GROUNDING, CONTINGENCY AND TRANSITIVITY

Roberto Loss

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Abstract
Grounding contingentism is the doctrine according to which grounds are not guaranteed to necessitate what they ground. In this paper I will argue that the most plausible version of contingentism (which I will label 'serious contingentism') is incompatible with the idea that the grounding relation is transitive, unless either 'priority monism' or 'contrastivism' are assumed.

1. Introduction

The fact that Frida Kahlo's *Casa Azul* is blue depends on the fact that it is of the specific cobalt-blue shade typical of the historic centre of its borough, *Coyoacán*. The fact that the current Finance Minister of Greece Yanis Varoufakis is European depends on the fact that he is Greek. The fact that it is true that the average temperature of the Earth's atmosphere is increasing depends on the fact that the average temperature of the Earth's atmosphere is indeed increasing. These all appear to be *grounding* claims, that is, claims of non-causal dependence, determination and explanation between the more fundamental and the less fundamental: it is *because Casa Azul* is of that specific shade of cobalt-blue that it is blue; it is *in virtue of* being Greek that Varoufakis is European; it is the actual increase in the average temperature of the Earth's atmosphere that *explains* why it is true to say that the average temperature of the Earth's atmosphere is increasing. In general, to say that the fact that p ('[p]') is *grounded* in the plurality of facts Γ ('[p] $\leftarrow \Gamma$')[1] is to say that [p] either (metaphysically) *depends on*, is (metaphysically) *determined by*, or is (metaphysically) *explained* by Γ. If this is the case, then [p] is a *derivative* fact. If, instead, there is no plurality of facts grounding [p], then [p] is a *fundamental* fact, that is, a fact belonging to the *fundamental level* of reality.[2,3]

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[1] '$\leftarrow$' stands here for *full* grounding. The notion of *partial* grounding ('$|\leftarrow$') can be defined as follows:

Partial grounding: $f \mid\leftarrow \Delta \quad =_{df} \quad$ for some Γ: $f \leftarrow \Gamma$ and $\Delta \subseteq \Gamma$

See, for instance, Gideon Rosen, 'Metaphysical Dependence: Grounding and Reduction' in Bob Hale and Aviv Hoffmann (eds.) *Modality: Metaphysics, Logic, and Epistemology* (Oxford: Oxford University Press, 2010) pp. 109–36, p.115; and Kit Fine, 'Guide to Ground' in Fabrice Correia and Benjamin Schnieder (eds.) *Metaphysical Grounding: Understanding the Structure of Reality* (Cambridge: Cambridge University Press, 2012), pp. 37-80, p. 50.

[2] Although I wish to remain neutral about what kinds of entities facts are, for simplicity's sake I will follow Rosen, 'Metaphysical Dependence', and take facts to be true propositions 'individuated by their worldly items and the manner of their combination' (p. 124).

[3] For an introduction to the notion of grounding and its relation to the notion of determination, dependence and explanation see, among others: Fabrice Correia and Benjamin Schnieder (eds.) *Metaphysical Grounding: Understanding the Structure of Reality* (Cambridge: Cambridge University Press, 2012); Kelly Trogdon, 'An Introduction to Grounding' in Miguel Hoeltje, Benjamin Schnieder and Alex Steinberg (eds.), *Varieties of Dependence: Ontological Dependence, Grounding, Supervenience, Response-Dependence (Basic Philosophical Concepts)*. (Philosophia Verlag, 2013), pp. 97-122; Ricki Bliss and Kelly Trogdon, 'Metaphysical Grounding' in Edward N. Zalta (ed.) *Stanford Encyclopedia of Philosophy* (Winter 2014 Edition), http://plato.stanford.edu/archives/win2014/entries/grounding; and Michael J. Raven, 'Ground', *Philosophy Compass* (forthcoming).

The notion of metaphysical grounding lies at the centre of an intense discussion in the current debate in metaphysics. Among many others, the following is a list of questions that have attracted attention in the literature:

(Q1) Do grounds necessitate what they ground?

(Q2) Are universal or negative facts fundamental?

(Q3) Is grounding transitive?

(Q4) Is grounding a 'contrastive' notion?

(Q5) Are the parts more fundamental than the whole they compose?

