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NEW ELEATICISM

ABSTRACT. The Eleatic Principle denies the existence of causally inert entities. In this paper, I discuss a particular justification of the principle - that causally inert entities have no explanatory value in science. I argue against this justification, showing that non-causal explanations and entities do important work in scientific explanations. I then propose that the Eleatic should instead adopt an alternative principle, one where explanatory power conditions the existence of postulated entities. To flesh out the principle, I present an account of explanation, connecting it with directed dependency, arguing that grounding dependence, not just causal dependence, can generate explanation. Finally, I point to a theory that could minimize the ontological commitments entailed by accepting the new principle.[1]

INTRODUCTION

Ontology is about what exists. Sometimes, philosophers design tests, or set up principles, intended to check if some postulated entities exist or not. If they exist, they are allowed in our ontology, if they don't they're not. The principle I will be concerned with; 'the Eleatic Principle', is a criterion for existence which take causality as the dividing line. This principle states that causal activity, or the ability to partake in causal processes, is prerequisite of existence. As such, the principle can be used in arguments against the existence of various entities: mental properties, abstract entities, mathematical properties, mereological composites etc.[2] That way, it serves the purpose of narrowing the scope of ontological concern, making it attractive for minimalist metaphysics. In this paper, I want to do two things: (1) Question a particular justification for the principle; that only causal entities play explanatory roles in science. I argue that this justification is weak, at best. My argument rests on the fact that natural science sometimes non-trivially uses non-causal explanations and entities. (2) Suggest that the Eleatic, instead of using causal potency,

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[1] Master's thesis written at the University of Gothenburg, fall 2016, supervised by Anna-Sofia Maurin.

[2] Combined with the premise that the entity in question is causally inert.

should distinguish between existing and non existing entities based on their explanatory powers. In a slogan: whatever uniquely explains, exist.

Some clarification of the assumptions in this paper and what it doesn't claim are in order. I am not arguing against every justification for the Eleatic principle that has been offered, so even though the particular one I do argue against might loose its justification, there are other options available.[3] Any further mentioning of 'the' justification should be read with this in mind. Furthermore, I will assume that, in addition to explanatory value, the Eleatic accepts ontological parsimony as a theoretical virtue. All else being equal, less ontology is better. Finally, a note on causality. First, the causal order is the temporal order such that an effect precedes its cause. Second, I take causation to be a strict partial order (irreflexive, asymmetric and transitive). Third, causal relations are explanatory relations, and fourth, absences and omissions are not part of the causal order. These claims will be fleshed out in section 3.1 and 3.2

In the first section I present the Eleatic principle as well as a particular justification for it. In section two I present an argument which states that the justification has wrongly assumed that only causal explanations are needed in science. The argument consists of two cases in which non-causal explanation figure in complete scientific explanations. In section three I suggest that the justification for the Eleatic principle instead should be involved in the content of the principle itself, so that postulated entities with explanatory value are those which count as existing. I present a theory of explanation and and how it connects to dependence, claiming that both causation and grounding dependence are connected with explanation. Finally, in section four, I look at an argument - that grounding is metaphysical causation - reducing the ontology entailed by the new principle, and suggest that this position ought to be considered given ontological parsimony.

1.   JUSTIFYING THE ELEATIC PRINCIPLE

One reason for adopting the Eleatic Principle is that you are a scientific realist. A central tenet of most versions of scientific realism is *naturalism* which roughly

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[3] For an epistemic justification, see for instance Colin Cheyne (1998).

states that 'nothing at all exists except the single world of space and time.' (Armstrong, 1989, p. 3).[4] Postulating entities that lie outside of naturalism's scope then, must from this perspective be met with skepticism:

> To postulate entities which lie beyond our world of space and time is, in general, to make a speculative, uncertain, postulation. The postulation may perhaps be defended if it can be presented as *explaining* some or all of the spatio-temporal phenomena. But if the entities postulated lie beyond our world, and in addition have no causal or nomic connections with it, then the postulation has no explanatory value. Hence (a further step of course) we ought to deny the existence of such entities. (Armstrong, 1989, p. 7–8)[5] [Author italics]

Only entities with explanatory value are justified, and only causal entities can be explanatory. This suggests that Armstrong thinks that causal explanations are the only explanations that can provide information about the natural world. Furthermore, all such explanations of spatio-temporal phenomena will, according to Armstrong, be a scientific endeavor:

> The nature of space and time is to be discovered a posteriori. It is a matter for science. (Armstrong, 1997, p. 6)

These claims, that entities need to be causal to be explanatory, and that explanations in natural science can account for the nature of space and time, together make up the justification for accepting the Eleatic Principle:

> *The Eleatic Principle:* Everything that exists makes a difference to the causal powers of something. (Armstrong 1997, p.41)

It's important to distinguish between the principle and its justification, so in order to be clear, I intend to argue against the justification for the principle, which I take to be the following:

> *Eleatic Justification:* Non-causal entities have no explanatory value in science.

