GROUNDING: NECESSARY OR CONTINGENT?

BY

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Abstract: Recent interest in the nature of grounding is due in part to the idea that purely modal notions are too coarse-grained to capture what we have in mind when we say that one thing is grounded in another. Grounding not being purely modal in character, however, is compatible with it having modal consequences. Is grounding a *necessary* relation? In this article I argue that the answer is 'yes' in the sense that propositions corresponding to full grounds modally entail propositions corresponding to what they ground. The argument proceeds upon two substantive principles: the first is that there is a broadly epistemic constraint on grounding, while the second links this constraint with Fine's Aristotelian notion of essence. Many think grounding is necessary in something like the sense specified above, but just why it's necessary is an issue that hasn't been carefully addressed. If my argument is successful, we now know why grounding is necessary.

1. Introduction

Philosophical theses cast in terms of grounding expressions include claims such as mental properties are instantiated *in virtue of* physical properties; the proposition that the rose is red is true *because* the rose red; dispositional facts are *posterior to* categorical facts; the existence and nature of wholes are *metaphysically explained* by the existence and nature of their parts; and so on.[1] My target is how grounding and modality interact. Recent interest in the nature of grounding is due in part to the idea that purely modal notions are too coarse-grained to capture what we have in mind when we say that one thing is grounded in another. Grounding not being purely modal in character, however, is compatible with it having modal consequences. Is grounding a *necessary* relation? There are various things that you might mean in claiming that grounding is necessary. Let [p]

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be the fact that p, Δ a plurality of facts, and ∧Δ the conjunction of propositions that correspond to the members of Δ. Three possibilities to consider: if [p] is (fully) grounded in Δ, then it's metaphysically necessary that (i) if ∧Δ then [p] is grounded in Δ; (ii) if ∧Δ then something or other is grounded in Δ; or (iii) if ∧Δ then p. Generalizing from (i)–(iii), we arrive at three different senses in which a relation might be necessary. Identity on the standard conception is necessary in all three senses. By contrast, when a philosopher claims that composition is both necessary and universal, normally the claim is that it's (ii)-style necessary; if $a_1, a_2, \ldots, a_n$ compose b, then it's necessary that, if $a_1, a_2, \ldots, a_n$ exist, then $a_1, a_2, \ldots, a_n$ compose something or other (Sider, 2001, pp. 202–3). With respect to grounding the question instead is normally whether the relation is (iii)-style necessary. Where '□' formalizes metaphysical necessity, consider, then, the following thesis:

NECESSITY: if [p] is (fully) grounded in Δ, then $\Box(\wedge\Delta \rightarrow p)$.

The goal of this article is to argue that NECESSITY is true. Many think that something like NECESSITY is true,[2] but just why the thesis is true is an issue that hasn't been carefully addressed. If my argument is successful, we now know why grounding is necessary.[3]

Before turning to my argument for NECESSITY, however, why is the truth or falsity of the thesis philosophically important? The overall significance of the thesis lies in the fact that various philosophical theses are cast in terms of grounding vocabulary, and working out the modal consequences of a philosophical thesis is crucial to evaluating its plausibility. Consider, for example, maximalism about truthmaking, the thesis that every truth has a truthmaker. A familiar difficulty for this thesis is the problem of negative existentials, the problem of identifying truthmakers for propositions such as <there are no unicorns>. Now, suppose, as many do, that we are to understand truthmaking in terms of grounding (Rodriguez-Pereyra, 2005; Schaffer, 2010). In particular, suppose that an entity e is a truthmaker for <p> just in case [p] is (fully) grounded in [e exists]. If NECESSITY is false, then e being a truthmaker for <there are no unicorns> doesn't require that <e exists> entails that there are no unicorns. In the absence of this restriction, there are various plausible candidate truthmakers for <there are no unicorns>, such as the conjunction of propositions corresponding to the positive facts. If NECESSITY is true, however, the potential truthmakers for <there are no unicorns> become increasingly baroque, appealing to entities such as totality propositions and absences. Hence, while maximalism is on fairly firm ground with respect to negative existential truths provided that NECESSITY is false, if NECESSITY is instead true this might not be the case.

It's worth noting that two fairly natural ways of arguing for NECESSITY prove unsuccessful. The first argument is that determination relations are (iii)-style necessary, and grounding is a determination relation. Problem: causation is a determination relation and presumably not (iii)-style necessary (Leuenberger, manuscript). You might think instead that the distinction between full and mere partial grounding itself secures NECESSITY. One way of illustrating the distinction is by way of the following contrast: while, for some suitable p and q, [p∧q] is merely partially grounded in [p], [p∨q] is fully grounded in [p]. With this example in mind, you might claim that [p] is fully grounded in Δ just in case [p] is grounded in Δ and □(∧Δ → p), and [p] is merely partially grounded in Δ just in case [p] is grounded in Δ and ~□(∧Δ → p). Problem: facts corresponding to necessary truths can have mere partial grounds. If [p] is merely partially grounded in Δ and <p> is necessarily true, it's a trivial matter that □(∧Δ → p). Consider again [p∧q]. Suppose that <p> is a necessary truth, as is <q>. For some suitable p and q, [p∧q] is merely partially grounded in [p], despite the fact that <p∧q> is true in all possible worlds.[4] Moral: the distinction between full and mere partial grounding is an explanatory distinction rather than a purely modal one.

My argument for NECESSITY relies on two principles:

> SIGNIFICANCE: [p] is (fully) grounded in Δ only if the *connecting questions* with respect to [p] and Δ lack *cognitive significance*.
>
> ESSENCE: the connecting questions with respect to [p] and Δ lack cognitive significance only if there are certain *essential truths* characteristic of [p], Δ, the plurality consisting of [p] and Δ, or the entities they involve according to which ∧Δ → p.[5]

With these two principles in place, the argument for NECESSITY is as follows:

(1) Suppose that [p] is (fully) grounded in Δ.
(2) By (1) and SIGNIFICANCE, the connecting question 'Why should [p] obtain given that each member of Δ obtains?' lacks cognitive significance.
(3) By (2) and ESSENCE, there are essential truths about [p], Δ, the plurality consisting of [p] and Δ, or the entities they involve according to which ∧Δ → p.
(4) The essential truths are metaphysically necessary.
(5) By (3) and (4), □(∧Δ → p).[6]

The bulk of the article is devoted to clarifying and defending SIGNIFICANCE and ESSENCE.