(Q1) concerns the so-called *Entailment Principle*:

Entailment: If $[p] \leftarrow \Gamma$, then $\Box(\wedge\Gamma \supset p)$
(where '$\wedge\Gamma$' is the conjunction of all the propositions corresponding to facts in Γ)

Necessitarians hold that Entailment is valid and, thus, that (full) grounds necessitate what they ground.[4] For example: the existence of Socrates appears to ground and necessitate the existence of its singleton {Socrates}; the fact that this flag is red grounds and necessitates the fact that something is red; the fact that *p*, and the fact that *q* jointly ground and necessitate the fact that *p* & *q*. *Contingentists*, on the other hand, hold that Entailment admits of counterexamples.[5] The typical putative case of a contingentist grounding fact brings us to question (Q2). Consider what we might call the 'abundant totality fact' *A* that (say) *a*, *b*, and *c* are all the existing entities (supposing, of course, that *a*, *b*, and *c* are indeed all the existing entities). Since the joint existence of *a*, *b*, and *c* fails to necessitate *A*,[6] necessitarians appear to have three main options at their disposal for what concerns the question of what, if anything, grounds *A*:

(N1) *A* is fundamental
$\sim\exists f\,(A \leftarrow f)$[7]

[4] Grounding necessitarians include, among others: Fine, 'Guide to Ground'; Rosen, 'Metaphysical Dependence'; Kelly Trogdon, 'Grounding: Necessary or Contingent?', *Pacific Philosophical Quarterly* 94 (4) (2013), pp. 465-485; Paul Audi, 'Grounding: Toward a Theory of the In-virtue-of Relation', *Journal of Philosophy* 109 (12) (2012), pp. 685-711; and Fabrice Correia, *Existential Dependence and Cognate Notions* (Philosophia Verlag, 2005).

[5] Grounding contingentists include, among others: Jonathan Schaffer, 'The Least Discerning and Most Promiscuous Truthmaker', *Philosophical Quarterly* 60 (239) (2010), pp. 307-324; Stephan Leuenberger, 'Grounding and Necessity', *Inquiry* 57 (2) (2014), pp. 151-174; Alexander Skiles, 'Against Grounding Necessitarianism', *Erkenntnis* (forthcoming).

[6] Unless we assume, with Timothy Williamson (*Modal Logic as Metaphysics*, Oxford: Oxford University Press, 2013), that necessarily, everything is necessarily something. In this paper I assume Williamson's 'necessitism' to be false.

[7] This position is considered, for instance, by Fine, 'Guide to Ground', p. 62.

(N2) *A* is grounded in the facts [*a* exists], [*b* exists], [*c* exists], and (what we might call) the 'sparse totality fact' that everything is either identical to *a*, *b* or *c*.
$A \leftarrow [Ea],[Eb],[Ec],[\forall x(x=a \vee x=b \vee x=c)]$[8]

(N3) *A* is grounded in the facts [*a* exists], [*b* exists], [*c* exists] and every 'non-existence fact' about contingently non-existing entities
$A \leftarrow [Ea],[Eb],[Ec],[\sim Ez_1],[\sim Ez_2],[\sim Ez_3],[\sim Ez_4],\ldots,[\sim Ez_n],\ldots$[9,10]

Contingentists, on the other hand, do not need to posit either fundamental totality facts or fundamental non-existence facts at the fundamental level of reality. Since they reject Entailment, they can simply claim that what grounds the fact that *a*, *b* and *c* are all the entities that exist are simply the facts [*a* exists], [*b* exists], [*c* exists] taken together:

(C) $A \leftarrow [Ea],[Eb],[Ec]$

In other words, whereas necessitarians appear to be forced to take either some universal facts (such as abundant and sparse totality facts) or some negative facts (such as non-existence facts) to be fundamental, contingentists can ban both from the fundamental level of reality and please the aesthetic sense of those who have a taste for desert fundamental landscapes. Therefore, although contingentists are not committed to answering negatively to (Q2), it seems that they would lose much of their dialectic leverage against necessitarians, were they to admit either universal or negative facts at the fundamental level of reality. For this reason, in what follows I will call the version of contingentism that bans universal and negative facts from the fundamental level of reality, '*serious contingentism*'.