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[4] I couldn't hope to provide a unanimously held account of naturalism here, partly because I don't think that such unanimity exist, but mostly because I think the one represented by Armstrong suffices for my purposes. I will throughout this paper assume that naturalism in some form or other is true and that we should strive to keep our theories compatible with it.

[5] As Colywan (1998, p. 7) notes, explanatory value is often part of justifying scientific realism, so using it to determine the scope of that realism seems natural.

The Eleatic principle expressed above is a revised version that Armstrong uses in order to '[g]et around annoying counter-instances to the simpler formula' (Armstrong, 1997, p.41), referring to Graham Oddie's critique of an earlier formulation of the principle, objecting that the causal relation itself is causally inert, by which infinite regress threatens (Oddie, 1981). In his (1997) Armstrong explicitly uses the Eleatic Principle to argue against the existence of uninstantiated universals, but it could just as easily be used in arguments against any proposed entity, premised on the idea that they could not make a causal difference in the world of space and time.

The Eleatic Principle is sometimes only implicitly referred to or mentioned as *Alexander's Dictum*, in the latter case most often as a principle in philosophy of mind considered as a premise in over-determination arguments.[6] Given that the Eleatic principle is used to do some important philosophical work, it seems motivated to examine its justification. For reasons of scope, clarity and simplicity, I will be primarily concerned with the formulation of the principle stated above. I take it that the formulation above is sufficiently uncontroversial and sufficiently similar to the versions discussed by Colywan (1998), Ellis (1990), Cowling (2014, 2015), Hudson (2003), Elder (2003), etc.[7]

In the next section, I will argue that the Eleatic justification is incorrect in asserting that only causal entities have explanatory value, and I will give two examples of non-causal contribution to explanation in science.

2. Non-causal explanations in science

Although causal explanations are abundant in science, not every scientific explanation is entirely causal, or so I'll argue. In support of such an argument I want to present two cases of non-causal contribution to scientific

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[6] As an example of the former: in his 1990 book *Truth & Objectivity* B.D Ellis appears to commit to the principle when proposing that 'only those entities implicated in causal process explanations exist, such as protons, electrons, and the fundamental forces, but not those deriving from model-theoretic explanations, such as space-time points, propositions, numbers, sets or idealizations'. Under the flag of *Alexander's Dictum* the principle has occurred in Hudson (2003), Cargile (2003), Elder (2003), and Kim (1993).

[7] I use 'uncontroversial' here to denote the formulation of the principle, not the principle per se. The controversiality of the principle hinges on whatever background commitments you have. A mathematical realist ought to think it's controversial, not so for a scientific realist.

explanation, as well as some endorsements of the general idea that non-causal explanations have value in science. Let's start with the latter.

Skow (2014) argues that all explanations of *events* are causal but admits that grounding explanations (equivalent to in-virtue-of locutions) can be found in science:[8]

> […] scientists also often aim to give in-virtue-of explanations. When a chemist explains why a pane of glass is fragile by describing its molecular structure, she is giving an in-virtue-of explanation. (Skow, 2014, p. 447)

Facing this challenge, Skow simply revises his thesis to state that '[A]ll explanations of events other than in-virtue-of explanations are causal' (Skow, 2014, p. 447). I will take his revised thesis as an indication that he believes non-causal explanations can be found in science.[9]

Audi (2012) endorses the idea that explanations sometimes can be, and are, non-causal, and claims that explanation connects to dependency:

> […] being spherical does not *cause* things to have the power to roll. Nor is being spherical identical with the power to roll, since the power to roll is a power also of cylinders, which are not spherical. So the fact that a given thing is spherical non-causally determines the fact that it has the power to roll. (Audi, 2012, p. 104) [Author italics]

Schaffer is perhaps the strongest advocate of non-causal explanation (here referred to in the form of metaphysical explanation), citing the potential role it could play for physicalists:[10]

> Metaphysicians—led by Fine—have only recently (re-)turned to a notion of *grounding* that has the structural features appropriate for backing the explanation of the less fundamental from the more fundamental, thus

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[8] Skow (2014, p. 447) accepts a liberal definition of events, and says it's uncontroversial that 'like ordinary material objects, events have spatial and temporal locations. It makes sense to ask where and when an event happened.'