2. *Cognitive significance*

Our first order of business is SIGNIFICANCE. I begin by contrasting two general ways in which subjects can be epistemically situated with respect to certain questions they pose.

Consider the following two cases. First, adapting a case from Stoljar (2006, Ch. 1), imagine that a group of intelligent slugs live on a surface of tiles, all of which are either triangles or pie pieces. Combinations of these tiles make up further shapes including circles. The slugs perceptually detect various shapes including triangles and circles but fail to detect pie piece shapes, and they suspect that triangles are fundamental while circles are non-fundamental. Suppose that Sue the slug asks, 'Why should there be circles rather than figures of some other shape given the fundamental facts?' Sue, however, isn't completely in the dark about how circle shapes might fit into a world that is fundamentally non-circular. Sue is able to see how truths about non-detected non-triangular tiles – whatever they may be – are the sorts of considerations that could render the circular truths intelligible in such a world.

Now suppose that Frank, while having a basic understanding of chemistry, is ignorant of various chemical concepts such as crystalline bonding. As he looks at the Fabergé egg on display in the museum, he realizes that he's missing something and asks, 'Why should this object be fragile given the nature of the bonding of its constituent molecules?' Like Sue, Frank doesn't see himself as having come upon an explanatory mystery, for he has an overall sense of how various chemical truths might be explanatorily relevant to the fragility of the Fabergé egg.

Call general questions of the form that we find above *connecting questions*. More specifically, a question is a connecting question just in case it has the form 'Why should [p] obtain given that each member of Δ obtains?' where [p] and the Δs are distinct facts such that neither causally explains the other. The circle and fragility cases have the following features. First, each case involves *ignorance*, specifically ignorance of certain facts explanatorily relevant to the connecting questions Sue and Frank pose. In each case our questioner is operating with incomplete knowledge of the subject matter at hand. Second, each connecting question has *substantive content* for the subject who poses it. That is to say, in each case posing the question comports with the nature of the questioner's epistemic situation, where an epistemic situation includes the truth-values of a subject's beliefs and their epistemic status (i.e. whether they are justified or unjustified and the role they play in the justification of the subject's other beliefs). In other words, different substantive answers are epistemically possible for the subject in each case.[7] Third, Sue and Frank both have the impression that the substantive content of their respective connecting questions is *contingent*. More specifically, it appears to them that, were they fully informed

about the nature of the entities involved in their questions, these questions would cease to have substantive content for them; they would belie the nature of their respective epistemic situations. Sue's overall sense is that, were she fully informed about the nature of the entities involved in the fundamental shape facts, she would have an informative answer to her connecting question concerning circles, and the same applies, *mutatis mutandis*, to Frank and his connecting question concerning the fragility of the Fabergé egg. With respect to connecting questions like those about the Fabergé egg, Levine, for example, claims that if Frank were to persist in his question having learned the underlying chemistry, we should be '. . . absolutely puzzled as to what substantive content there could be to [Frank's] wondering', and, with respect to 'fragility', Frank is 'holding on to the word with nothing in mind that it signifies' (2001, p. 83).

Let's now compare the circle and fragility cases to two further cases that have the first two features while lacking the third, the impression of contingent substantive content. Suppose that recurrent activity above a certain threshold between the V1 and MT/V5 neural structures is the neural correlate of the visual experience as of motion (Block, 2005). Suppose that Max is aware of this fact, and having a rudimentary though incomplete understanding of how V1 and MT/V5 interact, asks, 'Why should someone have an experience with that phenomenal character rather than a different type of experience when there is such neural activity?' Unlike Sue and Frank, however, it's Max's impression that the substantive content of his connecting question is non-contingent; it seems to Max that, were he fully informed about the nature of the visual experience as of motion and the V1 and MT/V5 neural structures, his connecting question still wouldn't belie the nature of his epistemic situation.

For our fourth case, suppose that moral rightness is coextensive with the maximization of that which is good. Suppose that Glenda is aware of this fact, but she is unsure whether goodness is to be understood in terms of pleasure, desire satisfaction, or some other notion. With this operating in the background, she asks, 'Why should an action be a right action given that it maximizes that which is good?' Like Max, Glenda's impression is that the substantive content of her connecting question is non-contingent in the sense that, were she fully informed about the nature of the entities relevant to her question (e.g. *being good* and *being right*), her question would still have substantive content for her.

Let a connecting question of the form 'Why should [p] obtain given that each of the members of Δ obtains?' be *cognitively significant* just in case it's metaphysically necessary that, for any rational individual, being fully informed about the nature of [p], Δ, the plurality consisting of [p] and Δ, and the entities these facts involve doesn't suffice for the question to lack substantive content for that individual.[8] So a connecting question of this form lacks cognitive significance just in case it's possible that being fully

informed about the natures of the relevant entities suffices for the question to lack substantive content for some rational individual. While the connecting questions in the first two cases apparently lack cognitive significance, the connecting questions in the last two cases apparently have it. In the motion case, for example, it seems that reasoning more carefully or learning more neuroscience or cognitive psychology won't make the posing of such questions epistemically inappropriate for Max (Chalmers, 1995; Levine, 2001, Ch. 3).[9] And in the rightness case, we don't have the sense that further clarifying the notion of utility maximization or better understanding just which states are good, for example, would close off the epistemic legitimacy of the question for Glenda (Moore, 1903/1993).[10]

Three points of clarification about cognitive significance are as follows. First, cognitive significance in my sense is importantly different from Frege's (1892/1980) notion that goes under the same name. Frege's notion, of course, is closely related to the *a posteriori*. For Frege, if an identity statement is knowable *a posteriori*, it has what he calls cognitive significance. With this in mind, consider what I call *Frege's principle*: if there is an informative answer to a connecting question that is knowable *a posteriori*, the question has cognitive significance. Frege's principle is obviously false on our conception of cognitive significance. If a connecting question has an epistemically accessible, informative answer – be it knowable *a priori* or *a posteriori* – it lacks cognitive significance. Equivalently, if a connecting question has cognitive significance, it lacks an accessible informative answer.[11] This is true for the simple reason that, if a connecting question has an accessible, informative answer, then there are possible rational individuals who grasp that answer because they grasp the natures of the entities relevant to the connecting question. As such, the connecting question lacks substantive content for such an individual.

