NO WORK FOR FUNDAMENTAL FACTS

By Thomas Oberle

Metaphysical foundationalists argue that without fundamental facts, we cannot explain why there exist any dependent facts at all. Thus, metaphysical infinitism, the view that chains of ground can descend indefinitely without ever terminating in a level of fundamental facts, allegedly exhibits a kind of explanatory failure. I examine this argument and conclude that foundationalists have failed to show that infinitism exhibits explanatory failure. I argue that explaining the existence of dependent facts in terms of further dependent facts ad infinitum is unproblematic by arguing for the plausibility of a ground-theoretic version of the Hume-Edwards Principle, which states that if each fact in a plurality of facts has a ground, then the plurality itself has a ground.

Keywords: grounding, fundamentality, metaphysical foundationalism, the cosmological argument, the Hume-Edwards Principle.

I. INTRODUCTION

Metaphysical foundationalism is the view that ground is well-founded, that there are some fundamental facts that ground all the derivative or dependent facts. Metaphysical infinitism denies that ground must be well-founded. Chains of ground can descend indefinitely without ever reaching a level of fundamental facts. On infinitism, every fact is dependent. A common argument for foundationalism, which I term 'the externality argument', says there must be fundamental facts in order to explain why there are any dependent facts at all. Since the infinitist does not admit the existence of fundamental facts, the foundationalist argues infinitism exhibits a kind of explanatory failure.

A crucial premise of the externality argument is the externality assumption: no dependent fact can explain why there are any dependent facts at all. Only facts that are *external* to the collection of dependent facts, i.e. only facts that are fundamental, are up for the explanatory task. I argue that foundationalists have hitherto failed to offer convincing justification for the externality assumption. Thus, for all foundationalists have shown, there is nothing problematic with

the infinitist explaining why there are any dependent facts at all in terms of further dependent facts.

Interestingly, a causal version of the externality assumption also motivates the cosmological argument from contingency. Theists typically endorse a version of the principle of sufficient reason (PSR) that says, 'every contingent fact has an explanation', and go on to argue that no contingent fact can explain why there are any contingent facts at all. The argument concludes that only a fact external to the collection of contingent facts—a necessary fact—is up for the explanatory task. Though various theists endorse the externality assumption for different reasons, endorsing the externality assumption amounts to rejecting the Hume-Edwards Principle (HEP), roughly, that explaining the parts of a collection is sufficient for explaining the whole collection. I argue that explaining the existence of dependent facts in terms of further dependent facts ad infinitum is unproblematic by arguing for the plausibility of a ground-theoretic version of HEP, which states that the plurality of all dependent facts has a ground iff every dependent fact has a ground. Thus, there is no work for fundamental facts.

The plan for this paper is as follows. In Section II, I briefly introduce the notion of ground and the debate between metaphysical foundationalism and metaphysical infinitism. In Section III, I introduce the externality argument in more detail. In Section IV, I attempt to clarify the explanatory target of the argument. In Section V, I critically evaluate two proposed lines of justification for the externality assumption. In Section VI, I offer a ground-theoretic version of HEP and discuss some of its implications. In Section VII, I conclude by considering objections.

II. GROUND AND METAPHYSICAL FOUNDATIONALISM

Ground is a determinative form of non-causal metaphysical explanation. Metaphysical explanations are familiar. They pertain to what makes or determines something's being the case. For example, to causally explain the occurrence of a football match, we will describe the events preceding the match that led to its occurrence. To metaphysically explain it, we will describe the underlying goings-on that make it the case that a match is occurring. We might say the occurrence of a football match is grounded or consists in the various actions of its participants. Those actions are what make it the case that a football match is occurring in the first place. Unless otherwise noted, I use 'explanation' and 'ground' interchangeably throughout this paper.

Some prefer to treat ground in terms of the sentential connective, 'because'. Grounding claims then take the following form,

S because Γ

where S is a sentence and Γ is a list of sentences, and 'because' is interpreted in a metaphysical rather than causal sense.[1] Others prefer to treat ground as a relational predicate that applies to facts. In this approach, grounding claims take the following form.