As for (Q3), the idea that the grounding relation is transitive has been criticised in the literature[11] by means of putative counterexamples like Jonathan Schaffer's famous case of the dented sphere (which will be discussed in section 5).[12] Since, however, transitivity appears to be a 'natural, plausible, and useful assumption', Schaffer has proposed an interesting 'replacement which not only avoids the counterexamples but [also] explains why transitivity seemed plausible, while preserving its use in generating structure'.[13] The main idea—which brings us to (Q4)—is that grounding should be taken to be a *contrastive* notion, and thus a *quaternary* relation having the form:

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[8] See, for instance, Rosen, 'Metaphysical Dependence'.
[9] To my knowledge, nobody upholds this (rather uneconomical) option in the literature (at least explicitly).
[10] For simplicity's sake I am not considering whether the facts [*a* exists], [*b* exists], and [*c* exists] are derivative or fundamental. If, for instance, [*b* exists], and [*c* exists] were derivative on [*a* exists] then [*b* exists], and [*c* exists] would not feature among the fundamental grounds of *A* (if any). This issue is not crucial to the argument I will present in section 2 and can thus be left aside.
[11] See, for instance: Jonathan Schaffer, 'Grounding, Transitivity, and Contrastivity' in Correia and Schnieder, *Metaphysical Grounding*, pp. 122-38; and Gonzalo Rodriguez-Pereyra, 'Grounding is not a Strict Order', *Journal of the American Philosophical Association* (forthcoming). Notice, however, that Rodriguez-Pereyra argues that grounding is not transitive because it takes *truthmaking* not to be transitive and to be a case of grounding. Therefore, it is not clear whether his counterexamples could show that also the more specific notion of grounding discussed in this paper is not transitive.
[12] For a discussion of Schaffer's counterexamples to transitivity, see: Michael J. Raven, 'Is Ground a Strict Partial Order?', *American Philosophical Quarterly* 50 (2) (2013), pp. 191-199; Jon Litland, 'On Some Counterexamples to the Transitivity of Grounding', *Essays in Philosophy* 14 (1) (2013); Amir A. Javier-Castellanos, 'Some Challenges to a Contrastive Treatment of Grounding', *Thought: A Journal of Philosophy* 3 (3) (2014), pp.184-192; and Rodriguez-Pereyra, 'Grounding is not a Strict Order'.
[13] Schaffer, 'Grounding, Transitivity, and Contrastivity', p. 129.

Contrastive Grounding: The fact that φ rather than φ* grounds the fact that ψ rather than ψ*

While standard binary grounding is not transitive, claims Schaffer, contrastive grounding is, at least if transitivity is defined as follows:

Differential Transitivity: If the fact that φ rather than φ* grounds the fact that ψ rather than ψ*, and the fact that ψ rather than ψ* grounds the fact that ρ rather than ρ*, then the fact that φ rather than φ* grounds the fact that ρ rather than ρ*

Finally, (Q5) addresses the relation between grounding and mereology. This table is composed of a certain number of particles arranged table-wise. It seems thus correct to say that the fact that there is a table depends on the fact that there are particles arranged table-wise. Furthermore, this train of thought can be generalised to the idea that every mereological composite entity at least partially depends on the existence of its parts. This quite widespread idea, which can be labelled 'priority pluralism', has been attacked by Schaffer, who has argued for the 'priority monist' thesis, according to which there is only one fundamental entity, the *cosmos*, which is the mereological fusion of every concrete entity, and such that each one of its parts is metaphysically dependent on it.[14] Schaffer takes grounding to be a relation that can hold between entities from different ontological categories, and thus also between individuals. However, if we take grounding to be a relation between facts (as I will be doing in this paper), then the central claim of Schaffer's 'Priority Monism' can be formulated as follows:

Priority Monism: There is exactly one fundamental existence-fact about a concrete object and it is the fact that the cosmos exists.

In what follows I will argue that there is an interesting and so far unnoticed relation between (Q1)-(Q5), that is, that (serious) contingentism appears to be incompatible with the idea that the grounding relation is transitive, unless either priority monism or contrastivism about grounding are assumed. I will thus conclude that philosophers endorsing priority pluralism and the idea that grounding is transitive and non-contrastive appear to have good reasons to also endorse necessitarianism and the validity of Entailment.