[9] That all explanations of events are causal is compatible with the argument I am pursuing here, given that events are a subdomain of entities.

[10] Further examples: Schaffer (2012) states that '[T]o explain a macro-effect from a micro-cause, one needs a "diagonal" explanation that crosses both times and levels.', Pexton (2012) argues that 'An illustrative case study in how the abstraction away from causal details to non-causal structural features can be explanatory can be found in the explanation of a surprising generality across the biological world, an allometric scaling law.' Other concrete examples, including 'Antipodal weather patterns' and 'the FitzGerald-Lorentz contraction', have been given by Colywan (1998).

(re-)gaining the ideology needed to discuss metaphysical explanation, and articulate explanatory versions of views such as physicalism. (Schaffer, forthcoming) [Author italics]

The above citations are meant to illustrate that non-causal explanations are things taken seriously by metaphysicians, but they provide little or no evidence of such explanations appearing in science. The passages above seem to be about the very *idea* that non-causal explanations can figure importantly in science, but they do not demonstrate it. Now, I want to turn to the two concrete examples which are supposed to show that non-causal explanations in fact do appear in science.

CHEMICAL

In Schaffer (2016a) we find an example of a hybrid-explanation, invoking both causation and grounding, used to explain why a gas has certain properties at a time (t1) in terms of the molecular motions by its molecules at a previous time (t0):
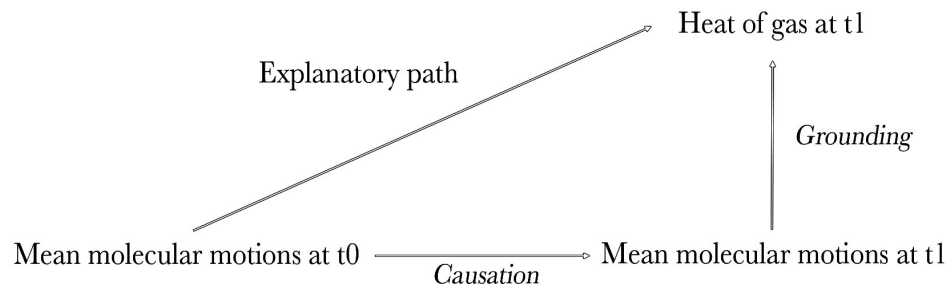

Fig. 1 Diagonal hybrid explanation (Schaffer, 2016a, p. 89)

This explanation states that the mean molecular motions at t1 are accounted for by the causal relation to the mean molecular motions at t0, thus providing a diachronical and external story about the two states. More importantly (for my purposes), the explanation states that the heat of the gas at t1 can be accounted for synchronically and internally. Holding the mean molecular motions at t1 fixed, the heat of the gas at t1 is guaranteed, that is, the gas has the heat properties it has at t1 *in virtue of* the mean molecular motion at t1.

There might be a worry that the entities involved in the non-causal explanation are all causally potent, so it appears as if this example fails to demonstrate that non-causal entities have explanatory value in science. But it is still true that the complete explanation need the grounding relation backing it,

otherwise we would be unable to explain the heat of the gas at t1. If strictly causal, the explanation could only reference the mean molecular motions at t1, but this clearly isn't enough to explain the heat of the gas at t1. Since science uses metaphysical explanations, and such explanations are non-causal explanations, this raises a red flag against the Eleatic justification. This explanation (as well as some of the general endorsements above) make explicit reference to the grounding relation, a relation which I will examine more thoroughly in section three, but for now it suffices to say that the full explanation need more than the causal story to be complete. Schaffer stresses that hybrid-explanations are part of his explanatory unionism, in which there aren't several types of explanations (causal explanation, metaphysical explanation and mathematical explanation to name a few), but only explanation *simpliciter*, that is, one kind of explanation. I will, for now, remain neutral to the explanatory unionism advocated by Schaffer, as I think nothing important in my argument against the Eleatic justification rests on this point.[11]

Mathematical

Why do bees build their honeycombs out of hexagonal cells? According to the theory of evolution, natural selection favors the bees that build their honeycombs in the most efficient manner, minimizing energy output and maximizing utility of wax. This is an empirical fact, but one that can be partially explained mathematically:

> *The Honeycomb Theorem:* A hexagonal grid is the most efficient way to divide a Euclidian plane into regions of equal area with least total perimeter. (Hales, 2001, p. 4)

