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Grounding and the argument from explanatoriness

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Abstract In recent years, metaphysics has undergone what some describe as a revolution: it has become standard to understand a vast array of questions as questions about grounding, a metaphysical notion of determination. Why should we believe in grounding, though? Supporters of the revolution often gesture at what I call the *Argument from Explanatoriness*: the notion of grounding is somehow indispensable to a metaphysical type of explanation. I challenge this argument and along the way develop a "reactionary" view, according to which there is no interesting sense in which the notion of grounding is explanatorily indispensable. I begin with a distinction between two conceptions of grounding, a distinction which extant critiques of the revolution have usually failed to take into consideration: grounding *qua* that which underlies metaphysical explanation and grounding *qua* metaphysical explanation itself. Accordingly, I distinguish between two versions of the Argument from Explanatoriness: the Unexplained Explanations Version for the first conception of grounding, and the Expressive Power Version for the second. The paper's conclusion is that no version of the Argument from Explanatoriness is successful.

Keywords Causal explanation · Constitution · Constitutive explanation · Grounding · Metaphysical explanation · Scientific explanation · Unification

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1 Introduction

In the last few years, metaphysics has changed profoundly: a vast array of questions have come to be understood as concerning *grounding*, a supposedly explanatory notion of metaphysical determination.[1] For a taste, here are some examples:

(*Socrates*) The fact that the singleton set {Socrates} exists is *grounded in* the fact that Socrates exists
(*Torture*) Torturing innocent people for no reason is wrong *because* it doesn't maximize utility
(*Mental*) S is in pain *in virtue of* the fact that her C-fibers are firing

Advocates of this trend are eager to speak of a "grounding revolution" (Schaffer 2016). Expressions not long ago regarded with suspicion ('grounds', 'in virtue of', etc.) are now gaining widespread acceptance as legitimate and even indispensable tools in metaphysics. *Revolutionaries* believe that various philosophical theses should be spelled out in terms of grounding.

In a sociological sense, the grounding revolution succeeded in an astonishingly short amount of time: just a few years ago Gideon Rosen could write that expressions like 'because' and 'in virtue of' "are no part of anyone's official vocabulary" (2010: 109), and this is clearly no longer the case. Grounding has become a legitimate area of inquiry in its own right, and in the "applied grounding" literature, formulating philosophical claims in terms of grounding across various domains is now widely accepted.[2] However, that the revolution succeeded doesn't mean it was justified. I, for one, think it was a mistake.

Anyone who shares my conviction faces the obvious question: if the grounding revolution was a mistake, why did it succeed? History is written by the victors, so, unsurprisingly, the standard answer is the revolutionary's. The notion of grounding, we are told, is nothing new; it's as old as Western philosophy (just think of Plato's famous Euthyphro dilemma: is what is holy holy because the gods love it, or do the gods love holy things because they are holy?). Moreover, an implicit interest in grounding was already in the background throughout the second half of the twentieth century.[3] What is surprising is not that grounding receives so much attention today but that anyone ever thought it could be analyzed in other terms, for example entailment or supervenience. The revolution taught us that these analyses fail, and that the notion is clear enough to speak for itself. Some advocates of the

[1] See Fine (2001, 2012a), Correia (2005: Ch. 3), Schaffer (2009), Rosen (2010), and works to be cited later.

[2] In the last few years, many philosophers gave accounts of various phenomena explicitly in terms of grounding. See, among others, Witmer et al. (2005) and Bader (2013) on intrinsicality, Rodriguez-Pereyra (2005) and Schaffer (2010b) on truthmaking, Chudnoff (2011) on knowledge, Whitcomb (2012) on divine omniscience, Sartorio 2013 on free will and moral responsibility, Dasgupta (2014b) on physicalism, Maguire (2015) and Woods (2016) on moral naturalism, and Carmichael (2016) on theories of properties. Examples could be multiplied; the applied grounding literature is already vast and steadily growing.

[3] Cf. Schaffer (2009: 375, 2016), Correia and Schnieder (2012: 2–4), Raven (2012: 692–693), and Berker (2016).

ancien régime may hold on, but one day skepticism about grounding will entirely be a thing of the past, much like Quinean skepticism about *de re* modality is today.

As I will explain in Sect. 2, I see the dialectic a little differently. In my view, we shouldn't accept as a datum that philosophers have always been interested in grounding. They have been interested in many different things, and their interests often had an explanatory aspect. Accordingly, *reactionaries* who resist the grounding revolution shouldn't (and normally don't) try to analyze grounding.[4] Instead, they should say that whatever explanatory component grounding is supposed to capture can be captured without it. To get a better grip on the relevant explanatory component, it will sometimes be helpful to use resources from the general literature on explanation. Much of the contemporary debate about grounding proceeds in isolation from this literature, but as we will see (especially in Sects. 3 and 6), there is much to be learned from it for all parties to the debate.

The central motivation for grounding is that it's indispensable to a certain kind of explanation. I will call this the *Argument for Explanatoriness*. In Sect. 3, I will distinguish two versions of this argument, which can be advanced in defense of two different conceptions of grounding. I will rebut the argument for the first conception in Sects. 4 and 5, and the argument for the second conception in Sect. 6. In Sect. 7, I will conclude that no version of the Argument from Explanatoriness establishes its intended conclusion.

I'm not the first to express reservations about the grounding revolution. Hofweber (2009) and Daly (2012), for example, argue that grounding is unintelligible, while Koslicki (2014) and J. Wilson (2014) maintain that it does no useful theoretical work.[5] However, these criticisms assume that there is a fixed set of theoretical roles that the grounding literature uniformly assigns to grounding, and as we will see in Sect. 3, this assumption is mistaken. Different revolutionaries focus on different (and incompatible) theoretical roles that they want grounding to play; accordingly, we should be highly suspicious of any sweeping criticism that is meant to apply to all of the things that were invoked to play these roles. It is a wiser strategy to ask whether there is any candidate notion that is both explanatorily indispensible in some sense *and* a good candidate to be meant by 'grounding'. I will argue that there isn't.

2 The argument from explanatoriness

The three examples we started with use different locutions to express grounding, each familiar from the grounding literature: (Socrates) uses a relational idiom, (Torture) uses a connective, and (Mental) uses the prenective (a hybrid expression with an argument place for formulas and another for terms) 'in virtue of'. Throughout this paper, I will use the relational expression 'ground(s)' and treat it as aiming to express a many-one relation between facts. With little effort, the

[4] You might be just a conservative for resisting the revolution, but if you fight it after its triumph, you probably deserve to be called a reactionary.

[5] See also Bennett (2011) and forthcoming for a related view.

discussion to follow could be rehashed only using connectives, but I won't attempt to show this here.[6]

Philosophy has always been replete with informal statements using 'because', 'in virtue of' and 'grounds'. However, these words were used differently before the grounding revolution than they are today. Sometimes they were used for a very general notion of explanation. More often, they were used to express programmatic theses, usually made in the paper's introductory paragraph later to be replaced by something more precise. I will refer to these precisifications as *reactionary counterparts*. For example:

(Socrates*) The existence of Socrates *necessitates* the existence of {Socrates}

(Torture*) The fact that torturing innocent people for no reason doesn't maximize utility *constitutes* the fact that it is wrong

(Mental*) The firing of S's C-fibers *realizes* S's pain

Historical reactionaries typically thought that though 'in virtue of' and its kin were not downright unintelligible, they were insufficiently clear for theoretical purposes. Accordingly, they sought neither to analyze nor to eliminate these expressions. Rather, they were trying to systematically replace them (I relegate my defense of this claim to a footnote).[7] Thus, the relationship between grounding sentences and

[6] See Fine (2001, 2012a), Correia (2010, 2014), and Litland forthcoming for the connective view, Rosen (2010), Audi (2012a, b), Raven (2012), and Skiles (2015) for the relational view, and Rodriguez-Pereyra (2005), R. Cameron (2008), and Schaffer (2009) for the category-neutral view.

