one of the very few criterialist versions of restricted composition. By contrast, anti-criterialist versions of restricted composition abound. See, among others, Sanford 1993, Markosian 1998, Merricks 2005, Silva 2013, and Korman 2015.

> **Fundamental Composition Question** (FCQ): if the xs compose an object y, is the composition fact [the xs compose y] fundamental or are there some non-mereological fact(s) that fully ground it?

FCQ asks whether the "composition facts"—i.e. the facts about what composes what—are fundamental or grounded. Let *brutalism* be the view that, for any xs, if the xs compose a y, then the composition fact [the xs compose y] is an ungrounded or fundamental fact.[45] And let *derivativism* be the view that, for any xs, if the xs compose a y, then the composition fact [the xs compose y] is fully grounded in some non-mereological fact(s).

Assume that derivativism about composition is true. Interestingly, that assumption implies nothing at all—one way or the other—about whether SCQ has an answer. As a result, derivativism's truth is perfectly consistent with both criterialism and anti-criterialism.

To see this, suppose that some xs compose an object y_1, and that the composition fact [the xs compose y_1] is fully grounded in [the activities of the xs constitutes a biological life]. Also suppose that some other things, the ys, compose a different object y_2. However, assume that the composition fact [the zs compose y_2] is fully grounded in [the zs are chemically bonded]. Finally, add that there are no other composition facts.

The above suppositions, taken together, render derivativism about composition true. For there are only two composition facts, both of which are fully grounded in some non-mereological fact(s). However, one composition fact is fully grounded in a biological fact, while the other is fully grounded in a fact about chemical bonding. As a result, there are no perfectly general, non-

[45] See Markosian 1998.

disjunctive conditions the meeting of which is both necessary and sufficient for some xs to compose a further object. In other words, anti-criterialism is true.[46]

According to *conservatism* about composite material objects, there are roughly all and only the composite material objects that we ordinarily take there to be.[47] So conservatism says there are, among other things, such objects as living organisms and their biological parts, artifacts like tables and chairs, as well as inanimate natural objects like mountains, clouds, and planets. On the other hand, conservatism denies that there are arbitrary mereological fusions like the object composed of my dog and the tree in your back yard.

Conservatives should be attracted to anti-criterialism about composition. For a conservative-friendly answer to SCQ would have to state a single perfectly general condition met by the cells composing your living body, by all the parts of your car, and by the planets composing the Milky Way. Moreover, since conservatism denies that there are arbitrary mereological sums, that condition would *not* be met by any arbitrary scattered objects. It is just hard to see how there could be such a general condition, even one that is yet unknown to us.[48]

Conservatives should also be attracted to derivativism about composition. For conservatives tend to trust their intuitions. And, intuitively, whenever composition occurs, surely it does so *because of* or *in virtue of* something about the putative composing objects. Derivativism

[46] Derivativism's consistency with criterialism is easier to see. Suppose that composition is unrestricted. Add that, for any xs, the composition fact [the xs compose y] is fully grounded in [the xs are two or more]. Then every composition fact is fully grounded *and* there is an answer to SCQ.

[47] Daniel Z. Korman is perhaps conservatism's most prominent defender. See especially Korman 2015. Also see Markosian 1998 for a view that is consistent with conservatism but does not entail it.

[48] There is also an inductive reason for conservatives to conclude that anti-criterialism is true. Metaphysicians have been searching for a conservative-friendly answer to SCQ for nearly thirty years now. So far, they have come up empty handed. One conclusion to draw from this, of course, is that conservatism about composition is false. Alternatively, one might conclude that there is no completely general answer to SCQ. In other words, one might conclude that anti-criterialism is true.

vindicates this intuition. Brutalism, according to which composition's occurrence is never grounded in anything else, does not.[49]

So anti-criterialism and derivativism are not merely *consistent* with one another. They also have a common resonance with the conservative project in metaphysics. Moreover, if anti-criterialism and derivativism are both true, then the facts about what grounds the composition facts are fundamental facts.

Begin by supposing that derivativism about composition is true. Then there are facts of the following form: [[the xs compose y] is fully grounded in [the xs are F]]. Let facts of this sort be the *composition grounding facts*, i.e. the facts about what grounds the composition facts. For example, if [the xs compose y] is fully grounded in [the xs are chemically bonded], then [[the xs compose y] is fully grounded in [the xs are chemically bonded]] is a composition grounding fact.

Consider any composition grounding fact of the form [[the xs compose y] is fully grounded in [the xs are F]]. If that composition grounding fact is itself fully grounded in some other fact(s), then one of Section II's four extant accounts of what grounds the grounding facts captures the way that composition grounding fact is grounded.

The arguments of Section V allow us to rule out both a Bottom-Up Particularist account and a Top-Down Particularist account.

If Bottom-Up Particularism is true, then the composition grounding fact [[the xs compose a y] is fully grounded in [the xs are F]] is itself fully grounded in the "bottom" non-mereological fact, [the xs are F]. It would be arbitrary for [the xs are F] to fully ground the first-order grounding fact [[the xs compose a y] is fully grounded in [the xs are F]], but *not* to ground the second-order grounding fact [[[the xs compose a y] is fully grounded in [the xs are F]] is fully grounded in [the

[49] Although see Section 5 of Markosian 1998 for a rejoinder to the counterintuitiveness objection to brutal composition.

xs are F]]. So [the xs are F] fully grounds that second-order grounding fact as well. Likewise, it would be arbitrary for [the xs are F] to ground the first-order and second-order grounding facts but *not* the third-order grounding fact. So [the xs are F] fully grounds the third-order grounding fact to. And so on, *ad infinitum*.

Thus, if the composition grounding facts are grounded in the way Bottom-Up Particularism says, then there is a familiar infinite regress of grounding facts. Moreover, as we saw in Section V, there will be infinitely many fundamental facts accompanying this regress. So, for reasons familiar from Section V, we should reject the Bottom-Up Particularist approach to the composition grounding facts. Moreover, since Top-Down Particularism leads to a mirror-image infinite regress of grounding facts, we should reject the Top-Down Particularist approach to composition grounding facts for similar reasons.

Thus, the composition grounding facts must be—per the three other main accounts of what grounds the grounding facts surveyed in Section II—at least partly grounded in a general "connective" principle. For example, perhaps fact [[the xs compose a y] is fully grounded in [the xs are F]] is partly grounded in a general law of metaphysics stating that, necessarily, for any xs, the xs compose a y if and only if and in virtue of the fact that the xs are F. Or perhaps it is partly grounded in the fact that it lies in the general essence of the composition relation that, necessarily, the xs compose a y if and only if and in virtue of the fact that the xs are F.

Either way, though, the relevant principle states perfectly *general* necessary and sufficient conditions for composition's occurrence. In other words, that connective principle states an answer to SCQ. It follows that if the composition grounding facts are grounded then there is an answer to SCQ. That is, if the composition grounding facts are grounded then anti-criterialism is false. By contraposition, if anti-criterialism is true then the composition grounding facts are fundamental.

I have argued that, if derivativism about composition and anti-criterialism about composition are both true, then the composition grounding facts are fundamental. I have also argued that, if conservativism about composition is true, then so are derivativism and anti-criterialism. I conclude that, if conservatism about composition is true, then the composition grounding facts are fundamental facts—although the composition facts are all fully grounded, nothing fully grounds the fact that the composition facts are thus grounded.

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