

Priority monism, dependence and fundamentality

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Abstract Priority monism (PM) is roughly the view that the universe is the only fundamental object, that is, a concrete object that does not *depend* on any other concrete object. Schaffer, the main advocate of PM, claims that PM is compatible with dependence having two different directions: from parts to wholes for sub-cosmic wholes, and from whole to parts for the cosmic whole. Recently it has been argued that this position is untenable. Given plausible assumptions about dependence, PM entails that dependence has only one direction, it always goes from wholes to parts. One such plausible assumption is a principle of Isolation. I argue that, given all extant accounts of dependence on the market, PM entails No Isolation. The argument depends upon a particular feature of the dependence relation, namely, *necessitation* and *its direction*. In the light of this, I contend that the argument is important, insofar as it suggests that we should distinguish dependence from other cognate notions, e.g. grounding. Once this distinction is made, I suggest we should also distinguish between two different notions of fundamentality that might turn out to be not-coextensive.

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1 Priority monism and directions of dependence

Priority monism is roughly the view that the *universe*, or *cosmos*, i.e. the mereologically maximal element, is the only *fundamental* concrete object. That is to say that the universe *does not depend* on any other concrete object.¹ In fact any other concrete object *ultimately depends* on it.² The ‘ultimately’ proviso is important.³ Jonathan Schaffer, the main advocate of priority monism,⁴ notes that, strictly speaking, priority monism is compatible with the claim that composite objects that are different from the universe are dependent on their parts (Schaffer 2010a: 44). If so, dependence might have *two directions*, so to speak: (some) subcosmic wholes depend on *their* parts, but the cosmic whole does not depend on any of *its* proper parts. Rather its proper parts depend on it.⁵

Steinberg (2016) argues that this view is untenable: given plausible assumptions about monism and dependence, priority monism entails that *any* composite object whatsoever does not depend on its parts. The plausible assumptions are the following:

Necessity of Monism. If monism holds at @ it holds at any possible world w . That is, if the universe is fundamental at the actual world @, then, every possible world w is such that, at w , the universe at w is the only fundamental concrete object at w .

Internality of Dependence. If an object o_1 depends on object o_2 at possible world w_1 , o_1 depends on o_2 in every world w_2 in which both o_1 and o_2 exist.

Isolation. For any composite object o that exists at @, there is a possible world w such that the only concrete objects that exist at w are o and its parts.

The argument is brief enough to be quoted in full:

[A]ssume that (A) priority monism is true and suppose for *reductio* that (S) some composite object c depends on one of its proper parts p . By Isolation, there is a world w that includes only c and its parts, among them p . By Internality of Dependence, since c and p exist at w , c depends on p at w . By (A) and Necessity of Monism, at w the cosmos is the one and only basic concrete object. Since, at w , $c =$ the cosmos, c does not depend on anything concrete at w , in particular not on p . Contradiction! We may now deny our supposition (S) and discharge our assumption (A): if priority monism is true, no composite depends on any of its parts. (Steinberg 2016: 2026)

¹ It is an open question whether the concrete cosmos depends on something else which is not concrete.

² For more on that see Sect. 4.2.

³ See footnote 10 for some details on the “ultimately” proviso.

⁴ See e.g. Schaffer (2009, 2010a, b, 2015) and Ismael and Schaffer (2016). See also Trogon (2017).

⁵ Cf. Steinberg (2016: 2026). Schaffer (2010b: 347) distinguishes between something that is an *organic unity*, roughly a composite object such that its proper parts depend on the whole, and something that is a *mere heap*, roughly a composite object that depends on its proper parts.

The argument is valid, so there seems to be two options available for the defender of priority monism.⁶ She can learn to live with it, and simply claim that no composite object depends on its parts. In this case dependence has a *unique direction*, it always goes from wholes to parts. I am inclined to agree with Steinberg (2016: 2030) that this is a heavy burden. There seem to be composite objects such that almost none of the arguments for priority monism apply to, e.g. *heaps of sand*.⁷ For these objects it would be plausible to maintain the somewhat orthodox view that wholes depend on their parts.⁸

Or she can deny one of the assumptions above. Schaffer (2010b: 344) and Trogdon (2017) suggest that Necessity of Monism is negotiable. Benocci (2016) also suggests monists should abandon Necessity of Monism.⁹ Benocci sets for denying Necessity of Monism for

[S]teinberg argues convincingly that there is no reasonable way to deny Isolation or Internality of Dependence (Benocci 2016: 2).

To my knowledge nobody has challenged Isolation so far. This is what I shall do in this paper. Contrary to Steinberg and Benocci I believe there is *at least one*

⁶ I agree with Steinberg that the argument does not depend on some controversial assumptions about the underlying modal logic. On top of that, Steinberg shows how to frame the argument without possible worlds-talk. The resulting argument would be valid in the weakest modal system, i.e. **K**. Some of the arguments that follows depend on the acceptance of a stronger modal system, namely **B**. For a discussion see footnote 22.

⁷ Consider e.g. the *individuation argument*. At first sight the parts (the grains of sand) are not identified via their position in the whole (the heap). Or, consider the *emergence argument*. At first sight, the whole (the heap) does not have any property that is not fixed by the properties and relations of the parts (the grains of sand).

⁸ This burden of priority monism could be lightened in a number of ways. First, a monist could insist that, given transitivity of dependence, it is still the case that the heap depends on the universe. She could even insist that, in the light of that, the *individuation* and the *emergence* arguments in the previous footnote are not compelling. However, if the arguments for the claim that parts depend on their wholes are not compelling in this case, this provides all the more reason to allow that some wholes may depend on their parts. Second, the monist can deny that heaps are genuine composite objects. It is unclear whether this strategy can be used in all the relevant cases. For instance, Steinberg (2016) cites atoms and violins as objects that depend on their parts. It would be more contentious to deny that these are genuine composite objects. Finally, the monist could distinguish between different notions of dependence. This strategy seems promising to me, and I will focus on an akin proposal in Sect. 4.2. In any event, the question whether priority monism is compatible with different directions of the *same* notion of dependence is interesting in its own right. Thanks to two anonymous referees for this journal for having suggested these possibilities.

⁹ The debate on Necessity of Monism is related to a further one in metaphysics, i.e. the debate about whether the mereological structure of the world is metaphysically necessary or not. The relation between the two issues is best appreciated as follows: Necessity of Monism entails that every possible world has a universe, that is, a mereologically maximal element. Cotnoir (2013: 67) calls **Mereology** the following modal thesis, **Mereology**: Necessarily, the parthood relation is governed by the axioms of classical mereology. **Mereology** is sufficient to ensure that there is a mereologically maximal element in every possible world—given the *unrestricted composition* axiom—yet it is not necessary. One might endorse restricted composition, and require the necessary existence of the universe as an independent axiom. Two papers that focus explicitly on the relations between the debate on the necessity of the mereological structure of the universe and the necessity of monism are Cotnoir (2013) and Tallant (2013). Thanks to an anonymous referee here.

reasonable way to deny Isolation. Or better, there is one reasonable way for someone who endorses priority monism to deny Isolation. In fact, I will argue that Isolation is simply incompatible with priority monism. In a slogan: priority monism entails No Isolation.¹⁰ This is not only an interesting result in and on itself. As we shall see it casts new light on the relations between monism, dependence, and cognate notions, such as e.g. grounding and fundamentality.