[7] Although both Plato's Euthyphro dilemma and many of Aristotle's works are concerned with notions of dependence and priority, and perhaps some of these notions are explanatory in some sense, it's anachronistic to assume that they match any contemporary notion of grounding. 'Grounding', as used today, presupposes certain conceptual distinctions (e.g. between causal and non-causal explanation) that Plato and Aristotle didn't make. Some Plato scholars, like Evans (2012), do construe the Euthryphro dilemma in terms of grounding, but this reading is far from mandatory. Judson (2010), for instance, argues that though Plato did rely on some notion of dependence in setting out the dilemma, he was not clear in his mind about what that notion was. For a thorough discussion of Aristotle's various notions of priority, see Peramatzis (2011).

There is also little reason to think that contemporary philosophers recognized grounding before Fine's work. *Pace* Schaffer (2009: 363–4), for example, Lewis has never subscribed to a supervenience analysis of grounding; rather, he proposed to *replace* priority-talk with supervenience-talk (1983: 358). Poland (1994) and Loewer (2001), too, are widely but mistakenly cited as anticipating grounding. While they use 'grounding' and 'in virtue of' in their preliminary characterization of physicalism, they then go on to ask how physicalism should be formulated—they clearly don't think they already formulated it using grounding-theoretic vocabulary. Berker (2016) argues that many debates in ethics and value theory have been formulated in terms of 'in virtue of' and 'because' long before Fine's work. However, this at best shows moral philosophers' (reasonable) preference to engage with first-order issues without being sidetracked by difficult questions in moral metaphysics, not their implicit recognition of grounding (cf. Dancy 2004: 85).

Of the many alleged predecessors, Bolzano's *Grund* (1837) comes closest to some contemporary notion of grounding. However, even this is a bit of a stretch. Bolzano was mainly interested in what he called "objective explanation", thought of causal explanation as a special case of it, and didn't seem keen on carving out an interesting class of metaphysical or otherwise non-causal explanations. For more on Bolzano's views, see Tatzel (2002) and Schnieder (2014). (Thanks to Ghislain Guigon and Tuomas Tahko for discussion about the history of 'grounding'.)

their reactionary counterparts isn't analysis but *explication* in Carnap's sense: the replacement of an obscure expression with a more precise one that plays the original expression's core functions.[8] Unfortunately, revolutionaries often miss this point, and reactionaries rarely address it explicitly (though see Daly (2012: 89)).

The dispute between the revolutionary and the reactionary doesn't, then, concern the analyzability of grounding. Reactionaries typically recognize that 'ground'-sentences have an explanatory element but think that any such sentence has a cheap substitute: a reactionary counterpart that also has the desired element of explanation. Revolutionaries deny this claim and contend that grounding is indispensible for the relevant notion of explanation. This is the *Argument from Explanatoriness*.[9]

I take the Argument from Explanatoriness to be the "master argument" for grounding. This is not to say that no other motivation could be offered for introducing the notion. But it seems to me that one way or other, the alternative arguments that have been offered indirectly rely on the Argument from Explanatoriness. To take just one, revolutionaries often motivate grounding on the basis of its theoretical utility, or in other words, through its applications to first-order disputes: with the help of grounding, the thought goes, we can define philosophical positions that otherwise couldn't be characterized perspicuously. However, adherents of this Argument form Theoretical Utility typically think that the grounding-based characterization of the relevant position is superior because it captures an explanatory element that its rivals fail to capture. For example, Dasgupta has recently suggested that grounding is uniquely suited to capture the thesis of physicalism (roughly, the view that ultimately everything is physical). But he also adds that "the idea that physicalism should be understood as a grounding thesis is the idea that physicalism is ultimately an explanatory thesis" (2014b: 558). In a similar spirit, Maguire searches for the proper definition of ethical autonomy, the non-naturalist intuition that the ethical enjoys a certain kind of independence from the natural. He rejects the standard logical formulations (e.g. that no ethical truth is non-vacuously entailed by non-ethical truths) on the basis of counterexamples that his own, grounding-based formulation, resists. And then he argues that the main problem with these counterexamples is that they are deductive arguments whose "premises don't *explain* their conclusions" (2015: 193, emphasis in the original). There are many similar examples in the recent "applied grounding" literature, which I lack space to get into here. But the upshot is clear: while grounding is often motivated by its potential to explicate otherwise well-known philosophical positions, its adherents usually think that grounding has this potential precisely because it captures an important explanatory aspect of the respective

[8] See Carnap (1947: §2).

[9] Revolutionaries often emphasize that the connections they want to capture with grounding cannot be captured in *modal* terms (Schaffer 2009: 364–365; Rosen 2010: 110–114; Fine 2012a: 41), but as J. Wilson (2014) points out, this much is hardly controversial. On a more plausible construal of the argument, grounding would also need to be distinct from familiar non-modal relations, for example composition, realization, and set membership (Koslicki 2014: 306).

position. Which is to say that arguments for grounding based on its theoretical utility tend to presuppose the Argument from Explanatoriness.[10]

Some version or other of the Argument from Explanatoriness has been a recurring theme in the grounding literature.[11] But since the argument usually flies by in a few sentences, we need to spell it out in more detail. This will be the main task of the next section.

3 Two conceptions of grounding

All proponents of the Argument from Explanatoriness agree that there is a sense in which sentences like (Socrates), (Mental), and (Torture) are explanatory but their reactionary counterparts aren't. However, we need to be careful about how we understand this claim. All parties to the debate (all parties I am concerned with, anyway) accept that there is an explanation of the existence of {Socrates} by the existence of Socrates; that is, there is an explanation in which the existence of Socrates is the explanans and the existence of {Socrates} is the explanandum. Now in one sense, 'explanation' simply refers to an explanans and 'explanatory' to a feature of the explanans. So in the case of Socrates and {Socrates}, "the explanation" would be the fact that Socrates exists, and explanatoriness a property of this fact (as opposed to, for instance, the fact that {{Socrates}} exists, which fails to explain the fact that {Socrates} exists). This use is fairly widespread in the grounding literature. For example:

> "[W]hen I talk about "what explains P" or "an explanation of P," I have in mind the facts in virtue of which P is the case." (deRosset 2010: 74 ff)

> "[Grounding is transitive]: just as the explanation of an explanation also explains the explanandum, so too the grounds of the grounds of the grounded also ground the grounded." (Raven 2012: 689)

> "By 'ground' I mean a full explanation." (Dasgupta 2014a: 3)

While using 'explanation' synonymously with 'explanans' (and 'explanatory' for a property of explanantia) is permissible in many contexts, this notion of explanatoriness cannot be what revolutionaries have in mind when they complain that (Socrates*) is unexplanatory. This is because (Socrates) and (Socrates*) both mention the same explanans, namely, the fact that Socrates exists, and revolutionaries and reactionaries can agree that this fact is explanatory in the sense in which an explanans can be explanatory.

This might seem obvious but is good to bring out clearly. Revolutionaries often assert that grounding is explanatorily valuable, or even indispensable, but they rarely state explicitly *what sort of thing* explanatoriness is a feature of. For the

[10] Thanks to an anonymous referee for suggesting that I discuss the relation between the Argument from Explanatoriness and the Argument from Theoretical Utility.

[11] See Schaffer (2009: 363–364), Fine (2012a: 28), and Trogdon (2013a: §2), and works to be cited below.

Argument from Explanatoriness to work, by 'explanatory' they cannot simply mean something that characterizes explanantia. What else could they mean? 'Explanation' doesn't always refer to the explanans; in many contexts, it refers to something that involves the explanans, the explanandum, and the connection between the two. Accordingly, in these contexts 'explanatoriness' has to refer not to a property of explanantia but to a property of whatever things involve the explanans, the explanandum, and the connection between the two. Since in the present paper I treat grounding as a relation between facts, we can take the relevant entities to be facts. Then, the core claim of the Argument from Explanatoriness has to be that 'ground'-sentences express explanatory facts whereas their reactionary counterparts don't.

It was worth belaboring this point because I don't think there's anything else in the vicinity that 'explanatory' could be credibly taken to mean. 'Explanatory' either refers to a property of explanantia or to a property of facts (or propositions, sentences etc. depending on how we regiment grounding and explanation) involving the explanandum, the explanantia, and the connection between the two. (I challenge any reader who disagrees to propose an alternative as to what other sort of thing explanatoriness could be a feature of.) Therefore, if it turns out that there's no sense in which 'ground'-sentences specify the explanatory connection between the explanantia and the explanandum but their reactionary counterparts don't, then the Argument from Explanatoriness is unsound.