The fact that S is grounded in the facts, Γ.

Though neither account is required for my purposes, I adopt the relational approach to streamline discussion. Some say ground, as a relation, just is a form of explanation while others think ground backs or underlies explanation.[2] Though sometimes I will talk as if ground just is metaphysical explanation, I stay neutral on this debate. As a relation between facts, I prefer a conception of facts as non-representational states of reality as opposed to representational entities like propositions. This conception guarantees that our discussion pertains to the world itself rather than our representations of it. But this assumption is also not required. One can simply replace my conception of facts with their preferred view if they'd like.

Ground is also associated with a notion of fundamentality. I assume here a conception of fundamentality as independence. Those facts that are ungrounded, and hence independent, are fundamental. Thus, facts that are grounded are derivative or dependent. I also assume that ground forms a strict partial order; it is transitive, irreflexive, and asymmetric.

As a form of explanation, ground can be full or partial. We can say that Δ partially grounds A if it contributes to explaining or helps to explain A, and Δ fully grounds A if Δ provides us with a satisfactory or full explanation of A (Trogdon and Witmer 2021: 252). By a satisfactory or full explanation, I mean that Δ leaves nothing to be explained about A. Thus, a standard definition of partial grounding can be offered in terms of full grounding, while full grounding itself is left undefined in a formal sense, though not uncharacterized.

x is partially grounded by y $=_{df}$ there are Γ such that y is among Γ and x is fully grounded by Γ. (Dixon 2020: 245)[3]

When I use 'ground' throughout this paper without qualification, I mean full ground.

Since grounding explanations can chain together, the question arises as to whether chains of ground must eventually terminate, or be ultimately grounded, in some fundamental facts. The metaphysical foundationalist answers this question in the positive, maintaining that ground is well-founded.

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[1] See Dasgupta (2014).

[2] See Raven (2015) for a discussion of the distinction between unionism and separatism.

[3] See also Audi (2012: 698), Rosen (2010: 115), and Fine (2012: 50). See Leuenberger (2020) and Trogdon & Witmer (2021) for disagreement regarding this definition of partial ground.

A natural conception of well-foundedness is in terms of a chain of ground terminating in some fundamental facts in a finite number of steps or links. However, it is widely recognized that foundationalism is compatible with infinite chains of ground, where any two elements in a chain of ground can contain infinitely many elements between them.[4] Thus, I follow Scott Dixon (2016: 446) in defining well-foundedness as follows.[5]

> **FS** Every non-fundamental fact x is fully grounded by some fundamental facts Γ.

Though beyond our purview here, FS allows for several grounding structures that are intuitively well-founded but nevertheless contain infinite chains of ground.

By contrast, the metaphysical infinitist denies that ground must be well-founded. The infinitist thinks that ground is a strict partial order but simply maintains that there is nothing problematic with indefinitely descending chains of ground, i.e. chains that are not ultimately grounded in some fundamental facts. As we'll see in the remainder of this paper, this dispute comes down to whether infinitism ultimately fails to meet some explanatory demand that foundationalism can.

III. THE EXTERNALITY ARGUMENT

The externality argument for foundationalism says that fundamental facts are required to explain why there are any dependent facts at all. Jonathan Schaffer says where there is nothing fundamental, 'Being would be infinitely deferred, never achieved' (2010a: 62). A plausible interpretation of this phrase is that without any fundamental facts, there would be no explanation of the derivative or dependent facts. Ross Cameron argues that if there are no fundamental facts, then 'we are left without a complete explanation as to why the non-fundamental facts on that infinite chain obtain, or why the dependent entities on that infinite chain exist and/or are the way they are' (2022: 90). And Ricki Bliss argues, 'Where one thing depends upon another, and that further thing depends on something else, and so on *ad infinitum*, whilst we have an explanation for each thing along the way, what we do not have an explanation for is why there are any dependent entities whatsoever' (2019: 368). Bliss identifies a core assumption of this argument as *the externality assumption*: if we are to explain why there are any dependent facts at all, we must appeal to facts that are external to the collection of dependent facts, i.e. facts that are not dependent. And assuming that the categories of *being fundamental* and *being dependent* are mutually

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[4] For example, see Rabin & Rabern (2016: 369).
[5] Rabin & Rabern (2016) independently arrive at an equivalent understanding of well-foundedness.

exclusive and exhaustive, the fact or set of facts external to the dependent facts that do the ultimate explaining must be fundamental.