2 Dependence and isolation

In his discussion of Internality of Dependence, Steinberg writes that it is difficult to clearly evaluate it, insofar as Schaffer has a very *peculiar* understanding of the dependence relation. According to Schaffer, dependence can hold between things of different categories, such as facts, objects, propositions and so on. Dependence relations¹¹ form a well-founded strict partial order, thus structuring being into a hierarchy of levels of different relative fundamentality: if x depends on y , x is less fundamental than y . Finally, Schaffer thinks that this ordering reflects ‘what grounds what’. This suggests that Schaffer equates the relations of *dependence* and *grounding*.¹² I shall return to this in Sect. 4.2. As of now, I want to direct the attention of the reader to extant accounts of dependence. I will consider four of them, namely (1) *modal-existential* (Simons 1987); (2) *essential* (Fine 1995a); (3) *explanatory* (Correia 2005; Schnieder 2006), and (4) *identity* (Lowe 1998; Tahko and Lowe 2015) dependence. These are arguably the main accounts of the dependence relation on the market, and the ones Steinberg himself discusses when evaluating Internality. In the rest of the Sect. 2 I will argue that, no matter what specific account is endorsed, priority monism entails No Isolation.

Note that I do not take a stance here—nor I need to—as to which of these accounts—if any—is correct.

Priority monism (at @)—together with the claim that dependence induces a well-founded strict partial order—entails the following (at @):¹³

Ultimate Dependence. For any material object o that is distinct from the universe u , o *ultimately*¹⁴ depends on u .

Suppose o is a composite object. Ultimate Dependence leaves it open whether o also depends on (some of) its parts p_1, \dots, p_n . Even if it were the case, given that

¹⁰ **No Isolation:** For any composite object $o \neq u$ at @, there is no possible world w where the only concrete objects at w are o and its parts.

¹¹ I take this to be *ontological dependence* to be precise, in contrast e.g. with *conceptual dependence*.

¹² To be fair, he might have changed his views on the matter. For instance, Schaffer (2012) argues against the transitivity of grounding, and in favor of what he calls *Differential Transitivity*. By contrast, he takes dependence to be transitive. See, e.g. Schaffer (2010b: 346).

¹³ I am restricting the claim to @, to engage neither with Necessity, nor with Essentiality of Monism.

¹⁴ The “ultimate” proviso is here used only to flag that, eventually, all the chains of dependence will bottom out at the universe, i.e. the *unique root* to the tree of being, to use Schaffer’s suggestive phrase, is the universe.

each of the p_i depends on u , transitivity and well-foundedness guarantee that o ultimately depends on u .

2.1 Modal existential dependence

On the Modal Existential account of dependence, ontological dependence is a matter of *de re* necessity: the dependent object *could not exist* if the dependee did not exist. This account has a long-standing philosophical pedigree.¹⁵ In contemporary philosophy, the *locus classicus* is Simon's *Parts* (Simons 1987: 295–297).¹⁶ In its simplest construal,¹⁷ the Modal Existential Account may be stated as follows:¹⁸

Modal Existential Dependence. x depends on $y \equiv \Box(Ex \rightarrow Ey)$

According to Modal Existential Dependence, x depends on y iff necessarily, if x exists, then y exists. It follows from Ultimate Dependence and Modal Existential Dependence that, for any object o , the existence of o necessitates the existence of u . In other words, in any world w in which o exists, u exists. Given that u is not among o 's parts, this amounts to No Isolation.¹⁹

An objection should now be addressed. The point of the objection is that u is not among o 's parts at @. Yet what should be established is that u is not a part of o at any world w in which both u and o exist. As an answer to this, note that several arguments do provide the desired conclusion—i.e. they lead to the claim that u is not a part of o at any world w in which they both exist. Common to such arguments is the idea that, while monists can endorse some modal flexibility of mereological structure, they can (and as a matter of fact, should) impose some *constraints* on such flexibility, so that some radical mereological changes are simply not possible. As an example consider *composite* mereological fusions. As Uzquiano (2014) points out:

[M]odal Classical Mereology may allow for fusions to change their parts across possible worlds, but *changes are subject to stringent coordination constraints* (Uzquiano 2014: 40, italics added).

¹⁵ It traces back to Aristotle (*Met.* 1019a1–4). We find it in Descartes' *Principles of First Philosophy* and Spinoza's *Ethics*. Arguably it is co-extensive with Husserl's notion of *foundation*, in the *Logical Investigations* (Section 21: 475).

¹⁶ See for a discussion Mulligan et al. (1984), Fine (1995a) and Correia (2008).

¹⁷ For a more refined formulation see Simons (1987: 295), in particular his notion of *weak rigid dependence*.

¹⁸ I will be using E to express the existence predicate. Depending on different views about existence it can be defined—in first order logic with identity—as follows: $Ea \equiv \exists x(x = a)$.

¹⁹ Faced with this result, a friend of Isolation might be tempted to reformulate the principle, as the claim that, at any possible world w , the only concrete objects existing at w are o , its parts, and u . Note however that this reformulation of Isolation would not cause trouble for priority monism. To appreciate that, go back to Steinberg's original argument. The original principle of Isolation guarantees that at w , o is the mereologically maximal element. And, given priority monism, the mereologically maximal element cannot depend on anything else, thus contradicting the assumption that o depends on its parts. However, according to the reformulation of Isolation, o is *not* mereologically maximal at w . Thus, no contradiction threatens priority monism. Thanks to an anonymous referee for this suggestion.

Note that Schaffer himself explicitly endorses classical mereology. As a matter of fact, such an endorsement is crucial for his defense of priority monism. This lends testimony to the fact that constraints on modal flexibility should be expected.²⁰

As for a first argument to the effect that u is not part of o at any world w in which they both exist, consider a lonely mereologically simple particle o —at $@$, and consider our prosperous universe u —at $@$, with specks of dusts and the Milky way, galaxies and black holes, and so on. Now, I already argued that in every world w where the lone particle o exists, u exists. This, recall, is because the existence of o —the dependent entity—necessitates the existence of u —the dependee.

The argument is now that o cannot undergo such a radical mereological change so as to include u among its parts and yet retain its identity. The same goes—*mutatis mutandis*—for u . So, the argument goes, at w , u is not part of o .