Unfortunately, this intermediate conclusion still doesn't tell us *how* grounding is supposed to capture the explanatory connection between the explanantia and the explalandum. The answer to this question depends on how grounding fits into a popular picture that distinguishes between explanations and their worldly correlates. We can illuminate the distinction by first focusing on causation and causal explanation. Take the following two sentences:

(John$_{\text{c-expl}}$) John's eating spoiled meat *causally explains* his food poisoning

(John$_{\text{cause}}$) John's eating spoiled meat *caused* his food poisoning

(John$_{\text{c-expl}}$) is about causal explanation. It purports to be about an *explanation fact*: in the usual '[', ']' notation customarily used to represent facts, the fact [John ate spoiled meat] causally explains [John got food poisoning]. (John$_{\text{cause}}$) concerns causation. It purports to be about an *explanation-making fact*: the fact that [John ate spoiled meat] causes [John got food poisoning]. (To bring out the analogy with grounding, I'm assuming that the relata of causation are facts; nothing turns on this).

Whether grounding should be understood on the model of causation or on the model of causal explanation is a matter of controversy. Take [[Socrates exists] metaphysically explains [{Socrates} exists]]. If metaphysical explanation is analogous to causal explanation (a big "if", as I will argue in Sects. 4, 5), there is an explanation-making fact "responsible" for this explanation fact, in the same way causation facts are "responsible" for causal explanation facts. Call such facts *production* facts. Contemporary revolutionaries divide into two groups. Some use 'grounding' for metaphysical explanation itself; for example, they understand (Socrates) as

(Socrates$_{\text{met-expl}}$) [Socrates exists] metaphysically explains [{Socrates} exists].[12]

Others use 'grounding' for production and would understand (Socrates) as

(Socrates$_{\text{prod}}$) [Socrates exists] produces [{Socrates} exists].[13]

These two conceptions of grounding correspond to two versions of the Argument from Explanatoriness. Suppose that by 'grounding' we mean a kind of explanation. Then 'ground'-sentences are about this sort of explanation, and the complaint against reactionary counterparts is that they cannot express it. Call this the *Expressive Power Version*.

Suppose, on the other hand, that bythe following is false 'grounding' we mean production. Then the debate will be about what sort of facts are responsible for the metaphysical explanation facts: facts about production, or facts about necessitation, parthood, realization, etc. This raises the general question of what the relation is between the worldly phenomena and the explanations they are "responsible for". Philosophers often rest content with vague expressions ("underlies", "backs", etc.), which may be appropriate for some purposes but is not sufficiently clear if one's goal is to *argue* for production. The reading I find most plausible is that production *explains* metaphysical explanation:

(*Backing = Explanation*) If $\varphi_1 \ldots \varphi_n$ produce ψ, then [$\varphi_1 \ldots \varphi_n$ produce ψ] explains [$\varphi_1 \ldots \varphi_n$ metaphysically explain ψ][14]

Someone who accepts (Backing = Explanation) could argue as follows. Surely there are metaphysical explanation facts. The revolutionary has an account of what *explains* these facts: they are explained by production facts. The reactionary has no such account. It's in this sense that grounding (production) is indispensable to metaphysical explanation. Call this the *Unexplained Explanations Version*.[15]

These two versions of the argument aim to establish quite different conclusions. In the forthcoming sections, I will discuss them in more detail. For the sake of clarity, from now on I shall stop using the word 'grounding' in my official formulations and will stick to the clearer expressions 'production' and 'metaphysical explanation' instead, except in contexts where it's important to keep the ambiguity. Accordingly, I will refer to revolutionaries who identify grounding with production as p-theorists, and to those who identify it with metaphysical explanation as e-theorists. I will start with the Unexplained Explanations Version.

[12] Fine (2001, 2012a), Dasgupta (2014a, b); Litland forthcoming.

[13] Audi (2012a, b); Schaffer (2012, 2016); Skiles (2015); A. Wilson forthcoming.

[14] See Schnieder (2010: §1.d and 2014: 333–334) for a similar view.

[15] Some might prefer to identify "backing" with production instead. However, to object that the reactionary has no account of what produces the explanation facts would obviously beg the question in favor of production.

4 The unexplained explanations version

The Unexplained Explanations Version starts with the assumption that there are metaphysical explanations, and urges that they cannot be explained without invoking production facts. For example, what could explain [[Socrates exists] metaphysically explains [{Socrates} exists]]? The p-theorist contends that to answer this question we need to appeal to production. In premises and conclusion form:

Unexplained Explanations Version

(U_1) Assuming a relation of production, [[Socrates exists] produces [{Socrates exists}]] explains [[Socrates exists] metaphysically explains [{Socrates exists}]]

(U_2) Nothing acceptable to the reactionary can explain [[Socrates exists] metaphysically explains [{Socrates exists}]]

Therefore,

Production is indispensable for explaining [[Socrates exists] metaphysically explains [{Socrates exists}]][16]

Let's focus on U_2. Take the simplest candidate explanans of [[Socrates exists] metaphysically explains [{Socrates exists}]] the reactionary could come up with: [[Socrates exists] necessitates [{Socrates exists}]]. Why think this cannot serve as an explanation-making fact? The standardly cited reason is that necessitation is "not an explanatory relation". More carefully: necessitation doesn't guarantee, irrespective of its relata, the presence of metaphysical explanation. For example, not only does [Socrates exists] necessitate [{Socrates} exists], but also vice versa:

(Backwards-Socrates*) [{Socrates} exists] necessitates [Socrates exists]

Yet the following is false:

(Backwards-Socrates$_{\text{met-expl}}$) [{Socrates} exists] metaphysically explains [Socrates exists]

And what goes for necessitation also goes for other relations available to the reactionary: they cannot do the job of production because they are subject to confounding cases. The following is a natural way of making this thought more precise:

(*Generality Constraint*) For any relation, Φ, if [$\Phi(f_1 \ldots f_n, g)$] explains [$f_1 \ldots f_n$ metaphysically explain g], then for any $x_1 \ldots x_n$ and any y, if $\Phi(x_1, \ldots, x_n, y)$ then $x_1 \ldots x_n$ metaphysically explain y.[17]

Production facts—if there are any—satisfy the Generality Constraint; necessitation facts don't. This is why, the reasoning goes, [[Socrates exists]

[16] See Audi (2012b: 687–688) and Schaffer (2016) for similar arguments.

[17] See deRosset (2010: 79–81) and Audi (2012b: 697–698) for similar constraints.

metaphysically explains [{Socrates} exists]] cannot be explained by a necessitation fact.[18]

The reactionary can concede that necessitation by itself cannot explain [[Socrates exists] metaphysically explains [{Socrates} exists]], but keep wondering why we need production to explain it. Why can't we just cite the fact that [Socrates exists] necessitates [{Socrates} exists], *and that {Socrates} is the singleton set of Socrates*? After all, it is true of any x that if [x exists] necessitates [{x} exists], then [x exists] also metaphysically explains [{x} exists]. More generally: for [α_1 exists]…[α_n exists] to explain [β exists] it's not enough for the former to necessitate the latter, but β also has to be constructible from $\alpha_1 \ldots \alpha_n$ by repeated applications of the set-builder operation.[19]

The basic strategy is to say that it isn't simply necessitation but a complex pattern of modal and set-theoretic facts that guarantees the metaphysical explanation of [{Socrates} exists] by [Socrates exists]. Socrates and {Socrates} no longer pose a confounding case, then, since the pattern of modal and set-theoretic relations between them *is* generally sufficient for explanation. And of course, there is nothing special about this case: we can place similar restrictions on other putative explanantia to explain the metaphysical explanation facts without appealing to production. Call this strategy the *Restriction Approach*.[20]

There are two ways of understanding the Restriction Approach. On one reading, metaphysical explanations require "explanatory relations"; it's just that these relations are quite miscellaneous, and they are different from the relations metaphysicians usually have in mind when talking about explanatory relations. On an abundant conception of properties and relations, we can always define a relation that guarantees explanation by starting with a familiar relation and

[18] P-theorists who claim that production suffices for metaphysical explanation only if certain pragmatic and epistemic factors are also in place cannot accept the argument as it stands (Audi 2012a: 119–120; Trogdon 2013b: 468–473). Since this complication would only make the p-theorist's job harder, I will put it aside.