2. Serious contingentism and a counterexample to transitivity

Suppose serious contingentism is true and consider the possible world *w*. In *w*, a_1, a_2, a_3, ..., a_n ('the *a*s') are all the entities that exist, *b* is a contingently non-existing object, and there is an entity a_1, such that the fact that *b* does not exist is not even partially grounded in the fact that a_1 exists.

(1) The fact that *b* does not exist is not even partially grounded in the fact that a_1 exists
$\sim([\sim Eb] \mid\!\leftarrow [Ea_1])$

Consider now the abundant totality fact saying that a_1, a_2, a_3, ..., a_n ('the *a*s') are all the entities that exist (call it 'T'). *Qua serious* theorists, serious contingentists take T to be a

[14] Jonathan Schaffer, 'Monism: The Priority of the Whole', *Philosophical Review* 119 (1) (2010), pp. 31-76; Schaffer, 'The Least Discerning and Most Promiscuous Truthmaker'.

derivative fact. The fact that T is not necessitated by the existence of the *a*s (as I am here assuming) is not a problem for them, since, *qua contingentists*, they can consistently take abundant totality facts like T to be fully grounded by the totality of existence facts. Therefore, serious contingentists can claim that we also have the following, in *w*:

(2) T is fully grounded in the plurality of facts: [a_1 exists], [a_2 exists], [a_3 exists], …[a_n exists]
T ← [Ea_1],[Ea_2],[Ea_3],…,[Ea_n]

Given the definition of partial grounding

Partial grounding: $f \mid\leftarrow \Delta \quad =_{df}$ for some Γ: $f \leftarrow \Gamma$ and $\Delta \subseteq \Gamma$,[15]

it follows that T is partially grounded in the fact that a_1 exists

(3) T is partially grounded in fact that a_1 exists
T |← [Ea_1]

According to serious contingentists, also negative facts are not fundamental. Therefore, the fact that *b* does not exist must be a derivative fact. On what is this fact derivative? A *prima facie* plausible option for contingentists might be to say that the fact that *b* does not exist depends (at least partially) on T, that is the fact that the *a*s are all the entities that exist:

(4) The fact that *b* does not exist is grounded in the (abundant totality) fact (T) that the *a*s are all the existing entities
[~*Eb*] ← T

This idea seems to have the ring of intuitiveness to it, at least from the point of view of those (like serious contingentists) banning non-existence facts from the fundamental level of reality.[16] However, if partial grounding is transitive, it follows from (3) and (4) that the fact that *b* does not exist is indeed partially grounded in the fact that a_1 exists

(5) The fact that *b* does not exist is partially grounded in the fact that a_1 exists
[~*Eb*] |← [Ea_1]

thus *contradicting* (1).

3. Two non-starters

There are two possible responses to the argument above presented that can be dismissed straight away. The first is to claim that the possible world *w* is not a genuine possibility and, therefore, that, for every possible world *v*, every entity *x* existing at *v*, and every possible entity *y* not existing in *v*, *y*'s non-existence in *v* is partially grounded in *x*'s existence in *v*. This would entail, for instance, that even the tiniest and most insignificant

[15] Rosen, 'Metaphysical Dependence', p. 115; Fine, 'Guide to Ground', p. 50.
[16] A second option is to take non-existence facts to be grounded in the *sparse* totality fact that everything is identical to one of the *a*s. Since serious contingentists can take also sparse totality facts to be grounded in the totality of existence facts, the choice between these two options makes no difference to the argument I am presenting. For this reason, I will ignore the distinction between sparse and abundant totality facts until section 7.

entity in the remotest corner of the universe, such as a speck of dust on a remote planet, would be such that, if I existed without it existing, then its non-existence would have at least partially depended on my existence. This is, however, clearly false, as my existence (or non-existence) appears to be *irrelevant* to the non-existence (or existence) of a speck of dust on a remote planet on the other side of the universe.