A second argument is the following. Consider an object that is distinct from u at $@$, in particular, Dion, the stoic philosopher.²¹ Now, given the modal axiom **B**: $\alpha \rightarrow \Box \Diamond \alpha$, necessity of identity entails necessity of distinction.²² It follows that Dion and u are distinct at w as well as they are in $@$. Thus, if u is then part of Dion at w , it must be a *proper part* of it.²³ Suppose now u is indeed a proper part of Dion, say, Dion minus its left foot. A well known argument can be now used to claim that Dion cannot lose its left foot—at w , for otherwise it will become identical with u , against the necessity of distinction. Note however, that this seems highly implausible. This constraint on modal flexibility, i.e. the impossibility of losing a particular proper part at w , is much more implausible than the constraint I used in the previous argument.

A third argument exploits a still more demanding—yet, one might insist, plausible—constraint on modal flexibility. The constraint is the following:

²⁰ To be fair, Modal Classical Mereology is *not* Classical Mereology. One needs to take a further step.

²¹ I am *assuming* that Dion exists at $@$.

²² This is the reason why a modal system stronger than **K** is needed, as I pointed out in footnote 6. Necessity of distinctness is not provable in **K**. As a matter of fact, **B** is the weakest modal system in which it is provable. A formal proof is in Prior (1962: 206–207). An informal argument is in Wiggins (2001: Section 4.3). Fine (1995b: 255–256) derives *essentiality* of distinctness—which entails its necessity—in **E5**, the logic of essence that is based on **S5**. This should not sound too problematic. First, the orthodox view is that **S5** is the logic of *metaphysical modality*—the thought being that necessity and possibility are themselves not a contingent matter. The *locus classicus* is Plantinga (1974). And **S5** is strictly stronger than **B**. Even those who are skeptical about **S5**—most notably, Chandler (1976), Salmon (1989) and Bacon (2018)—find **B** beyond reproach—but see Salmon (1989: 4). Second, what is needed to run the arguments is the necessity of distinctness. **B** delivers it as a *theorem*, but the claim can be supported with independent arguments. Classic arguments in favor of necessity of distinctness that are independent from **B** are in Kripke (1980: 114) and Williamson (1996: 7–8). Thanks to an anonymous referee for pressing this point.

²³ This follows by the definition of proper parthood: x is a proper part of $y \equiv_{df}$ x is part of y and is distinct from y .

Necessity of Atomhood. If x is a mereological atom²⁴ in w_1 , x is a mereological atom in every world w_2 in which it exists.²⁵

The claim that u is not part of o at any world in which they both exist follows from Necessity of Atomhood. To appreciate this, consider again the lone simple particle o I took into account in the first argument. o is an atom—at @. By Necessity of Atomhood, it follows that o is an atom at w . If u is part of o at w , it follows—by anti-symmetry of parthood—that $o = u$. But this is impossible, given necessity of distinctness.

Finally, consider, the following constraint on modal flexibility:

Necessity of Parthood. If x is part of y at w_1 , then x is a part of y at each world w_2 where both x and y exist.

It is easily seen that Necessity of Parthood does ensure that u is not part of o at any w in which they both exist. Consider *any* object o (i.e. one that may or may not be a mereological atom) that is a *proper part* of u at @. By Necessity of Parthood, o is a part of u at w as well. If u is part of o at w it follows by anti-symmetry of parthood that $o = u$ —at w . However, o and u must be distinct—for o is a proper part of u , and thus distinct from it, at @. By necessity of distinctness, o and u are distinct at w .

Necessity of parthood sets severe constraints on modal flexibility. In fact, one might argue, it is basically the denial of flexibility itself. It is not, however, altogether implausible. Uzquiano (2014) makes a case to the effect that classical mereologists *should* indeed endorse Necessity of Parthood. A relevant passage is the following:

[I]f you think that identical objects are necessarily identical, if they exist, then it is not unnatural to think that the part-whole relation is not a source of contingency either: if one object is part of another, then the one is necessarily part of the other if they exist [...] (Uzquiano 2014: 34–35).

I conclude that priority monists can safely claim that u is not among o 's parts at any w in which they both exist. Hence, No Isolation holds.

2.2 Essential dependence

Modal Existential Dependence focuses on requirements about existence. These requirements are expressed in purely modal terms. Kit Fine famously argued that a purely modal connection between the existence of two entities is too weak to do justice to claims of dependence. According to Fine (1995a),²⁶ the necessity of the conditional expressing the dependence of x on y should be tied to the nature—or

²⁴ Defined as usual as something with no proper parts.

²⁵ For arguments against Necessity of Atomhood see Markosian (1998). McDaniel (2014) finds it “very plausible”.

²⁶ But see also, e.g. Mulligan et al. (1984) and Correia (2008).

essence—of the dependent entity x .²⁷ That is, we should claim that it lies in the essence of x that it exists only if y exists. Using Fine’s own notation, and using the sentential operator \Box_x for ‘it is true in virtue of the essence of x that’, Essential Dependence boils down to the following:

Essential Dependence. x depends on $y \equiv \Box_x(Ex \rightarrow Ey)$

According to Essential Dependence x depends on y iff, x is essentially such that it exists only if y exists. One might hold the view that $\Box_x\phi x$ is just equivalent to $\Box(Ex \rightarrow \phi x)$. Correia (2008: 5) calls this view Reductionism, i.e.:

Reductionism. $\Box_x\phi x \leftrightarrow \Box(Ex \rightarrow \phi x)$

Given Reductionism, Essential Dependence reduces to Modal Existential Dependence. Fine (1994) presents different counterexamples to the right-to-left direction of Reductionism. However, the left-to-right direction is widely accepted. Let me call it **Essence Entails Necessity**. It follows from Essential Dependence, Essence Entails Necessity, and Ultimate Dependence, that for any object o , the existence of o necessitates the existence of u . For it lies in the nature of o that o exists only if u exists.²⁸ If x is essentially ϕ , it is also necessarily ϕ . Thus, it follows that, in any world in which o exists, u exists as well. Given that u is not among o ’s parts, this amounts to No Isolation.²⁹

2.3 Explanatory dependence

Yet another account has it that dependence has to do with a particular sort of *explanation*, namely some sort of *metaphysical explanation* of the existence of the dependent entity, in terms of the dependee. Correia (2005) and Schnieder (2006) are paradigmatic examples of this approach. Despite a few differences between the two³⁰—most notably that Correia’s proposal is based on *partial ground*, whereas Schnieder’s is based on the notion of *because*—the common core amounts to asserting the existence of some F about the dependee y that *explains* the existence of dependent entity x . We can write this as:

Explanatory Dependence. x depends on $y \equiv \Box(Ex \rightarrow \exists F(Ex \triangleleft Fy))$

²⁷ Hence the name ‘Essential Dependence’.

²⁸ Perhaps the interesting question is whether we could have any reason to reject this. My guess is that any reason to reject it would also provide reason enough to reject the claim of the essential dependence of o on u . Thanks to an anonymous referee here.

²⁹ This follows from the arguments in Sect. 2.1.