The above principle linking cognitive significance on the one hand and the *a priori* and *a posteriori* on the other hinges on the presence or absence of accessible informative answers *tout court* rather than whether such answers are knowable *a priori* or *a posteriori*. A more controversial linking principle does turn on substantive issues concerning the *a priori* and *a posteriori*. Chalmers and Jackson (2001; henceforth C&J) argue that cases like the circle and fragility cases are characterized by *a priori* entailment. With respect to the fragility case, for example, they claim that the chemical truths supplemented with indexical truths, phenomenal truths, and the like *a priori* entail that the Fabergé egg is fragile. Hence, they claim that informative answers to 'Why should this object be fragile given the nature of the bonding of its constituent molecules?' are knowable *a priori*.[12] C&J's take on *a priori* entailment suggests what I call *C&J's principle*: if a connecting question lacks cognitive significance, it has an informative answer knowable *a priori*. Equivalently, if a connecting question lacks an informative answer knowable *a priori*, it has cognitive significance. The general

idea here is that connecting questions that lack cognitive significance have accessible informative answers, and, if C&J's claims about *a priori* entailment are correct, such answers are knowable *a priori*. Whether C&J are right about *a priori* entailment, however, is a controversial matter. Though I suspect that they're wrong about this, I will remain neutral on the C&J principle.

Second, the claim that a connecting question has cognitive significance should be distinguished from similar proposals in the literature, such as McGinn's (1993, Ch. 2) claim that we are cognitively closed with respect to certain facts. While some claim that the fact that connecting questions in the phenomenal/physical case have substantive content for us is a function of our current (probably contingent) scientific ignorance of a special type of empirical non-experiential truth (Stoljar, 2006, Ch. 4; see note 9), McGinn claims that we're chronically ignorant of these truths in the sense that epistemic access to them is incompatible with biological and psychological facts constitutive of human nature. Consistent with McGinn's view, however, is the possibility that there are other possible creatures with access to the relevant truths. If the connecting questions concerning phenomenal and physical facts are cognitively significant, however, it seems that either there are no such truths or they are in principle cognitively inaccessible.

Third, and most importantly for our purposes, the notion of cognitive significance plays an important role in the evaluation of certain philosophical theses. Returning to the link between phenomenal and physical facts, the appearance that connecting questions in this context are cognitively significant is at the root of a familiar challenge to physicalism. A standard gloss of physicalism is that in the actual world each mental fact is ultimately grounded in certain physical facts (Levine, 2001, Ch. 1; Loewer, 2001). Many agree that the appearance of cognitive significance with respect to connecting questions in the phenomenal/physical case – what Levine dubs the *explanatory gap* – gives us a *prima facie* reason to believe that physicalism is false, that the physical fails to ground the mental.[13] This is the explanatory gap challenge to physicalism. A presupposition here is that, if these connecting questions not only appear cognitively significant but also in reality *are* cognitively significant, physicalism so understood is false. And where naturalism is the thesis that each moral fact is grounded in certain natural facts in the actual world, I take it that many would agree that our impression that the connecting questions in this case are cognitively significant gives us a prima facie reason to reject naturalism. Operating in the background is the idea that, if such questions really are cognitively significant, naturalism so understood is false. Putting aside his focus on *a priori* entailment, this is one way of casting Moore's open question argument against naturalism.[14]

What should we conclude about grounding per se from our discussion above? Well, assuming that the reasoning behind our approaches to the explanatory gap challenge and the open question argument isn't wildly off target, there are two candidate conclusions to consider. Common ground between them is the idea that there is a broadly epistemic component to the cases we've discussed so far. If, for example, the fact that I'm having an experience as of motion is grounded in certain facts about recurrent activity between V1 and MT/V5, then the connecting questions in this case aren't cognitively significant, appearances to the contrary. The proposals disagree, however, about the generality of this component. The first is a thesis we've already seen:

> SIGNIFICANCE: [p] is (fully) grounded in Δ only if the connecting questions with respect to [p] and Δ lack cognitive significance.[15]

According to SIGNIFICANCE, this broadly epistemic feature is characteristic of grounding in general. Recall Lowe's (2010) notion of (rigid) existential dependence: one thing existentially depends on another just in case it's metaphysically necessary that if the former exists/obtains/occurs/etc. then the latter exists/obtains/occurs/etc. Cast in Lowe's terminology, SIGNIFICANCE is this: the fact that [p] is grounded in Δ existentially depends on the fact that the connecting questions with respect to [p] and Δ lack cognitive significance.[16] The second thesis is this:

> PARTIALITY: the epistemic component to the examples we've discussed so far isn't universal; some possibly true grounding claims are such that their connecting questions have cognitive significance.

I think that considerations on balance favor SIGNIFICANCE over PARTIALITY. Two points suggesting that this is so are as follows. First, paradigm cases of grounding have the relevant epistemic feature, two of which we've already discussed: the grounding of [p∧q] in [p], [q], and the grounding of [p∨q] in [p], for some suitable p and q.[17] With respect to the latter, for example, the connecting question, 'Why should [p∨q] obtain given that [p] obtains?' certainly lacks cognitive significance, for this question lacks substantive content even for individuals who know little about the nature of [p∨q], [p], the plurality of these facts, and the entities they involve. Such grounding claims involve relatively fundamental applications of the grounding notion, which in turn provide guidance for its application in less fundamental cases. Hence, we should expect that the epistemic feature in question is present in all contexts in which the grounding notion applies. The advocate of PARTIALITY, however, might respond that all that's special about such grounding claims is that they're relatively easy to grasp, and this fact alone doesn't guarantee that they're representative of all cases.