The second possible response is to deny that negative facts are grounded in totality facts. Here serious contingentists embracing transitivity would face a choice: (i) either they could claim that there is indeed a *single* fact that grounds every non-existence fact (but one that—unlike totality facts—is not grounded in any existence fact whatsoever), or (ii) they could claim that there is no single fact that grounds non-existence facts because each of them possesses some '*specific'* ground. In our case, for instance, contingentists might respond that there must be some fact *f* such that *f* grounds the fact that *b* does not exist and the fact that *f* grounds *b*'s non-existence cannot be 'generalised out'[17] to *any* non-existence fact.[18]

However, the prospects of both choices appear to be pretty dim. On the one hand, it is really hard to see what kinds of facts could 'generically' ground non-existence facts beyond totality facts. On the other hand, the idea that in every possible world non-existence facts always possess specific grounds strikes one as metaphysical wishful thinking. Consider, in particular, the case of fundamental and contingent entities: what can guarantee that it is necessarily the case that, if a certain fundamental and contingent entity were not to exist, the fact that it does not exist would possess a specific ground? Not only is the burden of proof on the contingentist's shoulder in this case, but the order to fill appears to be a pretty tall one.

I conclude, therefore, that serious contingentists endorsing transitivity had better look elsewhere to respond to the objection advanced in section 2.

4. Transitivity and priority monism

The intuition behind the argument of section 2 is that non-existence facts are grounded in 'the totality of what exists', so to say. However, there appear to be at least *three* main ways to precisely articulate this idea. The first is the one considered in section 2, according to which [*b* does not exist] is grounded in the abundant totality fact T

(4) $[\sim Eb] \leftarrow \mathrm{T}$

The second is to say that [*b* does not exist] is grounded in the *plurality* of existence facts *taken together*:

(6) $[\sim Eb] \leftarrow [Ea_1],[Ea_2],[Ea_3],\ldots,[Ea_n]$

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[17] On this notion of 'generalisation' see Kit Fine, 'Ontological Dependence', *Proceedings of the Aristotelian Society* 95 (1995), pp. 269-290, p. 277.

[18] This would be equivalent to claiming the following:

(*) $[\sim Eb] \leftarrow f \,\&\, \sim\forall x(\sim Ex \rightarrow ([\sim Ex] \leftarrow f))$

Admittedly, the definition of specificity as 'non-generalisability' is clearly wanting: on the one hand, it appears to be inadequate when the fact $[\varphi(a)]$ in question is such that *a* is the *only* entity *x* such that $\varphi(x)$; on the other hand, the fact that a grounding fact about an entity *x* cannot be generalised to *any* entity whatsoever is hardly sufficient to make it really 'specific' to *x*. Even so, it seems to be good enough for the purpose at hand, since it appears that, at least in worlds like ours in which (as it appears plausible to suppose) non-existence facts abound, contingentists would be committed to say (in this case) that non-existence facts possess grounds that are 'specific' *at least* in this sense.

The third is to take [*b* does not exist] to be grounded in the existence of the *mereological sum* of every existing thing, that is, in the Schafferean cosmos ('*k*'):[19,20]

(7) $[\sim Eb] \leftarrow [Ek]$

The fact that the non-existence of *b* is grounded in the existence of a_1 follows from (4) (and (3)) by the transitivity of grounding and from (6) by the very definition of partial grounding. Instead, if (7) is assumed, we need the further *pluralist* assumption that every entity is partially grounded in all of its proper parts ('*xPPy*' stands for '*x* is a proper part of *y*'):

(8) $\forall x \forall y(xPPy \rightarrow ([Ey] \mid\leftarrow [Ex]))$

As a matter of fact, it follows from (8) that

(9) $[Ek] \mid\leftarrow [Ea_1]$

and, hence, by (7) and (9) and the transitivity of partial grounding, that

(5) $[\sim Eb] \mid\leftarrow [Ea_1]$

If, instead, we embrace priority monism and take the cosmos to be the only fundamental entity (that is: the only entity *x* such that the fact that *x* exists is a fundamental fact), then from the fact that *b*'s non-existence is grounded in the existence of the cosmos it does *not* follow that the fact [*b* does not exist] also depends on the fact that a_1 exists. According to priority monism, it is a_1 that depends on *k*, *not* the other way around:

(10) $[Ea_1] \leftarrow [Ek]$

Therefore, within a monist setting no contradiction can follow from transitivity in our case. Monists can consistently claim that the fact that the cosmos exists grounds (i) every existence fact, (ii) every non-existence fact, and (iii) the totality fact. The fact that *b* does not exist and the fact that a_1 exists are thus *both* derivative facts grounded in the fact that the cosmos exists and cannot, thus, form a chain of grounding relations threatening the idea that grounding is transitive.