What reason do we have to accept the externality assumption? Since I think Bliss' version of the externality argument is the most developed, I'll briefly mention her suggestion so that we can get her full version of the argument on the table. She motivates the externality assumption by appealing to the following principle, adapted from Stephen Maitzen (2013, 2022).

> **KI**: Where K is any *substantial kind*, you can't explain why there are any Ks *at all* by invoking only Ks, even if your explanation goes on forever (Bliss 2019: 373).

Bliss' move is to then suggest that 'dependent fact' is a substantial kind.[6] If true, then it follows that we cannot appeal to any dependent fact to explain why there are any dependent facts at all. In certain contexts, I think KI is plausible. For example, consider someone who asks, 'Why are there any elephants at all?'. It seems right to say that a satisfactory answer to this question cannot appeal to any individual elephants. Instead, we'd have to appeal to certain biological or evolutionary processes that somehow gave rise to elephants as a species sometime in the past.

Putting the pieces together, Bliss (2019: 373) presents the following version of the externality argument, which I've adapted slightly by replacing 'entities' with 'facts'.[7]

1. There is an explanation for why there are any dependent facts whatsoever.
2. No dependent fact can explain why there are any dependent facts whatsoever.
    (a) (KI) Where K is any *substantial kind* you can't explain why there are any Ks *at all* by invoking only Ks, even if your explanation goes on forever.
    (b) 'Dependent fact' is a substantial kind.
    (c) Therefore, you can't explain why there are any dependent facts at all by invoking only dependent facts, even if your explanation goes on forever.
3. Therefore, there must be fundamental facts.

As it stands, the argument faces two challenges. First, the explanatory target in premise 1 requires clarification. Secondly, justifying the externality assumption, premise 2, is notoriously difficult. My main goal in this paper is to evaluate the externality assumption. Before doing so, I will attempt to clarify the explanatory target in the next section. Doing so will help narrow our focus and clarify the issues at stake when discussing the externality assumption in Section V and HEP in Section VI.

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[6] Bliss uses 'entities' instead of 'facts'. I opt for the term 'fact' to streamline discussion and maintain continuity with the rest of the paper.

[7] To be clear, Bliss does not endorse this argument.

IV. CLARIFYING THE EXPLANATORY TARGET

Premise 1 of Bliss' externality argument asserts that there is an explanation for the existence of dependent facts. The main problem with Bliss' construal of the explanatory target is that the question raised by the externality argument looks like a quantificational question. It seems to be asking for an explanation of an existential statement, namely, 'There are dependent facts'. What explains this fact? A plausible principle of ground is that an existentially quantified fact is explained by each of its obtaining instances.[8] Thus, we can plausibly say that the fact that there are dependent facts obtains in virtue of the fact that dependent fact$_1$ obtains, dependent fact$_2$ obtains, dependent fact$_3$ obtains and so on. Thus, there is no need for fundamental facts.

Instead of the quantificational question, perhaps Bliss has the following modal question in mind: Why do these dependent facts exist given that they presumably don't *have* to exist? But I don't think this is right. The modal interpretation puts us squarely into the territory of the cosmological argument from contingency, which appeals to a necessary cause in order to account for some contingent feature of reality. I'll say more about the cosmological argument in the next section. However, unlike the cosmological argument, the externality argument is not seeking a necessary ground for the supposed contingent existence of dependent facts. Rather, it aims to establish a *fundamental* ground of dependent facts and there is nothing about the externality argument that requires the fundamental facts to be necessary. For all the externality argument says, the fundamental facts could be contingently existent. Though strikingly similar in many ways, as we'll see below, the cosmological argument and externality argument should be kept separate.