But surely the fact that the grounding claims we're most confident in asserting satisfy SIGNIFICANCE supports the idea that all cases satisfy SIGNIFICANCE, though the relationship of support is potentially defeated by additional information.[18]

Second, I suspect that in general appearances to the effect that there are plausible grounding claims that violate SIGNIFICANCE can be explained away. More specifically, I suspect that such cases typically result from conflating two distinct matters, whether a connecting question has cognitive significance and whether its answer is knowable *a posteriori*, a mistake I warned about earlier in our discussion of Frege's principle.

Another approach the advocate of PARTIALITY might take is as follows. The narrow notion of explanation at issue with grounding is *objective* or metaphysical rather than epistemic; it shouldn't be subject to the sorts of epistemic constraints that attach to explanation generally speaking, such as issues concerning what particular subjects already know or don't know, their cognitive capacities, and so on (Lowe, 2010; Schnieder, 2006b). If SIGNIFICANCE is true, however, it's subject to just these sorts of objectionable constraints.

SIGNIFICANCE, however, ties grounding to general epistemic facts – what sorts of questions have substantive content for individuals who meet certain conditions – rather than the epistemic situation of any particular subject. As such, it doesn't impugn its objectivity. Compare grounding so understood, for example, to negative ideal conceivability. According to Chalmers (2002b), a statement S is negatively ideally conceivable when ideal rational reflection detects no contradiction in the hypothesis expressed by S (equivalently, when $\sim S$ is not *a priori*). In this case, whether a statement is negatively ideally conceivable for a subject is an entirely objective matter, despite the fact that conceivability is a broadly epistemic notion.[19]

3. Essence

Above I argued that grounding facts existentially depend on facts concerning cognitive significance. Our next order of business is ESSENCE. Generally speaking, the thesis is that the connecting questions with respect to [p] and Δ lack cognitive significance only if certain Fine-style essential truths characterize [p] and Δ (or other related entities) according to which $\wedge\Delta \rightarrow$ p. The thesis in particular is as follows:

> ESSENCE: the connecting questions with respect to [p] and Δ lack cognitive significance only if there are certain *essential truths* characteristic of [p], Δ, the plurality consisting of [p] and Δ, or the entities they involve according to which $\wedge\Delta \rightarrow$ p.

The thesis cast in terms of existential dependence is this: the fact that connecting questions with respect to [p] and Δ lack cognitive significance existentially depends on certain essential truths with respect to [p] and Δ.[20] I'll briefly consider Fine's broadly Aristotelian conception of essence before motivating ESSENCE.

Fine's (1994) notion of essence is primitive, and he uses the notion of a 'real' as opposed to 'nominal' definition to communicate the notion he has mind. The basic idea is that, while a nominal definition says what a term *means*, a real definition tells us what an entity *is*. To say, for example, that it's an essential truth about Socrates that Socrates is a human is to say that part of what it is to be Socrates is that Socrates is a human. If p is an essential truth with respect to entity e, then p is true regardless of what the world might be like; the truth of p doesn't turn on how things turn out. Cast in terms of grounding, the idea is that the essential truths lack worldly grounds. It follows that, if it's an essential truth about Socrates that he is a human, then <Socrates is a human> is metaphysically necessary despite the fact that Socrates is a contingent existent. For, if there is no possible state of the world relevant to the determination of the truth of <Socrates is a human>, then of course whether Socrates exists isn't relevant in this manner either.[21]

Why take this conception of essence seriously? Apart from its intuitive appeal, the motivation is in its theoretical utility, in particular its parsimony. It's a familiar idea that we are to understand essence in terms of metaphysical necessity; call this the *Moorean conception* of essence, after Moore (1919–20). One proposal is that for an object to be essentially F is for it to be metaphysically necessary that the object is F; another is that for an object to be essentially F is for it to be metaphysically necessary that the object is F if it exists. Cast in terms of grounding, the Moorean conception of essence has it that the essential truths are grounded in modal facts. After pointing to a host of problems for the Moorean conception,[22] Fine (1994) proposes that we instead understand metaphysical necessity (as well as other grades of necessity) in terms of essence. Cast in terms of grounding, the view is that the modal facts are grounded in essential truths rather than the other way around (Rosen, 2010). Here the idea is that the essential truths concerning concepts ground the conceptual truths, and the essential truths about everything whatsoever ground the metaphysically necessary truths. Other grades of necessity, such as nomological necessity, are to be analyzed in the same manner.[23] If Fine is right, then we can understand sundry important modal notions in terms of two core notions, that of essence and ground.

I think Fine's conception of essence is certainly worth taking seriously, and I will adopt it for the purposes of this article. Now we can return to ESSENCE. Suppose that the connecting questions with respect to [p] and Δ lack cognitive significance. In this case there is a possible world in which

being fully informed about the nature of [p], Δ, the plurality consisting of these facts, and the entities these facts involve suffices for the question 'Why should [p] obtain given that each member of Δ obtains?' to lack substantive content for some rational individual. But why is it that this question lacks substantive content for this subject? It's overwhelmingly plausible to think that it's something about the nature of the relevant entities that forecloses cognitive significance. The general idea is that, once you know what it is to be the relevant facts and the entities they involve, such questions no longer comport with your epistemic situation; when you grasp the relevant essential truths, you thereby see why it should be that [p] obtains given that each member of Δ obtains. What essential truth could play such a role? ESSENCE provides a straightforward answer: $\wedge\Delta \rightarrow p$.