[19] More formally, let '$\in^a$' stand for ancestral set membership. Then a relation R* that guarantees the explanatory connection between [Socrates exists] and [{Socrates} exists] can be defined as follows: R*([α_1 exists]…[α_n exists], [β exists]) iff

(a) [α_1 exists]…[α_n exists] necessitate [β exists]
(b) $\forall x\ (x \in \{\alpha_1 \ldots \alpha_k\} \rightarrow x \in^a \beta)$
(c) $\forall x\ (\sim\ \exists y\ y \in x \rightarrow (x \in^a \{\alpha_1 \ldots \alpha_k\} \leftrightarrow x \in^a \beta))$
(d) $\forall x\ (x \in \beta \rightarrow x \notin^a \{\alpha_1 \ldots \alpha_k\})$
(e) $\forall x \forall y\ (x \neq y \rightarrow (x, y \in \{\alpha_1 \ldots \alpha_k\} \rightarrow x \notin^a y))$

Note that necessitation may play a role in the explanation even if it's something like a conceptual truth that if some things exist, their set exists too (barring the set-theoretical paradoxes). Conditions (b)–(d) aim to capture the informal idea that the entities whose existence is to be explained are built out of entities lower down in the set-theoretic hierarchy. Conditions (d)–(e) are negotiable. The former captures a strict non-circularity condition (the explanans cannot be the existence of some entities, the existence of some of which also figures in the explanandum), while the latter captures a minimality constraint on explanation, namely, that "irrelevancies [are] fatal to explanations" (Salmon 1977: 95; cf. Audi 2012b: 699–701).

[20] Koslicki (2014: 331) outlines an analogous strategy for making sense of the fundamental or derivative status of various kinds of entities.

introducing restrictions on its relata.[21] Thus understood, the Generality Constraint is trivially satisfied: for any explanation, we can find a relation that is exceptionlessly sufficient for explanations of the same kind.

On another reading, we have little reason to care about such abundant relations in explanatory contexts. To be sure, it's Socrates and {Socrates} standing in a complex pattern of relations that explains [[Socrates exists] explains [{Socrates} exists]]. What this shows, however, is not that some explanatory relations are abundant, but that we should altogether stop thinking about metaphysical explanation in terms of "explanatory relations". On this reading, the Generality Constraint is false: sometimes the standing of certain things in a certain relation explains why there is an explanatory connection between facts about those things, even though other things could stand in the same relation without the corresponding explanatory connection. In a slogan form: explanation ultimately happens at the level of facts, not at the level of relations.

The choice between these two interpretations is largely a matter of bookkeeping; the important point is that we shouldn't expect to settle whether some facts explain another fact on the basis of the sparse relations they stand in. But the second interpretation sits better with most philosophers' use of the words 'explanatory relation', according to which only a few (presumably sparse) relations count as genuinely explanatory. So below I will defend the Restriction Approach under the second interpretation, although everything I have to say could be easily rephrased in line with the first.

Understood as a principle about sparse relations, we have reasons for being suspicious about the Generality Constraint that are independent from considerations specific to *metaphysical* explanation. Even in contexts where it's natural to speak of "explanatory relations", it's hard to think of any that by itself guarantees explanation, irrespective of the relata. Causation is a case in point. Some causes are explanatorily irrelevant because they only influence very fine-grained details of the explanandum event. For example, a complex series of events led eventually to Rasputin's death: he was served poisoned teacakes, then shot twice, and finally thrown into the Neva river, where he drowned. The primary cause of his death was the drowning, though the poisoning and the bullet wounds may have hastened the process. However, many minor details of the story exerted causal influence on the event that was Raputin's death (the gravitational influence of Mars, the angle from which the Sun shone, the day's pollen count, etc.), yet they were entirely explanatorily irrelevant to it.[22] Another case in which causes fail to explain is when they are too far removed in the causal chain from the explanandum event. For example, even in a deterministic world, citing the Big Bang would not make for an explanation of why Jimmy was late from school on a certain day, even though the Big Bang was clearly in the chain of causes that led to his lateness, and perhaps even fully determined it.[23]

One might insist that once the explananda are individuated with the proper level of grain, whatever is explanatorily irrelevant will turn out to be causally irrelevant,

[21] See Lewis (1983) for the sparse/abundant distinction. Thanks to Louis deRosset for drawing my attention to the abundant interpretation, and for forcing me to lay out the Restriction Approach more clearly.

[22] Strevens (2008); cf. Ruben (1990: Ch. 5, Ch. 7: 187–193); Lewis (1986: 226–227).

[23] Lipton (2001: 49).

too. However, this move reveals a deeper problem. As Strevens (2008: Chs. 2, 6) points out, ordinary talk of causation is thoroughly steeped in explanatory considerations: in most everyday contexts, assertions of the form 'c causes e' express propositions about causal explanation. There may well be a sparse relation of causation, which may or may not be reducible to other phenomena, such as energy transfer. But this sparse relation is emphatically not what answers our intuitions about the puzzle cases that dominate the literature on the analysis of causation. Thus any appearance of a neat one–one correspondence between causation and causal explanation stems from our tendency to confuse the two. It is therefore naïve to just assume that every causation fact explains a corresponding explanation fact. Instead, we would need to investigate in detail which low-level causal relations in an event's history are explanatorily relevant and which ones aren't.[24]

This same problem besets simplistic construals of the relation between the metaphysical explanation-making facts and the metaphysical explanation facts. If the former are anything like the causal explanation-making facts, we should expect them to be facts involving individuals instantiating complex patterns of properties and relations. It is misguided to ask which relations guarantee an explanatory connection between their relata, irrespective of what those relata are. Causation—the sparse, worldly relation, if there is one—is not such a relation, and as of yet we have been given no good reason to expect that there is any other relation that is.[25]

Properly understood, then, the Restriction Approach ought to be the default view about explanation in general, not just metaphysical explanation. Below I will discuss a few examples to illuminate how the view works in practice. They are all controversial, but I don't think this is a bad thing: they are controversial precisely

[24] Cf. Woodward (2003), Strevens (2008). Similar remarks apply to the objection that some p-theorists have in mind a notion of explanation that has no epistemic connotations, and that causes *do* always explain their effects in this sense of 'explain'. Explanation in this sense becomes indistinguishable from whatever explanation-making relation the p-theorist posits to explain it. The tendency to confuse explanation with explanation-making goes both ways round, and is chiefly responsible for the insistence of an epistemically untainted notion of explanation; in the philosophy of science, not even the most ardent realists work with such a notion (see, e.g., Kim 1994). In my view, the prevalence of 'because'-talk in the grounding literature further encourages this confusion, since 'because' is systematically ambiguous between explanation and explanation-making (cf. Strawson 1985).

[25] An anonymous referee suggests that this line of reasoning relies on a particular interpretation of p-theorists, according to which production explains a *sui generis* notion of metaphysical explanation. Perhaps the p-theorist could say instead that production backs explanation *tout court*, rather than (or in addition to) metaphysical explanation (cf. Schaffer 2016). However, I think the switch to the general notion of explanation brings little improvement. To be sure, explanation *tout court* is easy to distinguish from production. But this is only because not all explanation involves production (for example, there are causal explanations), and this we already knew. The real challenge lies in distinguishing explanation *when supposedly explained by production* (never mind how we call it) from production itself. Again, take the analogy with causation. We don't need to assume that there is a *sui generis* category of causal explanations for the following semantic hypothesis to be plausible: in those contexts in which we typically engage in 'causation'-talk, sentences of the form 'e caused f' (or 'f occurred because e occurred') are systematically ambiguous between causal and explanatory claims. Therefore, our intuitions about causation are likely to be explanatorily tainted. Likewise for the non-causal explanations p-theorists are interested in (never mind how we call them) and the relation(s) supposedly underlying these explanations.

because they are detailed and informative. Fellow reactionaries are free to replace them according to their own theoretical leanings.