Alternatively, we might think that the foundationalist's explanatory target is a mereological fusion, set, or conjunction. Perhaps the idea is that, while every dependent fact has a ground on infinitism, the set of all dependent facts, say, does not have a ground. However, it is implausible that we understand the explanatory target to be a mereological fusion, set, or conjunction. Fusions obtain in virtue of their parts, at least according to classical extensional mereology. Sets obtain in virtue of their members, at least according to the iterative conception of a set. And conjunctions arguably obtain in virtue of their conjunctions. Thus, on any of these interpretations, there is no work for fundamental facts.

We are left wondering what, exactly, fundamental facts are needed to explain. Bliss' question of, 'Why there are any dependent facts' includes the qualifier 'whatsoever' or 'at all'. Admittedly, these qualifiers perform some function. They seem to rule out as inappropriate an explanation in terms of instances. But the alleged inappropriateness of an explanation in terms of

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[8] See Rosen (2010: 117).

instances is still unclear. We've seen already that, on various interpretations of the explanatory target, explanation in terms of instances, parts, members, or conjuncts, is plausible. Thus, what these qualifiers are supposed to do seems to resist clarification.

To avoid these issues, my suggestion is that we construe the explanatory target as the *plurality* of all dependent facts. Let 'dd' be a plural term denoting all and only the dependent facts. We can now understand ground to accept plural terms on the right in addition to on the left, which I'll say a little more about shortly. The challenge, then, will be to say what grounds dd.[9] In this approach, the foundationalist is not looking for an explanation of the further fact that there are dependent facts, nor why the dependent facts exist as a fusion, set, or conjunction. On my proposal, what the foundationalist is after is an explanation of the existence of all *these* dependent facts taken plurally. Framing the explanatory target in this manner has the advantage of allowing us to speak of all dependent facts without presupposing that they form a distinct entity in and of itself, like a set, since a plurality is nothing over and above its members.[10]

We can then offer a more formal characterization of Bliss' explanatory principle underlying premise 1 of her argument. First, we introduce plural variables (vv, xx, yy, . . .) and plural quantifiers that bind those variables ($\forall vv$, $\exists xx$,. . .). We then introduce the following predicates. 'D(xx)' reads 'the xxs are dependent' and 'EE(xx)' reads 'there is an explanation of the existence of the xxs', assuming that the kind of explanation in question is ground. This allows us to formulate Bliss' explanatory demand as follows, keeping in mind that the domain of discourse ranges over facts.

Explanatory Demand $\forall xx \ [D(xx) \rightarrow EE(xx)]$

The formula reads, 'All dependent facts have an explanation of their existence'.

However, there is a complication with my construal of the explanatory target as a plurality. Ground is typically taken to be a many-one connection, allowing any number of facts on the left but requiring a single fact on the right. As I noted above, however, formulating the explanatory target as a plurality requires a many-many or plural notion of ground, where a plurality of facts on the left-hand side grounds a plurality of facts on the right-hand side.[11] And just how we understand this notion of plural ground has implications for the externality argument.

The foundationalist's worry is that, on infinitism, each fact in a chain of ground is grounded whilst the collection or plurality of facts itself is

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[9] Thanks to an anonymous referee for helping me clarify this.
[10] See Boolos (1984) and (1985).
[11] See Dasgupta (2014) and Litland (2016) for recent plural accounts of ground.

ungrounded. Infinitism allegedly fails to explain something that it should, namely the plurality of dependent facts. My contention is the opposite, namely, that the plurality of dependent facts is grounded iff each member of the plurality is grounded. This raises an obvious worry of circularity. If the thing to be explained is the plurality of all dependent facts, and the infinitist says that this plurality is grounded in dependent facts, then we might worry that the infinitist's position amounts to an explanatory circle; the plurality of dependent facts being grounded in the plurality of dependent facts. As we'll see, this worry doesn't arise if plural ground is distributive. Since this issue is directly related to my ground-theoretic version of HEP, which I present in Section VI, I address it in detail there.