There are three kinds of cases to consider with respect to ESSENCE. First, there are p-cases, cases in which truths of this form are essential truths with respect to p or the entities it involves. Three p-cases are as follows. Question: 'Why should there have been a global economic recession in 2008 given that 2008 was marked by severe declines in consumption, investment, government spending, and export activity?' Claim: this question lacks cognitive significance because part of the nature of the property *being a recession* is that, if an economy is characterized by significant declines in such measures of economic activity, that economy is in a recession. Question: 'Why should it be that either Hong Kong is part of Austria or Europe was at peace in 1950, given that Europe was at peace in 1950?' Claim: no cognitive significance in this case because part of what it is to be the disjunctive fact that either Hong Kong is part of Austria or Europe was at peace in 1950 is that it obtains if either of its disjunct facts obtain. Question: 'Why should this Fabergé egg be fragile given the nature of the bonding of its constituent molecules?' Claim: no cognitive significance in this case because part of what it is to be *being fragile* is that, for all x, if x is made up of molecules with weak crystalline bonds, x is fragile.[24]

Second, there are Δ-cases, cases in which the relevant essential truths – truths with the form $\wedge\Delta \rightarrow p$ – are characteristic of Δ or the entities this plurality involves. Three such cases are as follows. Question: why should someone be a philosopher given that Socrates is a philosopher? It's not part of what it is to be [Someone is a philosopher] that if Socrates is a philosopher then someone is a philosopher. The existential fact, to use Fine's 2012 phrase, 'knows nothing' of the fact involving Socrates. In other words, we can know everything there is to know about the nature of the existential fact without knowing the first thing about the Socrates fact (Rosen, 2010).[25] The same applies to the entities the existential fact involves. Claim: no cognitive significance in this case because part of what it is to be [Socrates is a philosopher] is that if Socrates is a philosopher then someone is a philosopher. While the existential fact knows nothing of the fact concerning Socrates, the latter knows something of the former, for

part of what it is to be Socrates is that Socrates is a particular individual, Socrates is someone. Question: why should the apple be colored given that it's red? *Being colored* knows nothing of *being red* (assuming that determinables aren't disjunctive properties consisting of their detetminates) and no fact involving *being red* is part of what it is to be [the apple is colored]. Claim: no cognitive significance here because part of what it is to be *being red* is that, for all x, if x red, then x is colored. Question: why should [p] obtain given that [p∧q] obtains? For some suitable p and q, [p] and the entities it involves know nothing of [q]. Hence, there is no essential truth characteristic of [p] or the entities it involves according to which p∧q → p. Claim: no cognitive significance because part of what it is to be [p∧q] is that p∧q → p.

Third, there are p/Δ-cases: cases in which the relevant essential truths are characteristic of the plurality consisting of [p] and Δ or the entities these facts involve. Question: why should [p∨q] obtain given that [p∧r] obtains? It's not part of what it is to be [p∨q] that p∧r → p∨q given that neither [p∨q] nor the entities it involves know [r], and it's not part of what it is to be [p∧r] that p∧r → p∨q given that neither [p∧r] nor the entities it involves knows [q] (for some suitable p, q, and r). Claim: no cognitive significance in this case because part of what it is to be the plurality consisting of [p∨q] and [p∧r] is that p∧r → p∨q. For, if we know everything there is to know about the nature of [p∨q] and [p∧r], surely we know that p∧r suffices for p∨q.[26]

Here is a final thought on the relationship between cognitive significance and essence. Although this isn't necessary for the argument for NECESSITY, I suspect that the converse of ESSENCE is true as well:

> ESSENCE*: if the connecting questions with respect to [p] and Δ have cognitive significance, then it's not the case that there are essential truths characteristic of [p], Δ, the plurality consisting of [p] and Δ, or the entities they involve according to which ∧Δ → p.

Suppose that a connecting question of the form 'Why should [p] obtain given that each member of Δ obtains?' is cognitively significant. What can we say about [p] and Δ in this case? Returning to the motion case, many have noted that when we attend to our experiences such as the visual experience as of motion when we have them, it strikes us that they're neither structural nor functional (or more generally dispositional) in nature. In other words, it strikes us that to have such an experience isn't merely to instantiate various properties that are related in such a way so as to either form a particular structure or perform a certain activity. (Paradigmatic examples of structural and functional properties are *being a methane molecule* and *being a gene*, respectively.) More generally, it strikes us that it's not part of what it is to be the visual experience as of motion

that neural activity of any particular sort suffices for having experiences of that type.[27] It also strikes us that it's not part of what it is to be recurrent activity of the appropriate sort between V1 and MT/V5 that such activity suffices for visual experiences as of motion. And the same holds for the plurality consisting of the mental state and such neural activity, as well as the relevant facts that correspond to them. Following Chalmers (1995, 2002a), it's impressions roughly of this sort that create the explanatory demand at issue in the explanatory gap between the phenomenal and the physical, our sense that their connection is arbitrary in nature.

Similar considerations apply to the open question argument against naturalism. Central here is our sense that it's not part of what it is to be a right action that committing an action that maximizes that which is good suffices for that action to be right.[28] It's impressions of this sort that underlie our sense that the connection between the moral and natural is arbitrary, that the sorts of questions we considered above are cognitively significant.

If these cases are representative, ESSENCE* is true, and the relationship between cognitive significance and essence is intimate indeed: the connecting question 'Why should [p] obtain given that $\wedge\Delta$ obtains?' lacks cognitive significance if and only if there are essential truths characteristic of [p], Δ, the plurality consisting of [p] and Δ, or the entities they involve according to which $\wedge\Delta \rightarrow$ p. If such a principle is true, a tantalizing possibility is that perhaps we can understand cognitive significance ultimately in terms of essence or vice versa. And notice, moreover, that, if ESSENCE* is true, then, not only is there a broadly epistemic dimension to essence in addition to grounding, but they're epistemically constrained in just the same manner. A natural thought here is that perhaps we can understand cognitive significance ultimately in terms of essence and grounding, or essence and grounding ultimately in terms of cognitive significance. These ideas deserve further thought.