Note, however, that this theorem is not sufficient for the full explanation. Other parts are needed, such as the fact that the bees that uses less wax tend to be fitter than other bees. Nevertheless, the theorem is an indispensable part of the explanation. Simply providing the causal history of how the bees came to build hexagonally shaped cells omit explaining *why* they do so. Consider this explanation of why bees build their honeycombs out of hexagonal cells: first, the bees might have used a triangular shape but at some point, the bees tried

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[11] I will, however, revisit Schaffer's unionism in section 3.1.

new shapes, for example squares. The 'square bees' were more efficient and hence fitter, thereby out-reproducing the triangle bees. Down the line, some of the square bees started building hexagonally shaped cells, which by the same process led to the out-reproducing of the bees that continued making squares. This causal explanation misses a crucial point: it's irrelevant to the final outcome what sequence of shapes the bees tried out in the past. No matter how the causal story might go, the Honeycomb Theorem explains why the bees would always come to build their honeycombs with hexagonal cells (Lyon, 2011). A full explanation of why bees build their honeycombs out of hexagonal cells is a package-deal containing both empirical and mathematical facts, i.e. both causal and non-causal explanation. Furthermore, this explanation explicitly references non-causal entities such as Euclidian planes.[12]

Before moving on to section three, let's take stock. First, I presented the Eleatic Principle and a particular justification for it - that non-causal entities have no explanatory value in science. I then argued that this justification could be substantially weakened, by showing that both non-causal explanations and non-causal entities make non-trivial contributions in science. The Eleatic principle can not, if I'm right, be justified by the claim that only causal entities have explanatory value. But I don't think that Armstrong is entirely wrong either. I do think there is something to the idea of letting explanatory value play a part in restricting the ontological domain, and in what remains, I will try to argue for a principle which places the responsibility for our ontology on the theoretical virtue of explanatory value. For if it is explanatory value that we care about, why not use that as the ruler of whether some postulated entity exist or not?

3. A new principle

Causal explanations are good explanations, but if they aren't the only type needed for a complete scientific account of the natural world, there is little

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[12] I should note that mathematical explanations of mathematical facts are more common than mathematical explanations of empirical facts, the former an example of pure non-causal explanation. It is, however, controversial as to whether or not such explanations are scientific in the right sense, since their scope arguably falls outside the domain of space and time.

reason for us to restrict ourselves to only them. What other types of explanations are there, and how might they be connected to ontology? In this section, I will explore the view that explanations are epistemic facts or sentences that are backed by some concrete relation between entities.[13] Notice that 'concrete relations' is open, so that an explanation could be backed by any relation with the right features, causal or otherwise. Another way to put it is that '*explanations track dependence relations*' (Kim, 1994, p. 68 [Author italics]). To be clear, it's the entities 'picked out' by the explanations that I suggest we allow in our ontology, so that for an entity to have 'explanatory power' is for it to participate in a relation that back an explanation. With this in mind, I suggest the following principle:

> *Explanatory Principle:* An entity is to be counted as real if and only if it has explanatory power.

Since this principle will restrict ontology based on explanatory power, and causal explanations are good explanations, causally relevant entities will probably still make up most of our ontological domain. This means that we can keep the intuitive pull of the Eleatic principle and its motivation, while recognizing that one of the defining features of causal entities - their explanatory power - might not be exclusively reserved for them. Furthermore, the principle does not necessarily or logically entail that the domain of entities existing according to it *must* contain non-causal contributes, but only that the existence of non-causal entities cannot be ruled out *prima facie*. If someone were to reduce all explanations to causal explanations, the domain of existing entities entailed by the Explanatory principle would contain exactly the ones which were entailed by the Eleatic principle, but such a conclusion must be the result of careful analytic investigation, instead of being merely assumed. The next subsection will try to flesh out a view of explanation, and its connection to dependence relations.

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[13] That explanation is to be understood as an epistemic notion is not entirely uncontroversial. Schaffer (2016a, p. 84) seems to think that they are epistemic when stating that causal explanation is 'an abstract pattern over facts or sentences', while Raven (2012) suggests that metaphysical explanations are ontic facts that stand in the right structural relation.