³⁰ A minor difference is the scope of the modal operator. Here I follow Correia (2005: 70). For the sake of completeness here is the official formulation of Schnieder (2006: 412): x depends on $y \equiv \exists F\Box(x \text{ exists} \rightarrow (x \text{ exists because } y \text{ is } F))$. The reader can convince herself that these differences do not play a role in the main argument in the text.

In Explanatory Dependence ‘ \triangleleft ’³¹ is supposed to capture a relation that underpins (metaphysical) explanation, such as the aforementioned ‘partial ground’ or ‘because’. According to Explanatory Dependence x depends on y iff, necessarily if x exists there is something about y —namely its being F —such that Fy explains the existence of x . Crucially, both Correia and Schnieder take \triangleleft to be *factive*. Thus, if x depends on y , in every world in which x exists Fy does obtain.³²

The claim of dependence presently at issue is the following. For any object o that is distinct from the universe u : $\Box(Eo \rightarrow \exists F(Eo \triangleleft Fu))$. That is to say that in any world w in which o exists, there is something about u —i.e. its being F —that explains the existence of o . The question before us, is then: does u ’s being F at w entail the existence of u at w ? *Serious Actualism*³³ might provide an easy answer. For, in effect, according to *serious actualism*

[I]t is not possible for an object to have a property without existing, i.e. [...] exemplification entails existence (Linsky and Zalta 1994: 437).

Serious actualism is a substantive—and controversial—metaphysical thesis. Monists need not endorse it. Suppose they do not. They might then distinguish between properties that are *existence-entailing*, and properties that are not.³⁴ Existence-entailing properties would be, in this perspective, those that entail the existence of their instantiators.³⁵ With this distinction set, we might ask: which properties are existence-entailing properties, and which ones are not? Berto (2012) provides a detailed list of properties that may be taken not to be existence-entailing:

[L]ogical properties (e.g. *being self-identical*) seem not to be existence entailing [...] The same seem to hold for counter-intentional properties -those having to do with being the object of some intentional state (e.g. *being adored*) [...] If we like negative properties nonexistents can have plenty (e.g. *not having a mass*) [...] Nonexistents can also currently possess the feature of having had certain properties in the past (e.g. *having been blue-eyed*). Analogously they may have modal properties, having to do with the having of properties at other worlds (e.g. *possibly being a great poet*). (Berto 2012: 150, my examples).

³¹ I will stay neutral as to whether \triangleleft is a sentential operator—in which cases it relates *propositional entities*—or a relation—in which case its relata are arguably *facts*. Thus I would stay neutral when it comes to specific ontological category of e.g. Fy —if any. I will assume that Fy somehow involves the instantiation of F by y . Nominalists are free to use their preferred paraphrase. Sometimes, for the sake of simplicity, I will write that ‘ Fy obtains’, but it is meant to signal neither an official endorsement of the relational view, nor an endorsement of an ontology of facts.

³² To repeat once again. I am using ‘ Fy obtains’, but this is not meant to imply that \triangleleft is a relation, whose relata are facts, or state of affairs. Those who are inclined to think of \triangleleft as a sentential operator can substitute to ‘ Fy obtains’, ‘ Fy holds’, ‘ Fy is the case’, or the like.

³³ See Plantinga (1983). See also the *Falsehood Principle* in Fine (1982).

³⁴ The distinction traces back to Prior (1967: 161). For a formal account see e.g. Cocchiarella (1969). See also the discussion of the so-called *Being Constraint* in Williamson (2013).

³⁵ Serious actualism may be phrased as follows: all properties are existence-entailing. Or equivalently: there are no non-existence entailing properties.

The question arises as to whether the property F in the claim of explanatory-dependence above is existence entailing. It should be clear that F does not fit into any of the categories listed by Berto. For, arguably none among the logical, negative, temporal and modal properties of the universe *explain* the existence of any of the universe's proper parts. In fact, even a quick glance at different arguments for monism is enough to convince us that the property in question must be something like: $F = \textit{being an integrated—or interconnected—whole}$. This is, on the face of it, a paradigmatic example of existence-entailing property if there is any.

The claim that F is existence-entailing is, as a matter of fact, intrinsically plausible. Hence, the quantifier $\exists F$ in the definition of explanatory dependence should be understood as tacitly restricted to existence-entailing properties. This is in fact what Correia himself suggests:

[A] constraint is imposed on the feature of the base for it to be a base [i.e. the set of properties F that partially ground the existence of the dependent entity]. The constraint is that the feature be “existence-entailing”, in the sense that having that feature requires existing [...] So formally, the *definiens* of “ x is based on y ” [i.e. $\exists F(Ex \triangleleft Fy)$] should be “ $\exists F$ (necessarily, for every z if Fz then z exists, and the fact that x exists is partly grounded in the fact that Fy)” (Correia 2005: 70).

The basic argument in favor of thus restricting the quantifier in the definition of Explanatory Dependence, is that by so doing we make sure that Modal Existential Dependence follows from Explanatory Dependence. I already argued that Modal Existential Dependence entails No Isolation. It is no coincidence that the same occurs here. If F in the definition of Explanatory Dependence is existence-entailing, at every world w in which Fu is the case, u exists. This means that in every world w in which o exists, u exists as well. Since u is not among o 's parts, this amounts to No-Isolation.

2.4 Identity dependence

Finally I will consider Identity Dependence, as it is introduced by Lowe (1998), and recently discussed in Tahko and Lowe (2015). It closely resembles Essential Dependence.³⁶ The thought is that “ x depends on y ” amounts to the claim that “the *identity* of x depends on the *identity* of y ”. As Tahko and Lowe note, identity here should not be taken to be the identity relation we are familiar with from first order-logic. Rather, it is supposed to cash out *what* a thing is, or *which* thing of a certain kind a thing is (Tahko and Lowe 2015: 17).

Tahko and Lowe settle for the following formulation:

[ID] x depends for its identity upon $y =$ There is a two place predicate F such that it is part of the essence of x that x is *related* by F to y (Tahko and Lowe 2015: 19)

³⁶ And in fact one could argue that it is just a special case of Essential Dependence, but I will not pursue this line here.

It should not be difficult to see the close proximity with Essential Dependence, given the explicit mention of the *essence of the dependent object* in the very formulation of Identity Dependence. I see two ways of rendering Identity Dependence:³⁷

Identity Dependence₁. x depends for its identity on $y \equiv \Box_x(Ex \rightarrow Ey \wedge \exists F(Fxy))$.

Identity Dependence₂. x depends for its identity on $y \equiv \Box_x(Ex \rightarrow \exists F(Fxy))$.

Consider Identity Dependence₁. Given Ultimate Dependence and Essence Entails Necessity, it follows from Identity Dependence₁ that in any world w in which o exists, u exists as well. Next, consider Identity Dependence₂. Given Ultimate Dependence and Essence Entails Necessity, it simply follows that in any world in which o exists, Fou obtains, for a certain F . We then run a similar argument to the one that was used in the case of Explanatory Dependence, to the point that F is existence-entailing, so that we can safely infer the existence of u from Fou . Thus, even according to Identity Dependence₂, in any world in which o exists, u exists as well. Given that u is not among o 's parts, this amounts to No Isolation.