4. Conclusion

Many think that NECESSITY is true, but just why it might be true is an issue that hasn't been properly addressed. If my argument is successful, we now know why grounding is necessary. We've focused on the second and third premises of the argument concerning SIGNIFICANCE and ESSENCE. We have a loose end, however, to address: the fact that there are putative counterexamples to NECESSITY. In closing I'll consider four potential counterexamples. I suggest that each case falls into one of two categories, neither of which is such that its members challenge NECESSITY.[29]

The first is due to Dancy (2004, Ch. 3). Suppose you reason as follows: (i) I promised to φ; (ii) my promise wasn't given under duress; (iii) I'm able

to φ; therefore, (iv) I ought to φ. Suppose further that each of the premises and the conclusion are true. Dancy suggests that (i) gives you a reason to commit the action, while (ii) and (iii), though not providing reasons themselves, jointly enable (i) to do so. A natural way of translating this into talk of grounding (what Dancy calls 'resultance') is to say that, while the fact that you promised to φ grounds the fact that you ought to φ, the fact that your promise wasn't given under duress, the fact that you're able to φ, and additional relevant facts jointly enable the promise-fact to ground the obligation-fact. Since the former doesn't modally entail the latter, we have a putative counterexample to NECESSITY.

The second and third potential counterexamples I adapt from Bricker (2006) and Schnieder (2006a), respectively. Consider the fact that all xs are F. This fact is grounded in the conjunction of facts to the effect that a is F, b is F, and so on. The proposition corresponding to this conjunctive fact, however, doesn't modally entail the proposition corresponding to the universal fact. Now consider the fact that Xanthippe became a widow. This fact is grounded in the fact that Socrates died, yet the proposition corresponding to the latter doesn't modally entail the proposition corresponding to the former given that there are possible worlds in which Socrates and Xanthippe were never married.

When faced with a case in which it seems that [p] is fully grounded in Δ yet $\sim\Box(\wedge\Delta \rightarrow p)$, the advocate of NECESSITY should check to see if there are additional explanatorily relevant facts Π such that $\Box(\wedge(\Delta, \Pi) \rightarrow p)$. If such additional facts are available, we have reason to believe that Δ is a mere partial ground that was misidentified as a full ground; in such a case, [p] instead is fully grounded in Δ, Π. Each of the three cases set out above are such that additional explanatorily relevant facts are available that meet the modal entailment condition: what are identified as enabling conditions in the first case, a totality fact – the fact to the effect that a, b, etc. are everything that exists – in the second case, and the fact that Socrates and Xanthippe were married in the third case. We're only going to encounter a problem for NECESSITY in this context if there is a case in which it seems that we've identified a full ground, yet there are no additional facts that are both explanatorily relevant and meet the modal entailment condition. Such cases, however, aren't forthcoming.[30]

A fourth potential counterexample that I adapt from Schaffer (2010) is as follows. Let's grant for the sake of argument a substance/mode (trope) ontology. Consider, for example, the connection between a rose qua substance and its particular redness qua mode. It is said that modes are dependent modifications of substances, and a natural way to translate this into grounding talk is to say that the fact that the particular redness exists is grounded in the fact that the rose exists. If this is right, however, then NECESSITY is false, given that it's not the case that the proposition

corresponding to the latter modally entails the proposition corresponding to the former.

You might think that we should give the same diagnosis here as we gave to the cases discussed above: the fact that the particular redness exists is merely partially grounded in the fact that the rose exists, and NECESSITY applies to full grounds. Presumably the idea here is that the existence of the particular redness is fully grounded in two facts: the fact that the rose exists, and the fact that the rose is a particular shade of red. I think, however, that a different response to this case is warranted. I agree that the fact that the rose is a particular shade of red seems explanatorily relevant to the fact that the particular redness exists. But, following Schnieder (2006a), tacking on the fact that the rose exists to this *explanans* seems to add nothing to the overall explanation. Since any partial ground in a grounding explanation is explanatorily relevant to the *explanandum*, it seems, then, that the existence of the particular redness isn't even partially grounded in the existence of the rose. I suggest instead (as Schnieder does) that the existence of the particular redness is fully grounded in the fact that the rose is a particular shade of red. The question 'Why should the particular redness exist given that the rose is a particular shade of red?' obviously lacks cognitive significance in our sense, so the proposal doesn't violate SIGNIFICANCE. Hence, it seems that the proponent of this putative counterexample, rather than mistaking a mere partial ground for a complete ground, mistakes a non-ground for a ground.[31]

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NOTES

[1] To fix ideas as well as sidestep certain controversies that I don't have the space to address here, I make two general assumptions about grounding. First, the best semantic theory will treat the various grounding expressions as they appear in the theses above as relational predicates (rather than, say, sentential connectives) introducing a single explanatory relation. Second, the relata of the grounding relation are restricted to facts, where grounds are pluralities of such entities. Proponents of the first assumption include Rodriguez-Pereyra (2005) and Schaffer (2009), while Correia (2010) and Fine (2012) reject the relational conception on grounds of ontological neutrality. Proponents of the view that the grounding relata are restricted to facts include Audi (2012) and Rosen (2010), while Schaffer (2009) rejects this view. For an overview of some of the key issues and recent literature with respect to grounding, see Trogdon, forthcoming.

[2] Proponents of theses akin to NECESSITY include Audi (2012), Correia (2005), Dasgupta (manuscript-a), deRosset (2010), Fine (2012), Rosen (2010), and Witmer *et al*. (2005). Bricker (2006), Chudnoff (manuscript), Dancy (2004, Ch. 3), Leuenberger (manuscript), Schaffer (2010), Schnieder (2006a), and Skiles (2012, Ch. 3), however, reject theses akin to NECESSITY.