3.1   What are explanations?

As we saw in section two, scientific explanations are sometimes both causal and metaphysical. Kim (1994) makes the proposal that the objective correlates of *any type* of explanation are dependency relations, taking a broad ontological category of relata to partake in such relations: events, states, facts, properties, regularities between events, and entities. Causal dependence will be part of the dependency relations (ranging over events), but Kim cautiously suggest that we may view other types of dependencies as explanatory:

> Socrates expires in the prison, and Xanthippe becomes a widow. The widowing of Xanthippe depends on the death of Socrates, and this is perhaps still another kind of dependence. There is a widespread belief in mind-body supervenience: the mentality of a creature depends on its physical nature. […] These and other dependence relations may generate explanations - explanations of mental phenomena in terms of their underlying neurobiology, and of evaluative facts in terms of the non-evaluative facts on which they supervene. (Kim, 1994, p. 67-68)

Kim is basically saying that we should focus our attention to the shared feature of explanation - dependency. Kim's proposal thus links the explanational to the ontic, generalizing that relation to the claim I introduced above: '*explanations track dependence relations*'. As noted in section two, Schaffer (2016a, p. 83-90) is sympathetic to the idea that explanation is a unified concept that can be backed with different dependency relations (although, he is more precise about the nature of those dependencies: "[…] the relations that back explanation are the relations of directed [contrastive] dependency"). He is thus denying that 'causal explanation' differs from 'metaphysical explanation' *qua* explanation, even though we might call an explanation metaphysical when backed by grounding, and causal when backed with causation. If we accept this idea, then the scientific explanations in section two are not hybrid-explanations in the sense that they utilize two different types of explanation. More plausibly, they are explanations that utilize two different dependency relations. This has the consequence that the Explanatory principle will ontologically include all entities that are relata in the dependence relations that backs explanation.

But what does it mean to say that some dependency relation 'backs' explanation, and what are the formal features of explanation? And is grounding apt to back explanation in the same way as causation, as I have assumed so far?

I will work with the notion of explanation as separated from ontology, a position argued for by Audi (2012b) and Schaffer (2012) amongst others, but not all will agree that they are distinct. For example, Raven (2012), and Fine (2012) take grounding to *be* a kind of metaphysical explanation, thus unifying the two. This means that they wouldn't acknowledge either explanatory unionism (that there is only explanation *simpliciter*) or the separation between explanation and grounding. In what follows, I will drop the debate about whether or not grounding and metaphysical explanation are separated and simply assume that explanation is distinct from, but closely connected with, the ontology it is about. Philosophers endorsing this separatist view often talk about explanation being backed by grounding (or causation).[14]

Consider the following explanation: {Socrates} exists because Socrates exists. The relation between the *explanandum* and the *explanans* is often thought to be asymmetric, so as to avoid circular explanations. If x explains y, y doesn't explain x, so if the explanation above is correct, then the explanation 'Socrates exists because {Socrates} exists' is incorrect. The correct explanation is backed with a dependency relation, namely the one between Socrates and {Socrates}: Socrates' existence *makes* {Socrates} exist.[15]

Besides being asymmetric, explanations are thought to be *irreflexive*, *transitive* and *well-founded*. They are irreflexive since nothing explains itself: the fact that my shirt is blue isn't explained by the fact that my shirt is blue. They are transitive since if x explains y, and y explains z, x (at least partially) explains z:

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[14] Note that the same relationship between explanation and grounding/causation is supposed to be denoted by 'tracking'. This means that Kim's suggestion that explanations track dependencies is tantamount to saying that dependencies back explanation.

[15] The relata in this explanation are intensionally co-extensive, making the explanation *hyperintensional*. That explanations cans have this feature has led a lot of philosophers (e.g. Fine, 2012, Kim, 1993) to abandon supervenience as a candidate dependency relation underwriting explanation. Supervenience simply cannot account for asymmetric dependence when two entities are modally covariant, so therefore supervenience is not part of the dependency relations that backs explanation. Consequently, that entities supervene is not enough to give them the explanatory value needed to be included in ontology, at least not by the Explanatory principle.

if I am late because I missed the bus, and I missed the bus because I overslept, then I am late because I overslept. Finally, explanations are well-founded, or; explanations terminate. If explanations were to lack this feature, infinite regress threatens to make all explanations vacant or empty, but intuitively, they are not - explanations really do explain.[16]

Imposing these restrictions on explanation seem both reasonable and plausible, and now we can start to investigate what kind of dependency relations, or directed dependencies, that can back explanation. The general program is to find out which dependency relations that can back explanation so that we get an idea of which kinds of entities that have explanatory value. Exhausting all potential dependence relations would, however, be a task too big for this paper, so I will restrict my attention to causation and grounding as candidate dependency relations for backing explanation.