This exhausts the discussion of the relations between different notions of dependence and Isolation. One might argue that Schaffer cannot really buy into any of these accounts, given his primitivism about dependence. Granted. But, first of all, priority monists are not committed to taking on board Schaffer's views on dependence. In fact, as I pointed out already, Steinberg himself uses—albeit briefly—exactly the accounts of dependence I addressed above. Second, there is a common feature of all the proposed accounts that deserves a mention.³⁸ They all seem to involve—at some level of analysis—some *relation of necessitation* that goes from the dependent to the depensee. One could try to make a case that this is a *core feature* of ontological dependence. And it is this very feature that is ultimately responsible for the No Isolation conclusion. The incompatibility of priority monism and Isolation would be thus rooted in the (hardly negotiable)³⁹ formal profile of the dependence relation.

Conversely, the overall argument also highlights a metaphysical cost of priority monism that has gone unnoticed so far. Priority monists are committed to the view that it is necessary for the actual universe to exist if anything that is actually part of the universe exists.

³⁷ One might think there is a third, simpler option: $\Box_x \exists F(Fxy)$. However, in the case at hand, $Eo \rightarrow (\Box_o \exists F(Fou) \leftrightarrow \Box_o (Eo \rightarrow \exists F(Fou)))$ holds—the reader can check for herself. Thus, under the assumption that Eo holds—which is indeed the case here— $\Box_o \exists F(Fou)$ and $\Box_o (Eo \rightarrow \exists F(Fou))$ turn out to be equivalent. This means that this simpler formulation boils down to Identity Dependence₂ in the main text.

³⁸ This feature will take center stage in Sect. 4.2.

³⁹ Perhaps it is hardly negotiable, but still negotiable.

3 Dependence and duplication

When Steinberg discusses Isolation he concedes that such a claim is false in full generality.⁴⁰ He then provides an argument that replaces Isolation with a weaker principle—one he calls Possibility of Isolated Duplicates. He gives no official formulation of it, but I think that the following proposal is suitable:

Possibility of Isolated Duplicates. For any composite object o —with parts p_1, \dots, p_n —that exists at @, there is a possible world w such that the only concrete objects that exist at w are o 's duplicate, o^* ,⁴¹ and the duplicates of o 's parts, p_1^*, \dots, p_n^* .

The argument against the compatibility of priority monism with the claim that dependence has two directions cannot be run with Possibility of Isolated Duplicates, Necessity of Monism and Internality of Dependence. This is because $o \neq o^*$. Thus, Internality of Dependence is not enough to guarantee that if o depends on *its* parts p_1, \dots, p_n , so does o^* depend on *its* parts p_1^*, \dots, p_n^* . What is needed to run the argument, as Steinberg rightly remarks, is some sort of Preservation principle. Once again, Steinberg does not give an official formulation, but I take that the following can be endorsed:

Preservation. Duplication preserves dependence relations between parts and wholes. More specifically, for any composite object o with parts p_1, \dots, p_n , if o depends on p_1, \dots, p_n , then any duplicate o^* of o depends on the duplicates of o 's parts, p_1^*, \dots, p_n^* .

It follows from Possibility of Isolated Duplicates, Preservation and Necessity of Monism that, given priority monism, no whole depends on its parts. However, I am not convinced that Preservation is an innocuous principle. Famously, David Lewis defined duplication as follows:

Duplication. Possible objects x and y are duplicates iff there is a one-to-one correspondence between x 's parts and y 's parts such that corresponding parts stand in the same *perfectly natural relation* and have the same *perfectly natural properties* (Lewis (1986): 61, italics added).

Preservation follows from Duplication only with the further assumption that “being dependent upon one’s parts” is a *perfectly natural property*. But this seems a substantive claim that should be argued for. Absent any argument in favor of the

⁴⁰ He claims that Isolation is

[P]lausibly true for all objects that do not ontologically depend on concrete objects other than their parts (Steinberg 2016: 2028).

Given that all subcosmic objects depend on some other concrete object that is not among their parts (by priority monism), this should make one question, I argue, the compatibility of priority monism and Isolation.

⁴¹ In what follows the notion of *duplicate* should be understood as the one introduced in Lewis (1986: 59–63).

naturalness of “being dependent upon one’s parts”, Preservation should be looked at with suspicion.

Furthermore defenders of priority monism could put forward yet another preservation principle that will undermine Steinberg’s argument:

Fundamentality Preservation. Duplication preserves Fundamentality. More specifically, if o is not fundamental, any duplicate o^* of o is not fundamental.

Why should Priority Monist endorse Preservation rather than Fundamentality Preservation?

Let me briefly discuss also Possibility of Isolated Duplicates. Possibility of Isolated Duplicates seems relevantly similar to Isolation. In effect, Steinberg *takes it to be relevantly similar*. And the result of the previous section was exactly that Isolation is incompatible with priority monism. Thus, I contend, it is perfectly kosher for the priority monist to simply reject Possibility of Isolated Duplicates as well—at least in the lack of an argument that motivates its acceptance.

Let us then consider possible arguments in its favor. One such argument appeals to intuition: Possibility of Isolated Duplicates is an intuitive principle that receives support from our modal judgments. No matter the general status of appeals to untutored intuitions, resorting to them in this particular case is simply unfair. Priority monism is a counter-intuitive modal thesis. That much is granted. Charity dictates that we should not let untutored modal intuitions carry too much weight when assessing the viability of such a thesis. As a matter of fact, Schaffer himself—while defending super-substantivalism, and indirectly priority monism—writes:

I just don’t think that commonsense should be taken serious on this issue. Commonsense (...) is a poor guide to the fundamental structure of reality (Schaffer 2009: 144).

In this context, it is safe to understand “common-sense talk” as “intuition talk”, or so I contend. The support that intuition provides to Possibility of Isolated Duplicates should neither impress, nor move monists one bit. They were ready to abandon common-sense modal intuitions right from the start.

Steinberg notes that Possibility of Isolated Duplicates—or some other similar principles

[A]re assumed in discussions of supervenience in which reduplication principles of worlds like *Isolation* have played a prominent role (Steinberg 2016: 2028).⁴²

One might argue that this lends some credit to such principles. But the guiding picture behind the reduplication principles in the supervenience literature is the broadly Humean picture based on *free recombability*: very roughly, shape and size permitting, any number of duplicates of any number of possible things can co-exist or fail to co-exist. However, recombability demands *modal freedom*: for two things to be recombable, there should be no necessary connection between them.

⁴² Steinberg cites Paull and Sider (1992).