For now, even with the explanatory target clarified, we are likely still wondering why infinitism does not have the resources to offer an explanation of this target. After all, each fact on infinitism is explained in terms of some further facts, ad infinitum. What is it that still needs explaining here that the infinitist can't explain? The main thrust of the externality argument is the externality assumption, that we must appeal to some fundamental facts to offer a full or otherwise adequate explanation of our explanatory target. The problem is that the foundationalist offers no compelling reason to accept the externality assumption, or conversely, that the infinitist's answer to the explanatory target above is problematic. In the next section, I consider two proposed justifications for the externality assumption and argue that neither is plausible.

V. THE EXTERNALITY ASSUMPTION

The externality assumption says no dependent fact can explain why there are any dependent facts at all. As I noted above in Section I, the externality assumption also plays a key role in the cosmological argument from contingency. And since there is little explicit discussion of the externality assumption in the fundamentality/grounding literature, my evaluation of justifications for the externality assumption will also interact with what proponents of the cosmological argument have had to say about it. We needn't worry that these distinct literatures are too incongruous. It is true that the application of the externality assumption in the cosmological argument typically involves causal explanation while its application in the externality argument involves non-causal or metaphysical explanation. But, as we'll see below, the underlying structural principles motivating either application are the same. In fact, I think it has been generally underappreciated just how striking the similarities between the two literatures are.

The application of the externality assumption in the cosmological argument becomes clear when comparing the basic structure of the cosmological and

externality arguments. Joshua Rasmussen (2010: 806–7) offers the following typical structure of the cosmological argument.[12]

Step 1. **Causal Principle**: Every contingent reality of category C has (or possibly has) a cause or explanation.

Step 2. **From Contingency to a Necessary Being**: For reason R, there is a contingent reality x of category C, such that x could not have been caused or explained by a contingent reality alone.

Therefore: There is a non-contingent (self-existent) reality, N, that serves as at least part of the cause or explanation of x.

We can see that this structure of the argument parallels the structure of Bliss' version of the externality argument. Both arguments begin with an explanatory demand, followed by the assumption that no fact internal to the collection of facts that need explaining can explain that collection. Step 2 above employs the externality assumption, which says that where the explanatory target is some contingent reality, *x, x* cannot be fully explained by some other contingent reality. If the externality assumption is true, *x* must be explained by something non-contingent, i.e. something necessary.

In the remainder of Section V, I discuss two proposed justifications for the externality assumption. The first says that explanations that violate the externality assumption are circular. The second says they are incomplete. If either justification were successful when applied to the externality argument for foundationalism, it would entail that the infinitist's explanation of the existence of dependent facts in terms of further dependent facts would be either circular or incomplete. I argue that neither line of justification for the externality assumption is convincing.

V.1 Circular explanations

We saw earlier that Bliss considered justifying the externality assumption with the following principle, her suggestion being that 'dependent fact' is a substantial kind.

> **KI** Where K is any *substantial kind*, you can't explain why there are any Ks *at all* by invoking only Ks, even if your explanation goes on forever.

Assuming that 'dependent fact' is a substantial kind, the main problem with using KI to justify the externality assumption is that KI just is a version of the externality assumption recast in terms of kinds. As such, we're still left with

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[12] My bolding. Rasmussen's inclusion of 'category C' is meant to capture the idea that cosmological arguments target a diversity of contingent phenomena which can include facts, events, or substances, among other things.

the prior question of whether KI is true and, if so, what makes it true. So, KI all on its own is unhelpful as a justification for the externality assumption.

If KI were true, then we might think that explanations that violate KI are somehow circular and so are bad explanations. Indeed, William Rowe (1997: 197) offers the following principle that is virtually identical to Bliss' KI principle (Rowe intends X and the Ys to be of the same kind).

> If you are going to explain why there are any objects of a certain kind (where it is a contingent matter that there are objects of that kind), you cannot do so by citing a fact of the form 'X caused there to be Ys', where X is an object of the kind in question. For to do so is circular.