3.2 BACKING EXPLANATIONS

CAUSATION

First, let's look at causal explanations. They are so widely accepted and intuitive that if the Explanatory principle can't pick out the entities involved in them, it clearly isn't a good principle. Suppose that the throwing of a rock caused the breaking of the window. The breaking of the window then depended on the throwing of the rock, and this dependence seems asymmetric such that the breaking of the window didn't cause the throwing of the rock. It's also irreflexive such that the breaking of the window didn't cause itself. For transitivity, suppose that if I get cut by the broken window, this is (at least partially) caused by the throwing of the rock. This causal dependence back an explanation: the window broke because the rock was thrown. As with the causal dependence, the explanation seems asymmetric: the cause explains the effect but the effect cannot explain the cause, irreflexive; the effect isn't

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[16] I take these formal features to be features of explanation, but I do want to note that there are other ways to understand explanation in general and metaphysical explanation in particular. See Hempel (1965) and Salmon (1986) for general accounts of scientific explanation, and Thompson (forthcoming) for an account of metaphysical explanation without a strict partial ordering.

explained by itself, and transitive; that I cut myself is (at least partially) explained by the throwing of the rock.

This causal explanation is backed by a causal relation, which means that the entities involved in that causal relation (for example the rock, the window and me) have explanatory value. According to the Explanatory principle, we should allow them in ontology. So far so good. But throughout this paper, I have invoked grounding as a relation that can also back explanation. What are the features of grounding, and can grounding back explanation?

Grounding

Let's take an example. Suppose I hurt my foot really badly and experience some intense pain. We could explain why I'm in pain by citing the causal history that led to the hurting of my foot, for example me accidentally stumbling into the leg of a table. But there seems to be an alternative explanation as to why I am in pain, one that cites my neural state at the time I am in pain. Both explanations seem accurate, but different: the causal one is temporal and gives a diachronical story about the events involved, the other one is synchronical and seems to be about what constitutes my pain, rather than what the cause for it was.[17] They are both, however, trying to explain the same thing: why is it the case that I am in pain? The constitutive explanation is often talked about as an in-virtue-of explanation, and it's in-virtue-of explanations that I think we should back with grounding.

Grounding, as I understand it, is a relation concerned with the ontological priority or fundamentality of entities.[18] It connects the less to the more fundamental, thereby providing structure to what there is. An illustrative example is that particles are more fundamental than chemicals, and chemicals

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[17] They also seem to hold counterfactually: if I hadn't stumped my foot into the table I wouldn't have been in pain, but if I hadn't been in the neural state that I was, I wouldn't have been in pain either.

[18] Other authors consider facts as the appropriate relata of grounding relations. Facts have, however, been interpreted differently. Audi (2012b, p. 3) writes 'On my view, grounding is a singular relation between facts, understood as things having properties and standing in relations. Facts, on this conception, are not true propositions, but obtaining states of affairs.' Schaffer (2016, p. 75) takes facts to denote something more akin to our everyday understanding of the word, and instead ops for entities being the relata of grounding since they denote 'some concrete elements of physical reality'. I think the differences between Schaffer's entities and Audi's facts so understood are fairly insignificant - they both seem to involve concrete physical elements.

are more fundamental than plants, which can be rephrased as the idea that plants depend on chemicals, and chemicals depend on particles. Dependence-talk is a natural way to express the idea that reality has levels, and grounding is supposed to be the relation bridging these levels of reality. But it's not just the dependence between physical entities that grounding links, it's also taken to connect other dependencies as well, for example the dependence of truth on being, whole on parts, sets upon members, and the mental on the physical. These dependencies are importantly different from causal dependencies since they are synchronical. Take the truth of the sentence <Socrates exists> as an example. The truth of the sentence depend on the existence of Socrates, but this isn't a temporal relation. It's not the case that Socrates comes to existence prior to the sentence being true, and so the dependence between them cannot be causal dependence, and can therefore not be explained causally. This is a powerful reason to recognize grounding as a dependence relation (Schaffer, 2016a).