But this is exactly what these like priority monism deny in the first place. Schaffer himself could not be more explicit:

The guiding idea is that *failure of free recombination* is the modal signature of an integrated monistic cosmos (Schaffer 2010b: 342).

This suggests the following: principles like Isolation, or Possibility of Isolated Duplicates, are underpinned by some sort of recombining/reduplication principles that demands the sort of modal freedom that monists deny. Pending any independent, non question-begging argument in favor of those principles, priority monists should simply reject them. Whether this is a cost in itself, is a further issue. As I pointed out already in the case of Isolation, the arguments in this paper could indeed be turned on their head.

4 Dependencies, grounding, fundamentalities

To conclude, I will first consider a possible objection to the arguments I discussed so far (Sect. 4.1), and then consider (one of) its consequences (Sect. 4.2).

4.1 Rigid and generic dependence

I have argued in Sect. 2 that priority monism is incompatible with Isolation. Thus, there is a consistent way—absent further arguments—for priority monists to claim that dependence *can* have two directions: from parts to wholes for (some) subcosmic wholes, and from whole to parts for the cosmic whole. The arguments in Sect. 2 depend crucially upon taking the relevant notion of dependence in Ultimate Dependence to be *rigid dependence*. In general, *rigid dependence* amounts to a claim that requires the existence of a *specific* object, the universe in the case at hand. There is yet another (general) notion of dependence, namely *generic* dependence, that only requires the existence of *an object of a certain sort*. Generic variants of all the relations of dependence we encountered in Sect. 2 are easily available. As an example, I will just put forward the generic variant of dependence for the Modal Existential Account. Roughly it boils down to a claim that x depends on something that is F :

Generic Modal-Existential Dependence. x depends on something that is $F \equiv \Box(Ex \rightarrow \exists y(Fy))$

If dependence in Ultimate Dependence is taken to be *generic dependence* the arguments in Sect. 2 will not straightforwardly go through. A claim of generic dependence would be a claim according to which every object $o \neq u$ depends upon *something that is the universe*—that is, something that fits the description F : being the mereologically maximal element. There is no guarantee that in any world $w \neq @$, F will pick out the very same object it picks at $@$. This is a way to cash out the (perhaps intuitive) thought that there are different universes at different worlds, and concrete objects can depend on different things—those different universes—at different worlds.

Does this detract from the arguments? Does this constitute an objection against them? Not really.

First, it seems more plausible to take the main tenet of priority monism to be a claim of *rigid* dependence. Both Schaffer and Steinberg seem to presuppose this. Specific claims of dependence are explicitly marked as using a two-place dependence predicate whose arguments are filled by *constants*, not *descriptions*. In fact, it is not at all clear whether priority monism would receive the same support if it was to be cashed out in terms of generic dependence.

Second, the point of the arguments was to provide a reasonable way for a priority monist to resist Steinberg's conclusion. No more, no less. And there is indeed one. First, claim that the dependence of any (actual) concrete object (distinct from the universe) on the (actual) universe is (some sort of) *rigid dependence*. Then claim that rigid dependence and priority monism entail No Isolation. Thus, I conclude that the argument in Sect. 2 stands. I now want to take a look at (one of) its consequences.

4.2 Dependence, grounding, support

In Sect. 1 we encountered yet another relation in the vicinity of dependence, namely *grounding*. Schaffer seems to equate the two in a number of places, e.g. Schaffer (2010a, b, 2015).⁴³ Here is one of the most revealing passages:

[A] substance is a *fundamental entity*. A fundamental entity is basic, ultimate, and irreducible. It is not dependent on, grounded in, or derivative from anything else (Schaffer 2009: 131).

In the passage above, Schaffer seems not to distinguish between dependence and grounding. Thus, he recognizes *only one notion of fundamentality*, which is basically that of being ungrounded/independent.⁴⁴ This is where the importance of the arguments in Sect. 2 goes beyond the fate of monism. They are important insofar as they urge us to keep the dependence and grounding relations *distinct*. The key ingredient of the incompatibility arguments in Sect. 2 is the *direction of necessitation*: if x depends on y , the existence of x necessitates the existence of y . An

⁴³ See also Ismael and Schaffer (2016).

⁴⁴ As I noted already—see footnote 12—Schaffer has changed his views on a number of issues concerning grounding. This is likely to have significant implications for issues of fundamentality as well. The following seems particularly relevant in the present context. Schaffer (2016) discusses Wilson's pluralism about "small- g " dependence relations—in contrast to the "big- G " grounding relation—as expressed in Wilson (2014). He writes:

[A]nd—perhaps most relevantly given the current dialectic—there will be the question (one which Wilson especially should face) as to whether there is a single unified notion of fundamentality, as opposed to a merely schematic notion standing in for some yet-to-be-specified "small- f status", such as *being mereologically atomic* and *being set theoretically elemental* (Schaffer 2016: 161).

This passage seems to suggest that someone who is inclined to recognize different notions of metaphysical dependence—broadly construed—might be inclined to recognize different notions of fundamentality that are somehow relativized or indexed to such notions. I am about to push a similar point.

axiom of necessitation is often taken to be part and parcel of the grounding relation.⁴⁵ However the direction of necessitation is exactly the *opposite*: if x is grounded in y , the existence of y necessitates the existence of x . Thus, the arguments in Sect. 2 would not work were we to substitute grounding for dependence.⁴⁶ To see this, suppose we use *grounding* to define the following notion of *Support*:

Support. $xx = (x_1, x_2, \dots, x_n)$ ⁴⁷ (jointly) support $y \equiv$ “ Ey ” is grounded in “ Exx ”.

Support—much like dependence, and as opposed to grounding, at least in (some) orthodox characterizations of it—is meant to be a *categorically neutral* relation.⁴⁸ In such a definition I used the plural variable xx to underline the fact that we should allow y to be supported by the xx taken together.⁴⁹ Then we could define priority monism* as follows:

Priority Monism*. The universe is the only unsupported concrete object.

Nothing supports the universe. Rather, the universe supports all of its parts. Ultimate Support is a straightforward consequence of priority monism* (and well-foundedness of grounding/support):

Ultimate Support. For any material object o that is distinct from the universe u , u *ultimately* supports o .

With this in hand, go back to Steinberg’s original argument, and replace Internality of Dependence with Internality of Support, as follows:

Internality of Support. If $oo = (o_1, o_2, \dots, o_n)$ support o at possible world w_1 , $oo = (o_1, o_2, \dots, o_n)$ support o in every world w_2 in which both $oo = (o_1, o_2, \dots, o_n)$ and o exist.

Note that Internality of Support follows from the axiom of necessitation for grounding. The point is that priority monism*—and Ultimate Support—are *not* incompatible with Isolation. For, given the direction of grounding-necessitation, the existence of u necessitates the existence of any concrete object whatsoever, but the converse does not hold. The existence of any o that is distinct from u does *not* necessitate the existence of u . A variant of Steinberg’s argument seems available for the conclusion that, if priority monism* is true, then there cannot be any composite object o in @ that is supported by (a selection of) its proper parts. This discussion

⁴⁵ See e.g. Fine (2012). For an exception see Skiles (2015). I follow Skiles (2015) in calling the view that the grounds necessitated the grounded “grounding necessitarianism”.