First, what could explain that (suppose) the moral facts are explained by natural facts? On one view, necessarily whenever a moral property is instantiated, so is a natural property that *constitutes* an instantiation of the moral property.[26] The idea is that the relation between mental and natural properties is akin to the relation between a statue and the lump of clay it's made of: one that implies an intimate connection between the relata but is looser than identity. Constitution is usually understood as a relation between material objects,[27] but on the present view it can also hold between properties or property instantiations.[28] Statues can be constituted by pieces of clay, gold, or other materials, but aren't identical to them. Analogously, moral rightness may be constituted by happiness maximization in the actual world and divine command in other possible worlds, without being identical to either.[29] There is a lot more to be said about this account; what is important is that neither constitution nor necessitation does all the work in it. Necessitation doesn't by itself imply explanation, as should be clear from the examples I discussed above (for instance, [{Socrates} exists necessitates but doesn't explain [Socrates exists]). But plausibly, neither does constitution. Suppose a piece of clay, C, constitutes a statue, S. Does the existence of C explain the existence of S? Arguably not. C could have existed without constituting S; it could even have had the same intrinsic properties without constituting S (if, for instance, it had its statue-like shape due to some cosmic accident). Beside C's existence, the existence of S also requires that certain external conditions be in place, or in Baker's words, that C be in "statue-favorable conditions".[30] In the present case, these will be conditions in which the piece of clay is the subject of certain artistic intentions. So, even though C constitutes S, its existence doesn't all by itself explain S's existence. One may object that even in this case, C's existence at least partially explains S's existence. But in fact, on Baker's conception of constitution constituted material objects *never* take explanatory priority over the objects they constitute, since they mutually inherit each other's properties. For example, persons are alive in virtue of the human animals constituting them being alive, but also, human animals are conscious in virtue of the person they constitute being conscious.[31] Now, whether Baker's view is correct or not, it should be compatible with the constitution account of moral properties. If it is, then we should conclude that what's doing the explanatory work in this case isn't just constitution. It is the fact that both constitution and necessitation hold between natural and moral properties, or property instantiations (rather than between other sorts of things, e.g. material objects).

[26] See Shafer-Landau (2003: Ch. 3) and Ridge (2007).

[27] Wiggins (1968), Thomson (1998), Baker (2007).

[28] Shafer-Landau is not alone with this view; for a detailed account of property constitution, see Shoemaker (2003).

[29] Cf. Shafer-Landau (2003: 75–76).

[30] See Baker (2007: 36).

[31] Cf. Baker (2007: 37–38, 166–169).

Second example: assuming that mental facts are explained by physical facts, why are they? One view, defended by Ehring (2011: Ch. 5), relies on *tropes*. Tropes are abstract particulars: for instance, the trope that is the redness of some specific shirt is akin to the universal of redness in being abstract, but is like the individual shirt it characterizes in being particular. According to Ehring, properties (or as he calls them, property types) are classes of tropes. Moreover, every mental trope is a physical trope, so mental properties are classes of mental/physical tropes. However, these mental properties are too disparate to count as physical, despite containing physical properties as subclasses. Since Ehring takes the relation between a class and its subclasses to be parthood,[32] it follows that the relation between physical and mental properties is composition: mental properties are composed of physical properties.[33] So, the relation between the physical and the mental facts can be understood in terms of composition. However, this type of composition could play its explanatory role even if the existence of composite things couldn't always be explained in terms of the existence of their parts. For example, if there are gunky objects, then there is some pressure to deny this general principle (since otherwise we face an infinite regress of explanations that never bottom out). Moreover, independently of whether there is gunk, it isn't especially plausible that the existence of ordinary objects (organisms, planets, rocks, etc.) is explained by the existence of their arbitrary undetached parts.[34] Now, you don't have to accept these cases as genuine counterexamples to the thesis that the existence of composite objects is always explained by the existence of their parts. It's enough to appreciate that one *could* accept them consistently with Ehring's part-whole explanation of physicalism. If this is right, then what's doing the explanatory work in part-whole physicalism isn't just the composition relation; it's the distribution of mereological and membership relations over classes that involve such and such tropes.

Third example: if disjunctions are explained by their true disjuncts, why are they? The reactionary can borrow Fine's "truthmaker semantics" here, which relies on a notion of verification familiar from situation semantics. Generally, $A_1 \ldots A_n$ explain (in Fine's terminology, "are a strict full ground for") C iff the following holds: if f_1 verifies A_1, f_2 verifies A_2,…, f_n verifies A_n, then the fusion of $f_1 \ldots f_n$ verifies C, but not vice versa (2012a: 72). Therefore, for any fact that verifies some sentence, A, the fusion of this fact with another fact that verifies another sentence, B, is a verifier of AvB. This is why A explains AvB. Again, what's doing the explanatory work isn't

[32] Ehring is relying here on Lewis (1991).

[33] This view is a close cousin of the subset account of realization, according to which mental properties have a proper subset of the causal powers of the physical properties that realize them (J. Wilson 1999 and Shoemaker 2007). Ehring proposes part-whole physicalism as "a *metaphysical explanation* for why the sets of causal powers of mental properties stand in the subset relation to the sets of causal powers of certain physical properties" (2011: 172, emphasis in the original).

[34] Schaffer (2010a) uses these examples to motivate priority monism, for our purposes the thesis that the existence of the cosmos explains the existence of all other material objects. However, we can accept these examples without endorsing priority monism. For example, perhaps the existence of all material objects is explained by the existence of mereologically complex subatomic particles; this is compatible both with the existence of gunk and with the explanatory priority of integrated objects to their arbitrary undetached parts.

any single explanatory relation, such as composition or verification. We have seen in the previous paragraph that it cannot be composition, since there are plausible cases of composition without explanation. But given other details of Fine's truthmaker semantics, it cannot be verification either. According to Fine, it's possible for there to be a verifier, f, such that f verifies A iff it verifies B, where A ≠ B. This is a special case of what Fine calls weak full ground: A weakly fully grounds B, B weakly fully grounds A, and neither explains the other. (Fine uses the 'for… is for…' locution to express weak full ground. For example, for John to marry Mary is for Mary to marry John; the two are weak full grounds of each other.[35]) So, verification is certainly possible without an accompanying explanation. Thus in Fine's framework, neither composition nor verification does the explanatory work all by itself; it's a certain pattern of mereological relations among facts and the verification relations they bear to sentences that does it.[36] (Some readers may find it surprising that I appeal to Fine's own views about grounding to advance the reactionary view. Note, however, that in the present context my main opponent is the p-theorist, whereas Fine is an e-theorist.)

The lesson we can draw from the foregoing paragraphs is that if we are looking for a relation whose role in metaphysical explanations is similar to the role of causation in scientific explanations, we shouldn't expect one that by itself *guarantees* explanation. We should expect one that often occurs in explanatory patterns, but which is not universally sufficient for explanatoriness. As of yet, we have been given no reason for thinking that the reactionary's familiar relations couldn't play *this* role.[37] By now it should also be clear why the main argument of this section doesn't lead to eliminativism about causation, as Schaffer (2016) worries other versions of production skepticism might: since causation often figures in scientific explanations but isn't universally sufficient for them, its explanatory role is very different from the alleged role of production in metaphysical explanations. In this regard, causation is closer to the familiar relations production was supposed to *replace* than to production itself.[38]

I think we can go even further. Earlier I summarized the Restriction Approach with the slogan that explanation happens at the level of facts, not at the level of relations; we don't need to think of explanation in terms of explanatory relations at all. From the scientific explanation literature, we already know plausible examples

[35] The notion of weak ground is not uncontroversial even among revolutionaries; deRosset (2013), for example, argues that it's hopelessly obscure. However, this doesn't matter for my present purposes. Fine's notion of verification, and the example of John's marrying Mary and Mary's marrying John sharing the same verifier, is intelligible even if we don't want to refer to it as a case of weak ground.

[36] Cf. Fine (2012a: 73, 2012b: 8).