[3] A familiar thought is that to explain something is to show that it 'couldn't have been otherwise' given its *explanans*. The idea is that the locution 'couldn't have been otherwise'

with respect to causal explanation concerns nomic/physical necessity, and in the case of metaphysical explanation the modality is stronger. So it may be that NECESSITY has the status of a default view. Still, it would be preferable for the advocate of NECESSITY to have a positive argument for her view, one that vindicates the general thought about the connection between metaphysical explanation and necessitation that makes the view attractive in the first place. Thanks to Shamik Dasgupta for helpful discussion here.

[4] Here's another perhaps more interesting example. Consider the intensional view of properties according to which properties are grounded in the plurality of their possible instances. Suppose that $f_1, \ldots f_n$ are the members of a proper sub-plurality of possible F-instances. Consider the conjunctive fact that f_1 is a member of the class that is F and $\ldots f_n$ is a member of the class that is F. On the intensional view of properties, <F exists> is necessarily true and the fact that F exists is merely partially grounded in this conjunctive fact.

[5] Suppose that <all horses are animals> is necessarily true. As will become clear later, in this case the connecting question, 'Why should all horses be animals given that, say, Hong Kong is a city?' lacks cognitive significance. According to ESSENCE, it follows that a certain essential truth characterizes [all horses are animals], [Hong Kong is a city], the plurality of these facts, or the entities they involve: if Hong Kong is a city then all horses are animals. You might claim, however, that the horse and city facts and the entities they involve are independent with respect to essence. To avoid this potential problem, let's henceforth restrict the propositions that play the p-role in SIGNIFICANCE to contingent truths. With respect to NECESSITY we're only interested in <p> as a contingent truth in any case, for if [p] is grounded in Δ and <p> is a necessary truth, then it's a trivial matter that $\Box(\wedge\Delta \rightarrow p)$. Thanks to Stephan Torre for helpful discussion here.

[6] By 'ground' I mean 'full ground' unless otherwise noted. This argument doesn't show that propositions corresponding to mere partial grounds modally entail propositions corresponding to what they ground, for, if [p] is merely partially grounded in Δ, the question 'Why should [p] obtain given that each member of Δ obtains?' is cognitively significant. That this is so will be clear after we consider the notion of cognitive significance in the next section; see note 17.

[7] Thanks to Moritz Schulz for helpful discussion on the notion of substantive content.

[8] In an earlier draft of this paper I characterized the notion of cognitive significance as follows: a connecting question of the form 'Why should [p] obtain given that each member of Δ obtains?' is cognitively significant just in case it's metaphysically necessary that the question has substantive content for any rationally ideal individual fully informed about the nature of [p], Δ, the plurality consisting of [p] and Δ, and the entities they involve. As Skiles (2012, Ch. 3) points out, however, characterizing cognitive significance in this way seems to trivialize SIGNIFICANCE. For suppose that [p] is grounded in Δ. There is obviously a possible rationally ideal individual who is fully informed about the natures of the relevant entities but also understands that Δ metaphysically explains [p], and posing the relevant connecting question would certainly belie the nature of this individual's epistemic situation.

[9] Stoljar (2006, Ch. 4) defends what he calls the *epistemic view* with respect to experience which includes the claims that (i) we're ignorant of a special type of empirical experience-relevant non-experiential truth; and (ii) were we to come to understand truths of this type, we would see that the modal arguments against physicalism (i.e. the zombie and knowledge arguments) fail. In developing this view, Stoljar argues that the epistemic situation of the slugs with respect to circles that I discussed above is analogous to our epistemic situation with respect to the experiential in its essential respects (on the assumption that the special type of empirical experience-relevant non-experiential truth we're ignorant of concerns fundamental truths), *contra* what I suggest above. See Trogdon, 2009, for more on why this is a mistake.

[10] Of course, our judgments concerning which connecting questions are cognitively significant are defeasible. This is for the simple reason that the appearance of cognitive significance with respect to a connecting question is compatible with the question lacking this feature. It may be that, while it seems that the epistemic legitimacy of certain connecting questions is insensitive to what there is to know about the nature of the relevant entities, such knowledge would in fact cancel their epistemic legitimacy for us.

[11] If a connecting question has cognitive significance, it doesn't follow that that question lacks a true answer. Instead, what seems to follow is that it's not the case that the question has an accessible, substantive content removing answer. So the existence of an informative answer that is in principle inaccessible and an uninformative answer along the lines of a dormative virtue explanation, for example, are compatible with a connecting question being cognitively significant.

[12] Perhaps C&J would accept Frege's principle because for them its antecedent is necessarily false – it's necessary that if a connecting question has an accessible informative answer, that answer is knowable *a priori* rather than *a posteriori*.

[13] Even those who Chalmers (2002a) identifies as 'type-B' materialists (e.g. Block and Stalnaker, 1999) tend to agree on this point. For one argumentative strategy widely endorsed by type-B materialists is the *phenomenal concept strategy* (Stoljar, 2005). The strategy is to argue that there are special features of our cognitive relation to phenomenal character that are both physically explicable and predict that connecting questions with respect to the phenomenal and physical would strike us as cognitively significant. A presupposition here is that the existence of the explanatory gap poses a *prima facie* problem for physicalism, for, in the absence of such an assumption, it's unclear why the physicalist should be interested in implementing the strategy in the first place.

[14] Thanks to Dana Goswick for helpful suggestions regarding how to think about cognitive significance.

[15] Another way to put SIGNIFICANCE is as follows: if there is not only an explanatory gap between [p] and Δ but an *unbridgeable* one, it's not the case that [p] is grounded in Δ. Returning to the phenomenal concept strategy (see note 13), I don't interpret the advocate of this strategy, therefore, as claiming that the explanatory gap between the phenomenal and physical is unbridgeable, that the sorts of questions discussed above really are cognitively significant. I see advocates of this strategy instead as attempting to explain in a way compatible with physicalism why it seems to us that the gap is unbridgeable, why such questions strike us as cognitively significant.

[16] Keep in mind that the relations of grounding and existential dependence are distinct relations, for they have different formal features. The former, for example, is irreflexive while the latter is not. This difference comports with the idea that grounding is an explanatory relation while existential dependence is not.