If we believe there to be a genuine kind of dependence different from causal dependence, what might its features be? Let's revisit the example with singleton Socrates from 3.1. We had an explanation stating that {Socrates} existed because Socrates did, and that there was a dependence between them. The dependence cannot be underwritten with causality, for it is not the case that Socrates is coming to existence prior to {Socrates}, and so it seems more plausible to say that Socrates *makes* {Socrates} exist. To put this constitutive dependence in grounding terms: Socrates grounds {Socrates}. This means that grounding is asymmetric, for if Socrates makes {Socrates} exist, it cannot be right that {Socrates} makes Socrates exist. Grounding also appears to be irreflexive, since {Socrates} isn't making {Socrates} exist. For transitivity, let's say that if {Socrates} is grounded in Socrates, and Socrates is grounded in particles arranged Socrates-wise, {Socrates} is (at least partially) grounded in particles arranged Socrates-wise.[19] So the explanation '{Socrates} exists because Socrates exists' is backed with grounding, which means, just as in the case when causal explanation was backed with causation, that the entities

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[19] There are, however, arguments that grounding is neither irreflexive (Jenkins, 2011) or transitive, (Schaffer, 2012). There is even an argument suggesting that grounding lacks a structural partial order altogether (Rodriguez-Pereyra, 2015).

involved (sets, Socrates, and particles) in the grounding relation have explanatory value. Consequently, the Explanatory principle states that the entities involved should be considered as existing.

The conclusion that abstracts entities, such as sets, must be considered as existing might worry friends of the Eleatic principle, or anyone else who accepts ontological parsimony as a theoretical virtue. Such worries can, I think, be dissolved. Alongside a strict partial ordering, grounding is often thought to be well-founded, so that x is fundamental iff nothing grounds x.[20] This means that we can make a distinction between fundamental entities and derivative entities, where the latter are grounded in the former. Derivative entities owe their existence to the fundamental entities in which they are grounded. Those who are reluctant to the idea of letting abstract entities figure in ontology can simply try to make the case that no abstract entities are fundamental.

But the whole point of introducing grounding in the first place was to have *more* relations that could back explanations, so there is at least some ontological cost involved, given that grounding itself isn't an analyzable concept (Rodriguez-Pereyra, 2005, Schaffer, 2009). One way to mitigate this worry is to point to all the theoretical benefits of grounding, providing some perspective to the ontological price-tag. This strategy is basically to choose explanatory power over ontological parsimony. Another strategy is to argue that grounding is a type of causation - metaphysical causation - in which case our ontology wouldn't expand at all when accepting grounding, but merely add explanatory value. Pointing to such an argument will make up the last section of this paper.

4. Grounding as metaphysical Causation

In this section I entertain the possibility that grounding is a kind of causation, where causation is to be understood as a genus level notion. This kind of unionism is explicitly proposed by Wilson (2016), and Schaffer (2016a) suggests

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[20] Although, there are those who think that grounding can survive the loss of well-foundedness. See for example Bliss (2013).

that there is a striking structural analogy between the two.[21] I will simply outline the idea as they understand it, suggesting that it provides an interesting position if we take ontological parsimony seriously. Following Wilson, I will for the remainder of this paper refer to *causation* as a genus level notion while treating *grounding* and *nomological causation* as species thereof. 'Nomological causation' will denote what 'causation', usually denotes. Note however that Schaffer disagrees with Wilson and takes the two to be separate, so when I say that they agree about some analogy between grounding and nomological causation, have this distinction in mind, appearances notwithstanding. The consequence of accepting Wilson's position is that, when accepting the Explanatory principle, our ontological commitments are equal to those of the Eleatic principle, but we get far more explanatory power.

4.1 Structural analogy

The first immediate, but perhaps circumstantial, analogy between nomological causation and grounding is the 'producing' or 'generative' feature they appear to have. They both structure reality in some sense, where an effect can be seen as the product of its nomological cause, and the grounded as a product of its grounds. As we have seen in section three, they also appear to connect similarly to dependence, where the effect depend on its nomological cause and the grounded depend on its grounds: the breaking of the window depended on the throwing of the rock, and the existence of {Socrates} depended on the existence of Socrates. The first is an instance of dependence by nomological causation and the latter of dependence by grounding. We also saw that both grounding and nomological causation was irreflexive, asymmetric and transitive, a view which both Schaffer and Wilson hold (Schaffer, 2016, p. 55, Wilson, 2016, p. 5-6). According to Wilson, arguments *against* the strict partial order of grounding are closely related to arguments against the strict partial order of nomological causation, which he interprets as further support of the analogy between them. If it, for example, turns out that grounding isn't transitive (see

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[21] Others have suggested causation to be a type of building relation, so perhaps grounding is the genus level notion under which causation is a species. For such an account see Bennett (2011).

Schaffer 2012), such a conclusion would plausibly target the transitivity of nomological causation as well (Wilson, 2016, p. 6-8).