[37] Note that the emerging view is more reactionary in spirit than J. Wilson's. According Wilson (2014), the direction of metaphysical explanation is ultimately settled by primitive fundamentality facts. On my view such appeal is unnecessary: the direction of explanation should be decided by our general theory of explanation. For example, I am attracted to a unification view: the direction of explanation is settled holistically by which deductive systematization of the total set of accepted sentences is the most unified. (For more on this, see also see the next section.)

[38] Thanks to Karen Bennett, Matti Eklund, and Ghislain Guigon for helpful discussions about the extent to which the reactionary view about production might carry over to causation.

of explanations that aren't "backed" by any explanatory relation: mathematical explanations, for instance, are non-causal, but they don't proceed by citing explanatory relations. Instead, Lange (2014) for instance argues that mathematical explanations derive their explanatoriness from exploiting a symmetry that contains some kind of invariance under certain transformations.[39] Or, to take another example, scientific explanations that only cite laws directly explain an instance of a law by simply citing that law; no further appeal to causes is necessary.[40] Given the analogy with scientific explanation, it wouldn't be far-fetched to think that there are cases of metaphysical explanation, too, that aren't backed by explanatory relations. Certain cases of "logical grounding" may be good candidates. Above I proposed that we explain these cases (or at least one such case) by appealing to a pattern of mereological and verification relations, but of course, this presupposes Fine's controversial truthmaking semantics for metaphysical explanation. Instead, we may simply say that a disjunction is explained by any of its true disjuncts, but that there is no underlying explanatory relation that makes this the case. This raises the natural question: if there are such "bare explanations", i.e. explanations that hold not due to any combination of "explanatory" or "determinative" relations, then *why* do these explanations hold? This is a hard question, and presumably, the answer to it should flow from one's general theory of explanation. In this paper, I don't attempt to give such a general theory. But the history of scientific explanation should make it clear that the model based on explanatory/determinative relations widely accepted among p-theorists (as well as some of their opponents, for example J. Wilson 2014) is not without alternatives. I, for one, am partial to a unificationist approach, according to which $f_1 \ldots f_n$ explain g just in case there is an argument with $f_1 \ldots f_n$ as premises and g as its conclusion that fits into the best systematization of the phenomena, i.e. the systematization that generates the largest possible number of conclusions using the smallest possible number of argument patterns.[41] (Though I lack space here to

[39] See also Steiner (1978) on explanatory proofs in pure mathematics, and A. Baker 2005 on mathematical explanations in the empirical sciences.

[40] The explanation literature usually follows Hempel (1965) in mostly focusing on causal explanation, but most philosophers (including Hempel himself) also recognize non-causal forms of scientific explanation. Achinstein (1983: Ch. 7–8), for example, discusses in detail all of the following: (i) special-case-of-law explanations, (ii) classification explanations, (iii) identity explanations, (iv) derivation explanations, (v) functional explanations. None of these can plausibly be said to invoke explanatory relations.

[41] This means that I require the availability of a deductively valid argument for any full metaphysical explanation. And this, in turn, means that there cannot be metaphysical explanations that don't involve at least the necessitation of the explanandum by the explanantia. However, Leuenberger (2014) and Skiles (2015) have recently argued that there are cases of grounding in which the grounds don't necessitate what they ground. For example, Skiles argues that accidental universal generalizations are grounded in, but aren't necessitated, by their instances (to get necessitation, we would need to add some kind of totality fact: "these are the *only* instances"). But then isn't it sheer dogmatism to rule out such cases at the outset? I don't think so. Putative examples of grounding without necessitation lose much of their force when interpreted as examples of *metaphysical explanation* without necessitation. Skiles' treatment of grounding seems closer to the production conception, whereas Leuenberger isn't explicit about whether he understands grounding as production or as metaphysical explanation. Moreover, their cases are much more plausible when understood as concerning the former. Compare: even in deterministic worlds, earlier states of the world don't necessitate later states; they do so only in conjunction with the laws of nature. This is a good reason for thinking that

defend the unification view in any detail, I will say more about the role of unification in metaphysical explanation in the next section, when responding to a follow-up argument for grounding *qua* production.)

Here, then, is the main upshot of this section. The Generality Constraint is implausible as a constraint on explanatory relations: paradigmatic explanatory relations can hold between their relata without guaranteeing that they instantiate the explanation relation. Thus, we should also reject the Generality Constraint for metaphysical explanation. This effectively neutralizes quick "confounding cases" to production-free explanatory hypotheses, and the Unexplained Explanations Version, which crucially relies on them. Moreover, as I argued in the previous paragraph, explanatory relations may not even always be necessary for metaphysical explanation.

Without the Generality Constraint, confounding cases to grounding-free explanations become toothless. This, in turn, undercuts the main motivation for U_2, the indispensability premise of the Unexplained Explanation Version. However, one might think that U_2 could be supported without relying on confounding cases. Perhaps production is indispensable for our metaphysical explanations because it *unifies* them. To this argument I turn in the next section.

5 Metaphysical unification

Perhaps production unifies the metaphysical explanation-making facts. But what does it mean for a set of explanations to be unified in the relevant sense? There is little discussion of this in the grounding literature, which tends to focus instead on the unity and coherence of production itself.[42] This is an unfortunate way of framing the debate. My preferred variety of the reactionary view doesn't say that production is incoherent or disunified; it just denies its explanatorily indispensability. If there is a serious unification-based *argument* for production, it should focus not on whether production is unified, but on whether it would make our metaphysical *explanations* more unified. No such argument has been offered to date.[43] But in personal communication several people suggested to me that there is a unification-based

Footnote 41 continued
causation is not a necessitating relation. But it would be hasty to conclude that the explananda of causal explanations aren't necessitated by their explanantia; the right thing to say instead is that the explanantia include things other than the causes, for example, the relevant laws of nature. (Probabilistic causation is another matter. Many hold that chance effects strictly speaking *have no* explanation, while the probability of their occurrence can be explained deductively (Railton 1978; Kitcher 1989). Others disagree (Hempel 1965; Salmon 1984). Either way, probabilistic causation and explanation have no metaphysical analogue.) I thank an anonymous referee for pressing me on grounding necessitarianism and its relevance to the possibility of "bare explanations", and Dan Korman, Ted Sider, and Kelly Trogdon for helpful discussions about what the denial of the Generality Constraint amounts to.

[42] See Schaffer (2009: 376–377) and 2016: §3, §4.4, M. Cameron 2014, Koslicki 2014, J. Wilson 2014, and Berker 2016: §5–7.

[43] Schaffer's (2016) structural equation models (cf. A. Wilson forthcoming) don't amount to the kind of argument I have in mind. Production itself plays little role in these models; the heavy-lifting is done by non-trivial counterpossibles, which in turn are supposed to give us a better grasp of the *concept* of production. Perhaps this is an efficient strategy against production skeptics who think that the concept is

argument for production[44], which makes it worth our while to look more deeply into the issue.

Appeals to unification are hard to assess without having some idea of what unification is. Fortunately we don't have to reinvent the wheel, since there has been extensive theorizing about unification in the philosophy of science. The guiding idea behind unification theories of scientific explanation is that explanatory power is a holistic feature of theories: unified theories explain a large number of explananda via a small number of explanantia.[45] Since unificationists assume that every explanation corresponds to a deductively valid argument, this amounts to the claim that, in Kitcher's words, they "derive descriptions of many phenomena, using the same patterns of derivation again and again" (1989: 432). In what follows, I will rely on a broadly Kitcherian conception of unification: explanatory theories use a small number of argument patterns with few premises to derive a large number of conclusions. An argument pattern is, roughly, a sequence of schematic sentences with restrictions on what counts as a substitution instance of each schematic sentence. I trust that this is intuitive enough for our present purposes; technical details are relegated to this footnote.[46]

How does production increase explanatory power? In principle, the p-theorist and the reactionary can agree on the first-order metaphysical explanation facts and facts that involve neither production nor explanation; their disagreement revolves around what explains the metaphysical explanation facts. According to the p-theorist, production facts play an important role in explaining them. For instance, a simple schematic argument can be used to derive ($\text{Socrates}_{\text{met-expl}}$):

Set Production

S1) [Socrates exists] produces [{Socrates} exists]

S2) For any $\psi_1 \ldots \psi_n$ and φ, if $\psi_1 \ldots \psi_n$ produce φ then $\psi_1 \ldots \psi_n$ metaphysically explain φ

Footnote 43 continued
incoherent or disunified (though see Koslicki 2016), but I don't see why it should move those of us who just think it's superfluous.