5. Transitivity and contrastivism.

By embracing priority monism serious contingentists can successfully respond to the objection advanced in section 2 without rejecting the transitivity of grounding. This is, however, not their only option, as they can instead use the argument of section 2 to bolster the idea that grounding is a contrastive notion, without the need of embracing monism.

Consider, for instance, Schaffer's case of the dented sphere.[21] The fact that a certain sphere *s* is more or less spherical does not obtain in virtue of the fact that it has a certain dent *d*, but *in spite of* it, claims Schaffer. However, on the one hand, the fact that it is more or less spherical clearly depends on its having a specific (more or less spherical)

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[19] See Schaffer, 'Monism: The Priority of the Whole'. For simplicity's sake, I am here ignoring the restriction to concrete entities. Nothing of substance will hang on this.

[20] A variation of the first option consists in taking [*b* does not exists] to be grounded in the sparse totality fact that everything is identical to one of the *a*s (see above, footnote 16).

[21] Schaffer, 'Grounding, Transitivity and Contrastivity'.

shape *H*; on the other hand, it clearly has *that* specific shape partly in virtue of being dented in the way it is, that is, by having *d*.

Counter-example:

(D1) The sphere *s* has the shape *H* partly in virtue of being dented in the way it is, that is, by having *d*;

(D2) The fact that a certain sphere *s* is more or less spherical is grounded in its having a specific (more-or-less spherical) shape *H.*

Imagine, however, that you take the sphere *s* (which has the dent *d*) and start exerting some pressure on its dent *d* until the sphere is *e*-dented. As soon as you modify *d*, *s* will lose its original shape *H*. When the original dent is completely transformed into *e*, *s* has the shape *I*. However, both *H* and *I* are more-or-less spherical shapes. So, if we take *s* (that is *H*-shaped) and we slowly modify it so as to make it assume the shape *I,* we are not thereby making *any difference* to the fact that *s* is more-or-less spherical. In order to make such a difference a more radical change is needed (from *H* to, say, the non-spherical shape *Z*). Therefore, concludes Schaffer, the case of the dented sphere is not a counterexample to the transitivity of *differential* grounding.

Contrastivist solution:

($D1_C$) The fact that the sphere has the (*d*-dented) shape *H* instead of the (*e*-dented) shape *I* is grounded in the fact that it has the dent *d* instead of the dent *e*;

($D2_C$) The fact that the sphere is more-or-less spherical rather than not is grounded in the fact that it has the (more-or-less spherical) shape *H* instead of the (not more-or-less spherical shape) *Z*.

The same kind of contrastive treatment can also be applied to our counterexample (in a serious contingentist and priority pluralist setting) to the transitivity of grounding:

Counter-example:

(E1) The fact that the *a*s are all the existing entities is partially grounded in fact that a_1 exists;

(E2) The fact that *b* does not exist is grounded in the fact that the *a*s are all the existing entities.

Imagine, in fact, that in the world *w* God intervenes and eliminates a_1, without doing anything else. In such a case T would not be the abundant totality fact anymore. As an effect, the abundant totality fact would be the fact ('T-1') that the *a*s *minus* a_1, are all the entities that exist. However, the variation between T and T-1 would make *no* difference whatsoever to the non-existence of *b* in *w*. In order to make such a difference, God should intervene and change the abundant totality fact from T to a totality fact saying that *b* exists, like, for instance, the fact ('T+1') that the *a*s *plus b* are all the entities that exist. Therefore, within a contrastivist framework, also the case of *b*'s non-existence appears to be no counter-example to the (differential) transitivity of the grounding relation.

Contrastivist solution:

($E1_C$) The fact the *a*s rather than the *a*s-minus-a_1 are all the existing entities is partially grounded in the fact that a_1 exists rather than not;

($E2_C$) The fact that *b* does not exist rather than it does is grounded in the fact that the *a*s rather than the *a*s-plus-*b* are all the existing entities.