Both Schaffer and Wilson agrees on the deeper consequence of nomological causation and grounding sharing a strict partial order: grounding and nomological causation both allow an application of the *type/token* distinction where instances, or tokens, of the relation naturally generalize to types. Schaffer pushes the analogy of *component vs net distinction,* and the tripartite distinction between *incomplete and complete* factors for cause, where the equivalent for ground is *partial and full* factors, with *total* factors covering both. Further analogies include the two relations aptness in *screening off relations* and *structural equations models*.[22] Furthermore, both Schaffer (2016a) and Wilson (2016) argue that nomological causation and grounding stand in a similar relation to a surrounding metaphysical notion relevant for explanation - laws. Instances of nomological causation are governed by laws of nature, where instances of grounding are governed by metaphysical principles, suggesting (in Schaffer's terms) non-accidental generalization. This means that the generalizations are backed with 'formative principles - whether laws of nature or laws of metaphysics' (Schaffer, 2016, p. 57). Wilson argues that this is the only distinction between nomological causation and grounding - that different laws are invoked when explaining why a certain dependency holds. To explain grounding dependence, laws of metaphysics would be cited, and when explaining causal dependence, laws of nature would be cited (Wilson, 2016, p. 23).

I'm listing these analogies without explication for reasons of space and for the fact that they are not directly relevant to my point. The reason I am listing them at all is because they make up a substantial part of the argument suggesting a tight connection between grounding and nomological causation. What I want to do is to assume these claims of analogy and propose a possible upshot for the ontological commitments of the Explanatory principle. The upshot is that, even though grounding can back explanation and the Explanatory principle tells us that we should accept entities in such grounding relations, the grounding relation

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[22] The analogy in structural equation models plays a significant role for both Schaffer and Wilson, where the success of grounding 'surviving' a formal treatment designed for causation is seen as proof of the two relations similarity or, in Wilson's case, unity.

itself wouldn't be an ontological burden - its simply a species of the single primitive causation.[23]

Despite arguing for the tight connection between causation and grounding, Schaffer is more cautious about collapsing the two in the unionist schema proposed by Wilson. Even so, Schaffer admits to the allure of unionism:

> Indeed, given the depth of the analogy it is actually a substantive and difficult question as to whether there is any more than a nominal distinction between grounding and causation, and I am open to […] the idea that there is a single unified relation of generation called 'causation' when it drives the world through time, and 'grounding' when it drives the world up levels. (Schaffer, 2016a, p. 59)

Given that Schaffer and Wilson's arguments about the striking analogies between nomological causation and grounding holds some truth, this seems to be a promising view to adopt if we want to accept the Explanatory principle but still minimize our ontological commitments. My intention for this section was never to argue in favor of this position as such, but only to present a possible way in which we can avoid extra ontological commitment. As such, this section is intended as a response to those worried that the Explanatory principle might be overly inclusive when accepting grounding as an extra primitive.

5. Conclusion & summary

In this paper, I have argued for two things: (1) that the Eleatic principle cannot be justified by claiming that only causal entities have explanatory value, and (2) that we should accept a principle determining the existence of entities in terms of their explanatory value. In section one I introduced the Eleatic principle and a particular justification for it - that only causal entities have explanatory value. In section two, I argued against this justification by showing that non-causal explanations, and non-causal entities, non-trivially contributes to

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[23] This might look like a reduction of grounding to causation, so one might think that the Eleatic principle is true after all. This is mistaken. 'Causation' here is taken to include cases of metaphysical causation (or grounding) excluded in 'causation' as used in the Eleatic principle. Furthermore, there might be more dependencies than causal and grounding that can back explanation. Mathematical and logical dependencies are two additional candidates for backing explanation, and so *even if* grounding could be reduced to causation, that would not be a decisive argument against the Explanatory principle.

complete scientific explanations. In section three I presented an alternative principle conditioning the existence of postulated entities on their explanatory value. This principle took the intuitive pull of the Eleatic justification seriously, while not arbitrarily restricting explanatory value to causal entities. I presented a theory of explanation, and that dependencies back explanation. A suggested followed that, in addition to causation, grounding was part of the dependency relations that could back explanation. This had the consequence that the Explanatory principle would rule some abstract entities as existing. I argued that if this was worrisome, a feature of grounding - well-foundedness - could be used to classify abstract entities as derivatively existing, as opposed to existing fundamentally.

In the last section, I gave a response to a worry about the ontological cost of introducing grounding as a new primitive. The response consisted in presenting a view which proposed that grounding was a species of causation - metaphysical causation. This view had the benefit of cutting the ontological cost of accepting grounding alongside causation, since both would be instances of only one primitive, without loosing any explanatory value.

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