[44] The first one to mention it was Ted Sider.

[45] Friedman (1974), Kitcher (1989). On the "winner-take-all" conception of unification, any putative explanation that doesn't belong to the most unified set of explanations is not an explanation at all, while according to a graded view it is just a less good explanation (Woodward 2003: 367–369). For simplicity's sake I will assume the winner-take-all conception.

[46] A Kitcherian argument pattern is an ordered triple of (i) a schematic argument (a sequence of schematic sentences in which some non-logical expressions have been replaced by dummy letters), (ii) a set of sets of filling instructions that tell us what the substitution instances of each dummy letter are, and (iii) a classification: a set of sentences describing which sentences in the schematic argument are premises, which one is a conclusion, and which rules of inference are used. The notion of *stringency* also plays an important role in Kitcher's theory: the more stringent a pattern is, the more it contributes to unification. Roughly speaking, stringency is a matter of how hard it is for an argument pattern to be instantiated: the more demanding constraints are imposed upon the logical and non-logical vocabulary of an argument pattern, the more stringent it is. However, as Kitcher himself admits, his criteria of stringency yield clear results only in a relatively small number of special cases. Since the choice between revolutionary and reactionary theories is not among these, in what follows I won't pay too much attention to stringency.

S3) So, [Socrates exists] metaphysically explains [{Socrates} exists]

Since the reactionary cannot posit production facts, she has to find another way to derive the conclusion (predicate 'R*' below applies to some facts just in case they instantiate the pattern of modal and set-theoretic relations specified in Sect. 4; cf. footnote 20):

Set Necessitation + Membership

S1*) R*([Socrates exists], [{Socrates} exists])

S2*) For any $\alpha_1 \ldots \alpha_n$, β, if R*([α_1 exists]…[α_n exists], [β exists]) then [α_1 exists]…[α_n exists] metaphysically explain [β exists]

S3) So, [Socrates exists] metaphysically explains [{Socrates} exists]

Now the p-theorist is in a position to give a reasonably clear unification-based argument for production. Take a look again at Set Production. It seems that the arguments the p-theorist can use to derive the other metaphysical explanation facts will all use S2 and a premise about production. By contrast, the reactionary has to appeal to a variety of relations instead of just production. Worse yet, she cannot make do with anything as simple as S2: she has to use a variety of conditionals linking the metaphysical explanation facts to all sorts of metaphysical explanation-making facts. So, the p-theorist might conclude, the reactionary's theory is far less unified than his.

However, matters are not so simple. Let's distinguish between "clean" and "messy" comparisons of unification. A clean case is one in which we have two sets of candidate explanations such that (a) one set derives more explananda *or* derives its explananda from fewer explanantia *or* uses fewer argument patterns than the other set, and (b) the other set has none of these advantages over the first. These comparisons are clean because they yield a theory superior to its rival in some regards and inferior in none. An example from the sciences is the subsumption of special laws under more general ones: instead of accepting several independent laws as basic, we can derive them as special cases of some more general law. Another case is the derivation of the same explananda from a smaller set of explanantia by abandoning old explanatory hypotheses.[47] By contrast, in messy cases one of the two theories fares better along some dimensions of unification but fares worse along others. These cases are often difficult to assess because we have no quantitative method of weighing the rival criteria against one another.

The present case is a messy one. First, the p-theorist accepts the reactionary's explanation-making facts; he just rejects their *status* as explanation-making facts and so doesn't use them to derive the explanation facts. Second, the p-theorist also doesn't derive these facts from facts about production. If all you can go on is the schematic sentence '$\chi_1 \ldots \chi_n$ produce ψ' and the premise that some facts are among its substitution instances, you cannot yet tell whether those facts involve composition, realization, or constitution (etc.) without knowing more about the entities they concern.[48] This means that the p-theorist operates with a larger premise

[47] See Kitcher (1981: §5, 1989: §4) for more examples.

[48] Koslicki (2014: 330–331) makes a similar point, albeit in a different context.

set: the extra production facts he posits don't explain anything the reactionary has (by her own lights) left unexplained.

The p-theorist still has an advantage: she can derive all the metaphysical explanation facts using the same argument pattern. But it's hard to assess the significance of this advantage without knowing how stringent the argument pattern in question is (see footnote 49).[49] Either way, it remains the case that the p-theorist's explanations appeal to a larger number of unexplained phenomena, a whole realm of truths about production that can be neither derived from the reactionary's putative explanation-making facts nor used to derive them. So, even if considerations pertaining to unification don't clearly support the reactionary's case, they don't support the p-theorist's either. For anyone whose original ambition was to give a unification-based argument for production, this should look like a thin result.

In fairness to the p-theorist, I should note that I worked with a fairly minimal, heuristic notion of unification shared by unificationists of all stripes. So I close this section by inviting the p-theorist to say more about unification. If you think there is a unification-based argument for production, lay it out in detail. Provide a precise theory of unification, explain what exactly it is that production makes more unified, and say how it does so. Only then will we be in a position to even seriously evaluate appeals to unification in support of production.

6 The expressive power version

The second version of the Argument from Explanatoriness is concerned with expressive power: grounding sentences *express* the relevant sort of explanation, but their reactionary counterparts don't (I'm using 'express' broadly, to also include conceptual entailment). In the Socrates/{Socrates} case, for example, the argument will go as follows:

Expressive Power Version

(E_1) ($Socrates_{met\text{-}expl}$) expresses that a certain explanatory connection holds between [Socrates exists] and [{Socrates} exists]

(E_2) Nothing acceptable to the reactionary expresses this sort of explanatory connection

Therefore,

($Socrates_{met\text{-}expl}$) is indispensable for expressing that the relevant kind of explanatory connection holds between [Socrates exists] and [{Socrates} exists][50]

For all this argument says, the underlying explanation-making connections may well be captured in familiar modal, mereological, set-theoretic (etc.) terms. It's just the fact *that* these connections are of the intended explanatory sort that cannot be so

[49] My guess would be: not very. For example, S2 doesn't impose any restriction on the substitution instances of $\psi_1 \ldots \psi_n$ and φ.

[50] For similar arguments, see Fine 2012a, Dasgupta 2014b, and Litland forthcoming.

captured. So the natural question to focus on is what it is about metaphysical explanation that cannot be expressed in reactionary vocabulary.

One possible view is that no reactionary-friendly sentence expresses metaphysical explanation because no such sentence expresses *any* kind of explanation. According to this view, the problem is that the reactionary cannot convey that explanation is taking place without using words like 'explains', 'because', 'in virtue of', and the like. If this is what the argument is trying to show, there is something odd about mainstream discussions of grounding. First, the general explanation literature reached this conclusion long ago; we can learn this much from the series of failed attempts to fix Hempel's D–N model of non-probabilistic explanation.[51] Very few philosophers think today that *any* sentence that doesn't use explicitly explanatory vocabulary expresses explanation. Second, while it required philosophical insight to conclude that supervenience, necessitation, and other familiar relations don't always "back" explanations, it is plainly obvious that they don't conceptually entail them. Even in the heyday of reactionary metaphysics, nobody would have thought that sentences about set membership, necessity, composition (etc.) had explanatory content. We can see this merely by reflecting on the relevant concepts, without getting into tricky cases involving (say) intensionally equivalent explananda and explanantia. Accordingly, the familiar reactionary-friendly notions have never been introduced with the intention to express explanatory connections. Their role was, rather, to "back" or explain them.