⁴⁶ Naturally, I am not claiming that this is the *only* reason why we should distinguish between the two relations.

⁴⁷ Pluralities need not be *finite*. I am sticking to finite pluralities for the sake of simplicity of notation.

⁴⁸ See later on for a brief discussion. See also footnotes 31 and 32.

⁴⁹ That does not mean that the second argument place cannot be flanked by a singular variable. This also raises the interesting question as to whether the first argument place could be flanked by a plural variable, and whether in that case, *support* would be *distributive*. In other words the question is whether: $\forall xx \forall yy (xx \text{ support } yy \rightarrow (\forall y (y \text{ is one of the } yy) \rightarrow xx \text{ support } y))$ is an *axiom* or a *theorem* of the logic of Support.

shows—or so I contend—that we should distinguish between dependence and grounding, and cognate notions, such as support. These notions will back up different arguments for very different, in fact opposite, conclusions.⁵⁰

As a matter of fact, there are other reasons why we should want to distinguish dependence and grounding. I already hinted at one such reason: dependence seems to be *category neutral*,⁵¹ in that it potentially holds between entities of any sort. By contrast grounding—when constructed as a relation—is not usually taken to be thus neutral, in that it takes only *facts*—or states of affairs—as relata.

Grounding is usually taken to back up explanations of a particular sort, i.e. metaphysical explanations, whereas this is true of dependence—at least *prima facie*—only under a particular construal, that is, only of *explanatory dependence*.⁵² Finally, there is an interesting argument due to Schnieder against the identification of the two notions.⁵³ In a nutshell, the argument is the following. Those who identify dependence and grounding are committed to **Conflation** below:

Conflation: For every x, y : if x and y are facts then x is grounded in y iff x depends on y .

And yet, so the argument goes, there are several counterexamples to Conflation.

Once we distinguish the relations of dependence and grounding/support, we can define two different notions of fundamentality, as follows:⁵⁴

⁵⁰ What if someone were to insist that proper parts of the universe are both *dependent* on, and *supported* by the universe? This would have surprising consequences in the present context. Assuming a necessitation axiom for grounding, this would entail that for each concrete object o at @ the following hold: $\Box(Eo \leftrightarrow Eu)$. It would follow that every possible world w that contains at least one concrete object o of the actual world @, contains the entirety of @. To appreciate this, let o be an arbitrary object in @, and assume o exists at some w . There are two cases: either $o = u$ or $o \neq u$. If $o = u$, given that the universe *supports* all of its proper parts—corresponding to the right-to-left direction of the previous bi-conditional—its existence necessitates the existence of all of u 's proper parts. Thus, u and all its proper parts exist at w . But u and all its proper parts are all the concrete objects that exist at @. Hence, w contains the whole @. Next, suppose $o \neq u$. Then, given that o *depends* on u —corresponding to the left-to-right direction of the bi-conditional—it necessitates the existence of u . Thus, both o and u exist at w . Now repeat the first part of the argument to get the desired conclusion: every world w that contains at least one concrete actual object contains the whole concrete actual world. Thanks to an anonymous referee for pressing this point.

⁵¹ The term is due to Schnieder (2017).

⁵² As I pointed out already—see footnote 45—Skiles (2015) argues against grounding necessitarianism. Those who reject grounding necessitarianism should recognize a new source of difference between dependence and grounding. Dependence and grounding will differ in their *modal strength*. This option is interesting in the present context. For I argued that Isolation is compatible with Ultimate Support and thus with priority monism*. Thus, I concluded, a variant of Steinberg's argument would be available in this case. Note however that someone who finds grounding necessitarianism objectionable would arguably deny Internality of Support, for the two are obviously connected. As a matter of fact, as I pointed out in the main text, Internality of Support follows from grounding necessitarianism. As a result there would be a way to resist the aforementioned variant of Steinberg's argument on behalf of priority monists*. Thanks to an anonymous referee here.

⁵³ A detailed evaluation of Schnieder's argument lies beyond the scope of this paper. The interested reader is referred to Schnieder (2017: Section 4.6).

⁵⁴ A word of caution is advisable here. A lot more needs to be said about the different notions of fundamentality and their interaction. A significant question is whether one notion captures a *particularly salient* notion of fundamentality, to mention but one pressing issue. Thus the suggestions in the paper

Fundamentality_D. x is fundamental_D \equiv There is no y , $y \neq x$, such that x depends on y .

Fundamentality_S. x is fundamental_S \equiv There is no y , $y \neq x$, such that x is supported by y —alone, or by y together with some other object.

We thus can distinguish (at least) two notions of fundamentality: *being independent*, and *being unsupported*.⁵⁵ I see no (a-priori) reason to expect that they would turn out to be co-extensive.

The resulting picture bears some similarity with the proposal spelled out in Bennett (2017).⁵⁶ Bennett writes:

[I]f it is to be defined at all, absolute fundamentality should be defined in terms of building; to be absolutely fundamental is to be unbuilt (Bennett 2017: 134).

Bennett acknowledges that there are several *building relations*—she mentions explicitly *composition*, *constitution*, *set-formation*, *realization*, *micro-based determination*, and *grounding*—and she argues at length against what she calls *generalist monism about building relations*,⁵⁷ i.e. roughly the view that there is a privileged, highly general building relation that either is more fundamental than specific ones, or else is the only one there is. Given the rejection of generalist monism, she then goes on to recognize different notions of fundamentality that are indexed to different building relations. In general, according to Bennett, for each building relation R , we can define a corresponding notion of **Fundamentality_R** as follows:

Fundamentality_R: x is fundamental_R \equiv There is no y , $y \neq x$, such that x is R -related to y —or to some zz that include y .

Here is an explicit passage:

The denial of generalist monism *itself* makes it natural to index relative fundamentality, independently of the motivating thought that particular building relations can hold in opposite direction (Bennett 2017: 163).

In the passage above Bennett is talking about *relative fundamentality*, rather than *absolute fundamentality*. While it is true that the latter, and not the former, has been my main focus here, Bennett's argument generalizes. Furthermore, the passage is interesting for it explicitly claims that different notions of fundamentality might turn out not to be co-extensive, as I suggested above. As a matter of fact, one of Bennett's motivating examples for such a claim is exactly priority monism. According to Bennett's own understanding (Bennett 2017: 2107), priority monism

Footnote 54 continued

should be taken as first, tentative steps towards a more comprehensive account, rather than a fully fledged one.

⁵⁵ Recall priority monism, and priority monism*. They can be now phrased as follows: priority monism = the universe is the only fundamental_D object; priority monism* = the universe is the only fundamental_S object.