[17] Returning to the matter of mere partial grounding and cognitive significance (see note 6), suppose that [p$\wedge$q] is merely partially grounded in [p]. The connecting question 'Why should [p$\wedge$q] obtain given that [p] obtains?' is cognitively significant, for knowing everything there is to know about the nature of [p$\wedge$q], [p], the plurlaity of these facts, and the entities they involve wouldn't close off the epistemic legitimacy of the question. Thanks to Alex Skiles for helpful discussion here.

[18] In the final section of the article I consider potential counterexamples to NECESSITY that perhaps can be recast as potential counterexamples to SIGNIFICANCE. There I argue that these cases either conflate mere partial grounding with full grounding or they fail to locate grounding relations altogether. This diagnosis applies to these cases not only as potential counterexamples to NECESSITY but to SIGNIFICANCE as well.

[19] A related worry is this. It's true, you might claim, that it *seems* that considerations involving cognitive significance form a substantive epistemic constraint on grounding. But this appearance, you urge, can be explained away. What is true is just that we're *warranted in believing* that [p] is grounded in Δ only if it seems that their connecting questions lack cognitive significance. This debunking story, however, doesn't take into account the fact that there are a variety of considerations that might recommend a particular grounding claim or a general claim about what grounds what even when the relevant connecting questions appear cognitively significant. Let's return, for example, to physicalism understood as a general grounding thesis. The explanatory gap is troubling precisely because we have good reason to believe that the mental is ultimately grounded in the physical (otherwise, following Levine [2001, Ch. 1] and others, there would be no place for mental causation), yet it seems that this can't be so given the apparent cognitive significance of the relevant connecting questions. Thanks to Tim Fuller for helpful discussion on this issue.

[20] As I discuss below, on Fine's conception of essence the essential truths are metaphysically necessary. If this is right, then every truth whatsoever existentially depends on them. This, however, doesn't trivialize the essence constraint, for here the claim is that the connecting questions with respect to [p] and Δ lacking cognitive significance requires that there be essential truths of a certain form characteristic of [p] and Δ in particular.

[21] A potential complication for this view is that it may commit us to the prima facie implausible thesis that a proposition may be true in a world but not exist in that world. Here the idea is that <Socrates is a human>, for example, doesn't exist in worlds in which Socrates fails to exist, yet the proposition is true in those worlds on the present account. The issues here are difficult and fall outside the scope of the present article to adequately address. It's worth noting that, with considerations akin to this complication in mind, Fine apparently departs from what I've identified as the Finean view of essence in his 2005. Here he distinguishes between what he calls *necessary* and *transcendental* sentences, and seems to claim that sentences characterizing the essences of objects are transcendental but not necessary. Thanks to David Sanson for helpful discussion of these issues.

[22] The following is a representative example. It's metaphysically necessary that the number 2 has the property of being the sole member of singleton {2}. We don't want to say, however, that it's part of what it is to be 2 that it is the sole member of {2}.

[23] Fine departs from this view in Fine, 2002.

[24] Dasgupta (manuscript-b) argues that there are essential truths of roughly this sort, though not in a way directly tied to the notion of cognitive significance. (His arguments proceed largely on intuitions about metaphysical explanation.) Rosen (2010) suggests that part of what it is to be disjunction is that if a disjunctive fact obtains, then it's *grounded* in its corresponding disjunct facts that obtain. As he puts the point, 'On this view, to know the nature of disjunction is not simply to know the conditions under which a disjunctive proposition is true. It is to know something about what *makes* such propositions true' (2010, p. 131). You might think, however, that the notion of disjunction 'knows nothing' of grounding, to use Fine's (2012) phrase. It's worth noting that in this case you could still maintain that the putative essential truth described above is characteristic, for example, of the plurality consisting of disjunction and the grounding relation itself instead of the former alone (Fine, 2012). We needn't take a stand on these matters here.

[25] Perhaps you don't find the idea that the Socrates fact and the existential fact are related in this way particularly strange. There is a tension, however, between the claim that they are so related on the one hand and the intuitive judgments about essence that count in favor of Fine's conception of essence on the other. For, if we grant that they are so related, it's not clear why we should object to the idea, for example, that part of the essence of 2 is that 2 is the sole member of singleton {2}. See note 22.

[26] Thanks to Fabrice Correia for this example, as well as for helpful suggestions about how to formulate ESSENCE.

[27] What essential truths are characteristic of this mental state? A natural proposal with respect to the visual experience as of motion is this: part of what it is to be this mental state is that there is something it's like to have it. Alternatively, part of the nature of mental states of this type is that the world appears a certain way when you have such mental states. Rosen (2010) entertains the stronger claim that such essential truths exhaust the nature of experiences.

[28] In contrast to the visual experience as of motion (see note 27), I don't have firm intuitions regarding potential essential truths for rightness. This is, of course, compatible with having strong intuitions about what *aren't* essential truths in this context, which is what's required for the argument above.

[29] This section draws on material discussed in Trogdon, forthcoming.

[30] Notice that the first case apparently requires that we take the distinction between grounding and enabling conditions as a genuine metaphysical distinction rather than a purely pragmatic one. While Chudnoff (manuscript) defends the distinction as metaphysical in character, the fact that the corresponding distinction in the case of causation is almost certainly pragmatic seems to count against this idea.

[31] I wish to thank my audiences at the Workshop on Grounding and Determination at the University of Geneva (4 March 2011), the meeting of the Eastern Division of the American Philosophical Association (29 December 2011), and the PERSP Metaphysics Seminar at the University of Barcelona (27 April 2012) for their helpful comments. Special thanks are due to Derek Baker, Fabrice Correia, Sam Cowling, Shamik Dasgupta, Tim Fuller, Dana Goswick, Louis deRosset, Dan López de Sa, David Sanson, Jonathan Schaffer, Moritz Schulz, Alex Skiles, Jeff Snapper, Stephan Torre, and anonymous referees at *Pacific Philosophical Quarterly* as well as *Philosophical Quarterly*.

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