Rowe then argues, 'if every being were dependent any proposed explanation of why there are dependent beings would be viciously circular' (1997: 200). Similarly, Rasmussen asks us to consider a world in which there are purple balls of an unspecified quantity. Suppose the fact that those balls exist is explained by the fact that each purple ball was itself produced by a purple ball. Rasmussen suggests that this sort of explanation would be unsatisfying because, 'To say that the purple balls themselves explain why the purple balls exist seems to be circular' (2010: 812). So, maybe the externality assumption is motivated by a circularity worry.

To motivate this worry further, proponents of both the cosmological argument and the externality argument typically use biological analogies as an intuition pump for adopting KI. For example, Rowe suggests that explaining why there are any dependent entities by appealing to further dependent entities would be like explaining why there are any human beings by appealing to the causal activity of Adam and Eve in producing other human beings (1997: 190). Similarly, Bliss says, 'Of course, citing the existence of flamingo parents *is* a perfectly good explanation of how some flamingo or other came to be. But it seems like a woefully bad explanation of why there are any flamingos whatsoever. . . Analogously, so the reasoning might go, for dependent entities: no dependent entity, or chain of dependent entities can explain why there are any dependent entities whatsoever' (2019: 371). Granted, appealing to the causal activity of the members of species *x* to say why there are any members of that species at all certainly does seem illicit. But, as I already mentioned, Rowe's and Bliss' analogy here functions at most as an intuition pump that is meant to motivate the use of KI in the cosmological and externality arguments, respectively. And it isn't obvious to me that the intuitiveness of KI within a biological/causal context, such as explaining why there are any human beings, automatically transfers into the non-causal or grounding context involving facts.

Here's why. I suspect part of the reason why explaining the existence of human beings, say, in terms of the causal activity of Adam and Eve strikes us as absurd is because we already know that human beings have not always

existed. We already know that a genuine explanation for why any human beings exist at all must appeal to species and evolutionary factors that have nothing to do with particular members of the human species. The same goes for any biological species. But when it comes to explaining why there are any dependent facts, we have no such prior knowledge that there is a finite set of such facts. To assume that we do would be question-begging against the infinitist. Yet proponents of the externality assumption simply assume that the apparentness or intuitiveness of the biological analogies transfers over to the metaphysical case involving facts.

But when it comes to the question, 'Why are there any dependent facts at all?', there doesn't seem to be anything wrong with offering a non-causal explanation, i.e. a ground, that violates KI. Indeed, it's hard to see what else the question could be asking for if not a metaphysical or grounding explanation. A fact is dependent in virtue of being grounded by other facts. So, what makes it the case that there are any dependent facts is just the fact that there are grounded facts, that those facts obtain in virtue of others. Unlike the biological/causal cases, 'dependent fact' at most denotes an ontological category and therefore admits of no causal explanation. So, unless one already accepts the intuition that Rowe and others attempt to exploit, the use of various biological analogies within a causal context doesn't do much work in motivating a circularity worry for the infinitist within a non-causal or grounding context.

If our opponent then pivots and demands a ground for the plurality of dependent facts—in accordance with my proposed explanatory target above in Section IV—rather than the more general existential fact that *there are dependent facts*, then the infinitist has a ready answer. For any given fact, F, we can simply offer the full grounds of that fact, Δ, as an explanation for F. Of course, Δ will themselves be dependent facts and so an infinite regress ensues. As I mentioned earlier, one might worry that circularity ensues insofar as the infinitist seems to be explaining the plurality of dependent facts in terms of that very same plurality. This seems to be Rasmussen's worry as well. To use his example, he says that the entire collection of purple balls, C, explains itself. That would amount to saying, 'The purple balls exist because the purple balls exist'. But the infinitist is not necessarily committed to a similarly vacuous explanatory claim. The infinitist claims that, if every dependent fact has a ground, then the plurality of dependent facts is thereby grounded. As we'll see in more detail in Section VI, so long as the notion of plural ground involved here is distributive, there is no circularity problem.