To say that a_1's existence partially grounds T—says the contrastivist—is to say that a_1's existence makes a difference with respect to T, and so that an intervention with respect to a_1's existence would change which fact is the abundant totality fact. However, while removing a_1 from existence would indeed change the abundant totality fact from T to T-1, this would not make the faintest difference as to the non-existence of *b*, which is why the case at hand—concludes the contrastivist—is not a counter-example to the differential transitivity of grounding.

6. Necessitarianism and transitivity

Before concluding, it is worth mentioning how necessitarians can respond to the argument of section 2 (assuming they want to maintain both pluralism and transitivity without having to resort to contrastivism). In fact, while necessitarians have many options to choose from when it comes to the question as to what grounds non-existence facts, the argument presented in section 2 shows there is at least one option that is unavailable even to them. In fact, it should be now clear how necessitarians cannot *both* embrace option (N2), according to which abundant totality facts like T are grounded in the totality of existence facts together with a sparse totality fact (see above, section 1), *and together* claim that non-existence facts are grounded in abundant totality facts. In fact, this would entail in our case that, since a_1's existence helps ground T, and T grounds *b*'s non-existence, so the fact that *b* does not exist is partially grounded in the fact that a_1 exists, contradicting thus (1) (see above). However, necessitarians appear to have at least three other consistent options to account for what grounds the fact that *b* does not exist:

(N_w1) The fact that *b* does not exist is fundamental
$\sim\exists f\,([\sim Eb]\leftarrow f)$

(N_w2) T is fundamental and the fact that *b* does not exist is fully grounded in T
$\sim\exists f\,(T\leftarrow f)\ \&\ [\sim Eb]\leftarrow T$[22]

[22] It is worth mentioning, however, that, since T cannot obtain without the *a*s existing, (N_w2) is problematic if a seemingly plausible principle of free modal recombination between fundamental and contingent facts is assumed. On the validity of modal recombination at the fundamental level see: Karen Bennett, 'By Our Bootstraps', *Philosophical Perspectives* 25 (1) (2011), pp. 27-41 ('[…] it is plausible to think that whatever the fundamental elements of the world are, they are open to free modal recombination […] In the absence of a reason to constrain their possible combination, it should be assumed that there is no such constraint; they are freely recombinable.', p. 27); Ross Cameron, 'From Humean Truthmaker Theory to Priority Monism', *Noûs* 44 (1) (2010), pp.178-198 ('There must be free recombination amongst the fundamental existents; whenever there is a necessary connection, there must be ontological dependence to explain the necessary connection.', p. 188); and Schaffer, 'Monism: The Priority of the Whole' ('[…] fundamental actual concrete objects should be freely recombinable, serving as independent units of being (building blocks, as it were). […] If entities are metaphysically independent, then they should be modally unconstrained in combination.', p. 40). For a recent criticism of principles of modal recombination in general see: Jessica Wilson, 'What is Hume's Dictum, and Why Believe It?' *Philosophy and*

(N_w3) The fact that *b* does not exist is fully grounded in the fundamental *sparse* totality fact that everything is identical to either a_1, or a_2, or a_3, … or a_n. ($[\sim Eb] \leftarrow [\forall x(x{=}a_1 \vee x{=}a_2 \vee x{=}a_3 \vee \ \ldots \ x{=}a_n)]$) & $\sim\exists f$ ($[\forall x(x{=}a_1 \vee x{=}a_2 \vee x{=}a_3 \vee \ \ldots \ x{=}a_n)] \leftarrow f$)

Therefore, necessitarianism does not appear to be threatened by the argument of section 2 and appears thus to be at least a less committal alternative to its serious contingentist counterpart.

7. Conclusion.

In this paper I have argued that, if grounding is a transitive notion, serious contingentists must choose between priority monism and contrastivism. Since non-serious contingentism does appear to be a far less philosophically appealing theory than its serious version, it follows that, if the argument presented in this paper is on the right track, priority pluralists and 'orthodox devotees of ground'[23] have some good reasons to prefer necessitarianism to its contingentist alternative.[24]

Instituto de Investigaciones Filosóficas,
Universidad Nacional Autónoma de México
Circuito Maestro Mario de la Cueva
Mexico City, 04510, Mexico.
robertoloss@gmail.com

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[23] Raven, 'Is Ground a Strict Partial Order?'.

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