So, the supposed indispensability of the *general* concept of explanation has no bearing at all on the debate between the reactionary and the e-theorist. If there is an interesting argument here, it has to be that the reactionary cannot express that certain explanations are *metaphysical*. Consider, for instance,

(Socrates$_{\text{gen-expl}}$) [Socrates exists] explains [Socrates, {Socrates}, exists]

(Socrates$_{\text{gen-expl}}$) only uses modal and set-theoretic notions, and the general concept of explanation. The e-theorist could argue that (Socrates$_{\text{gen-expl}}$) still fails to express that the explanation is of the right sort. And the same goes for other sentences that only appeal to the general notion of explanation: they don't express that the explanation is metaphysical.

This variety of the Expressive Power Version aims at the right target. However, it still strikes me as unconvincing. There are various interpretations of the 'metaphysical' in 'metaphysical explanation' that don't require us to go beyond the reactionary toolkit. They all emphasize features that revolutionaries frequently cite when characterizing metaphysical explanations.

For example, revolutionaries often claim that metaphysical explanations are *non-causal*.[52] Presumably, they don't mean to say that all non-causal explanations are metaphysical. On the face of it, mathematical explanations, or scientific explanations that only cite laws, are non-causal too, but revolutionaries clearly don't mean to include them in the targeted set of explanations (see Sect. 4). Either way, to

[51] See, for example, McCarthy (1977), Achinstein (1983: Ch. 5), and Ruben (1990: 196–198).

[52] See, for instance, Correia and Schnieder (2012) and Correia (2014).

express that a certain explanation is metaphysical in the intended sense, reactionaries can take the non-causal characterization as a starting point and exclude other types of explanation as they see fit.

Alternatively, by 'metaphysical explanation' one might mean a *constitutive* explanation. This characterization is also fairly common in the grounding literature: metaphysical explanations are frequently said to feature explananda that somehow "consist in" their explanantia.[53] The reactionary can interpret 'constitutive' as shorthand for a finite list of relations that intuitively qualify as such. For example, she can say that an explanation counts as constitutive just in case it appeals to composition, material constitution, set-membership, or micro-basing.[54] Since these relations are acceptable to the reactionary, they provide a reactionary-friendly way of expressing the metaphysicality of metaphysical explanations.

A third possibility is to claim that an explanation is metaphysical when it belongs to a certain subject matter.[55] This interpretation yields a fairly heterogeneous set of explanations, but the reactionary has no problem expressing that her explanations belong to that set. Relations frequently discussed in metaphysics textbooks, taught about in philosophy classes with the word 'metaphysics' in their title, etc., count as metaphysical according the linguistic conventions in place, but there is no deeper reason why they do.[56] Modally robust relations tend to make for metaphysical explanation, but so do "constitutive" relations. So, any competent user of 'metaphysical' can infer that sentences about explanation citing set-membership, composition, or even entailment, express metaphysical explanation.

These interpretations aren't exhaustive. But they all allow the reactionary to reject (E_2): there *is*, as it turns out, a way to understand metaphysical explanation that can be expressed in vocabulary acceptable to the reactionary. Below, I will address two objections to this claim. The first objection is that none of the above interpretations captures what the revolutionary means by 'metaphysical explanation'. The second objection is that at least one of them does, and precisely for this reason the view I presented belongs to the revolutionary camp.[57]

Let's start with the first objection. The e-theorist might complain that the characteristics mentioned above (that metaphysical explanations are non-causal, or constitutive, or belong to the subject matter of metaphysics) are imperfect ways of gesturing at what she means by 'metaphysical explanation'. This shouldn't be surprising; after all, revolutionaries tend to agree that grounding is unanalyzable. But if that is so, none of the uses of 'metaphysical explanation' considered above quite expresses the *e-theorist's* notion of metaphysical explanation. My response is that I didn't intend to express the e-theorist's notion. As I argued in Sect. 2, pre-grounding era reactionary views should be seen as attempts to explicate, rather than

[53] See Rosen (2010), Fine (2012a), Raven (2012), and Skiles (2015).

[54] See Armstrong (1978: 18) and Kim (1998: 84) for micro-basing.

[55] Cf. Schaffer (2009).

[56] Cf. Merricks (2013: 722).

[57] Thanks to Jon Litland for pressing the first objection, and to Shamik Dasgupta and Ted Sider for pushing me on the second.

analyze, 'in virtue of'. I take a similar approach to 'metaphysical explanation': the non-causal, constitutive, and subject matter based approaches aren't intended as analyses of the e-theorist's notion but as replacements thereof with something (by the reactionary's lights) more serviceable. What is important to see is that the three explications sketched above undermine the motivation for the e-theorist's notion. It's undeniable that '[Socrates exists] necessitates [{Socrates} exists]' fails to express the explanatory connection between the relata. We can even grant that ($\text{Socrates}_{\text{gen-expl}}$) fails to express the *kind* of explanatory connection at issue. However, we would need some further reason to accept that anything is missing from '[Socrates exists] necessitates and constitutively explains [{Socrates} exists]' (where 'constitutive' stands for the disjunction of the relations I mentioned above). So, the point is not that the reactionary can express the e-theorist's notion of metaphysical explanation, but that she can express any notion of metaphysical explanation *worth expressing*.

The second objection is that one of my interpretations *does* capture the e-theorist's notion, and that this is grist in the e-theorist's mill. For example, even if 'metaphysical explanation' can be understood as constitutive explanation, this notion is useful if metaphysical explanations in this sense share some interesting features. Now, as I use the term, one is a revolutionary in so far as one deems a salient candidate notion of grounding *indispensable*. The present proposal makes the far weaker claim that it's sometimes *useful* to speak broadly of metaphysical (*qua* constitutive) explanation. Though 'grounding' has been used in so many different ways in the literature that it's virtually impossible to cut up the terrain in an uncontroversial way, my way of drawing the line between revolutionaries and reactionaries is not arbitrary. I consider it a core revolutionary thesis that we can do things with grounding we couldn't do without it. This assumption plays a significant role in the "applied grounding" literature: grounding-based formulations of physicalism, moral realism and intrinsicality deserve our attention, we are told, because they help themselves to conceptual resources that philosophers before the grounding revolution deprived themselves of. But if 'grounding' stands for nothing more than an explanation citing one of the relations that figure on the list of constitutive relations, this assumption is false, and it's hard to make sense of the recent enthusiasm about grounding. In fact, this use of 'grounds' and 'in virtue of' was the standard use *before* the grounding revolution.[58]

At this point it's worth reminding ourselves of something I said in Sect. 1. Given the variety of ways philosophers use the word, we should be skeptical of sweeping attacks on every possible use of 'grounding'. If all you mean by 'grounding' is metaphysical explanation, and by this you mean an explanation that cites familiar relations from some well-defined list, or whose subject-matter conventionally belongs to metaphysics, and you think this makes you a revolutionary, then count me in as your comrade. Just keep in mind that even the fiercest reactionaries can concede that there are explanations with these features (e.g. Daly 2012: 88–89).

[58] See also J. Wilson's (2014: 556–557) discussion of Theodore Sider on using 'grounding' to express commitment to broad research programs.

7 Concluding remarks

In this paper, I tried to show that on most readings the Argument from Explanatoriness is inconclusive, while on others it doesn't show much of interest. Throughout I have paid particular attention to a few popular problem cases, which comes with the obvious limitation that I have no perfectly general response to *all* possible cases. However, the choice of example was irrelevant to my answer to the Expressive Power Version, while my answer to the Unexplained Version is precisely that *no* fully general, one-size-fits-all schema subsumes all the metaphysical explanation-making facts. The Restriction Approach provides us with the tools we need to reject any quick and sweeping "counterexample" to production-free explanation-making facts.

My conclusion is twofold. First, we often hear the slogan that grounding is an explanatory notion, whereas the familiar concepts of pre-grounding-era metaphysics aren't. But it's far from clear how we should understand this slogan. There are at least two ways of understanding it, yielding two very different theoretical roles for grounding. Revolutionaries are now starting to recognize the significance of this difference (see especially Schaffer 2016), but a lot more work needs to be done to crystallize which notion of grounding is supposed to be explanatorily indispensible, and why. My more ambitious conclusion is that it's highly doubtful that any version of the Argument from Explanatoriness actually succeeds. If that is right, we lose our best reason for thinking that there is a notion that is a plausible candidate for being meant by 'grounding' and is in any way indispensible for metaphysical explanation.

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