⁵⁶ This entire discussion is indebted to some remarks of an anonymous referee for this journal.

⁵⁷ See Bennett (2017: 25–29).

boils down to the claim that the universe is *ungrounded*. Thus, it qualifies as *fundamental*_G.⁵⁸ However, it is not *mereologically unbuilt*, in that it is a *composite* object. Thus the universe does not qualify as *fundamental*_C, according to Bennett.⁵⁹

The very broad idea—the idea to define different, not co-extensive notions of fundamentality in terms of different relations—might very well be the same. Yet, the details might be relevantly different. For instance, it is a substantive question whether *dependence*, as it has been discussed in this paper, would qualify as a *building* relation in Bennett’s sense. The devil is in the details.

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References

- Bacon, A. (2018). The broadest necessity. *Journal of Philosophical Logic*, 47(5), 785.
- Bennett, K. (2017). *Making things up*. Oxford: Oxford University Press.
- Benocci, M. (2016). Priority monism and essentiality of fundamentality. A reply to Steinberg. *Philosophical Studies*. <https://doi.org/10.1007/s11098-016-0778-0>.
- Berto, F. (2012). *Existence as a real property. The ontology of meinongianism*. Dordrecht: Springer.
- Chandler, H. (1976). Plantinga and the contingently possible. *Analysis*, 36(2), 106–109.
- Cocchiarella, N. (1969). Existence entailing attributes. Modes of copulation and modes of being in second order logic. *Nous*, 3(1), 33–48.
- Correia, F. (2005). *Existential dependence and cognate notions*. Munich: Philosophia Verlag.
- Correia, F. (2008). Ontological dependence. *Philosophy Compass*, 3(5), 1013–1032.
- Cotnoir, A. (2013). Beyond atomism. *Thought*, 2, 67–72.
- Fine, K. (1982). Model theory for modal logic. Part III: Existence and predication. *Journal of Philosophical Logic*, 10(3), 293–307.
- Fine, K. (1994). Essence and modality. *Philosophical Perspectives, Logic and Language*, 8, 1–16.
- Fine, K. (1995a). Ontological dependence. *Proceedings of the Aristotelian Society*, 95, 269–290.
- Fine, K. (1995b). The logic of essence. *Journal of Philosophical Logic*, 24(3), 241–273.
- Fine, K. (2012). A guide to ground. In F. Correia & B. Schnieder (Eds.), *Metaphysical grounding: Understanding the structure of reality* (pp. 37–80). Cambridge: Cambridge University Press.
- Ismael, J., & Schaffer, J. (2016). Quantum holism: Nonseparability as common ground. *Synthese*. <https://doi.org/10.1007/s11229-016-1201-2>.
- Kripke, S. (1980). *Naming and necessity*. Oxford: Blackwell.
- Lewis, D. (1986). *On the plurality of worlds*. Oxford: Blackwell.
- Linsky, B., & Zalta, E. (1994). In defense of the simplest quantified modal logic. *Philosophical Perspectives*, 8, 431–458.
- Lowe, E. J. (1998). *The possibility of metaphysics*. Oxford: Clarendon Press.
- Markosian, N. (1998). Simples. *Australasian Journal of Philosophy*, 76, 213–226.
- McDaniel, K. (2014). Parthood is identity. In S. Kleinschmidt (Ed.), *Mereology and location* (pp. 13–32). Oxford: Oxford University Press.
- Mulligan, K., Simons, P., & Smith, B. (1984). Truth-makers. *Philosophy and Phenomenological Research*, 44(3), 287–321.
- Paull, R. C., & Sider, T. (1992). In defense of glocal supervenience. *Philosophy and Phenomenological Research*, 52(4), 833–853.
- Plantinga, A. (1974). *The nature of necessity*. Oxford: Clarendon Press.
- Plantinga, A. (1983). On existentialism. *Philosophical Studies*, 44, 1–20.

⁵⁸ “G” stands for “grounding”.

⁵⁹ “C” stands for “composition”.

- Prior, A. (1962). *Formal logic*. Oxford: Clarendon Press.
- Prior, A. (1967). *Past, present and future*. Oxford: Clarendon Press.
- Salmon, N. (1989). The logic of what might have been. *The Philosophical Review*, 98(1), 3–34.
- Schaffer, J. (2009). Spacetime the one substance. *Philosophical Studies*, 145(1), 131–148.
- Schaffer, J. (2010a). Monism. The priority of the whole. *Philosophical Review*, 119(1), 31–76.
- Schaffer, J. (2010b). The internal relatedness of all things. *Mind*, 119, 341–375.
- Schaffer, J. (2012). Grounding, transitivity and contrastivity. In F. Correia & B. Schnieder (Eds.), *Metaphysical grounding. Understanding the structure of reality* (pp. 122–138). Cambridge: Cambridge University Press.
- Schaffer, J. (2015). Monism. *Stanford Encyclopedia of Philosophy*. <https://plato.stanford.edu/entries/monism/>. Accessed July 2018.
- Schaffer, J. (2016). Ground rules: Lessons from Wilson. In K. Aizawa & C. Gillet (Eds.), *Scientific composition and metaphysical ground* (pp. 143–169). London: Palgrave and McMillan.
- Schnieder, B. (2006). A certain kind of trinity. Dependence, substance, explanation. *Philosophical Studies*, 129(2), 393–419.
- Schnieder, B. (2017). Grounding and dependence. *Synthese*. <https://doi.org/10.1007/s11229-017-1378-z>.
- Simons, P. (1987). *Parts. A study in ontology*. Oxford: Oxford University Press.
- Skiles, A. (2015). Against grounding necessitarianism. *Erkenntnis*, 80(4), 717–751.
- Steinberg, A. (2016). Priority monism and part/whole dependence. *Philosophical Studies*, 172(8), 2025–2031.
- Tahko, T., & Lowe, J. (2015). Ontological dependence. *Stanford Encyclopedia of Philosophy*. <https://plato.stanford.edu/entries/dependence-ontological/>. Accessed July 2018.
- Tallant, J. (2013). Problems of parthood for proponents of priority. *Analysis*, 73, 429–438.
- Trogon, K. (2017). Priority monism. *Philosophy Compass*. <https://doi.org/10.1111/phc3.12458>.
- Uzquiano, G. (2014). Mereology and modality. In S. Kleinschmidt (Ed.), *Mereology and location* (pp. 33–56). Oxford: Oxford University Press.
- Wiggins, D. (2001). *Sameness and substance renewed*. Cambridge: Cambridge University Press.
- Williamson, T. (1996). The necessity and determinateness of distinctness. In S. Lovibond & S. G. Williams (Eds.), *Essays for David Wiggins: Identity, truth and value* (pp. 1–17). Oxford: Blackwell.
- Williamson, T. (2013). *Modal logic as metaphysics*. Oxford: Oxford University Press.
- Wilson, J. (2014). No work for a theory of grounding. *Inquiry*, 57, 535–579.