Let's consider one more attempt to generate a worry of circularity. Alexander Pruss (2006) admits that it is not immediately obvious that an infinite regress of explanations is as vicious as a circle of explanations. But he suggests there is a way of closing the gap between these two. Pruss suggests that an infinite series of facts, $f_1, f_2, \ldots$ such that f_n is explained by f_{n+1}, can

result in circularity. Pruss' discussion is in terms of propositions, but this is inconsequential for our purposes. He writes,

> Let P indicate the conjunction of all of these propositions. Let E be the conjunction of the even numbered ones. Let O be the conjunction of the odd numbered ones. Every conjunct of E then has an explanation in terms of O, since p_{2n} is explained by p_{2n+1}, with none of the propositions being self-explanatory. Therefore, O has the resources for an explanation of E, if we are dealing with a case in which the conjunction can be explained simply by giving explanations of the conjuncts. But by exactly the same reasoning, every conjunct of O has an explanation in terms of E, since p_{2n+1} is explained by p_{2n+2}. Therefore, E has the resources for an explanation of O. Thus, we explain E in terms of O and O in terms of E, once we admit the sort of reasoning that the [Hume-Edwards Principle] posits. (2006: 43)

Pruss' point is that if conjunctions are satisfactorily explained in terms of their conjuncts, which he takes HEP to be saying, then a vicious circularity ensues.

Before addressing HEP below in Section VI, I'd like to point out that I think Pruss' example is spurious. If we take the conjunction of all even-numbered propositions, E, the only things that explain E are its own conjuncts because conjunctions are plausibly grounded in their conjuncts. The same goes for conjunction O of all the odd-numbered propositions. It is not the case in Pruss' example that one conjunction, E, explains another conjunction, O, and vice versa. It is only the case that those conjunctions are explained by their respective conjuncts, not each other. All that Pruss' example shows is that some conjuncts of E are explained by some conjuncts of O, and vice versa, since every even-numbered proposition is explained by an odd-numbered proposition and vice versa. But there is no circularity here because, again, it is only ever individual propositions that explain or are explained, rather than two conjunctions that explain each other.

As such, Pruss' example strikes me as rather contrived. Consider the following analogous example.[13] Suppose that A is explained by B and B is explained by C. Now consider the sets {A, C} and {B}. By Pruss' lights, the former set is explained by the latter while, simultaneously, the latter set is explained by the former. But it's clear that our chain of explanations, comprised of A, B, and C, is not viciously circular.

V.2 Incomplete explanations

Another common justification for the externality assumption is that explanations that violate it are incomplete in some sense. For example, Timothy O'Connor disagrees with Hume that a beginningless sequence of events may

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[13] Thanks to an anonymous referee for this example.

admit of a complete explanation. O'Connor writes, 'That there can be immanent, stepwise explanations for particular events in terms of prior causes is hardly news. The crucial claim here, it seems to me, is that this form of explanation can be complete, leaving nothing further to be explained...' (2008: 74).[14] And Ross Cameron argues,

> I think the foundationalist argument is right that, at least in some infinite regresses of metaphysical determination, we are left without a complete explanation as to why the non-fundamental facts on that infinite chain obtain, or why the dependent entities on that infinite chain exist and/or are the way they are. As a result, there are explanatory goals that the metaphysical foundationalist can meet that the infinitist cannot. (2022: 90)

O'Connor's concern strikes me as unwarranted, at least if the notion of explanation in question is ground. Given our distinction between full and partial ground, we can see that there isn't necessarily anything deficient about 'immanent step-wise explanations', as O'Connor calls them, because such explanations can be full grounding explanations. For example, the fact A&B is fully grounded by A and B, respectively. So long as an infinite regress is a regress of partial grounding, every fact is fully explained. Since any ground, either partial or full, will contribute to explaining what it grounds, any ground is a partial ground. And given our definition of partial ground, a partial ground, Δ, of z is always a subset of a collection of facts, Γ, such that Δ, Γ fully ground z. So, even an infinite regress of partial grounds does not rule out that every fact that is a member of the regress nonetheless has a full ground and is, therefore, fully explained. At no point in the regress would we be concerned that some fact has not received a full explanation.

A more plausible worry with infinite successive explanations is that a certain kind of explanation of a certain phenomenon has not been achieved, namely, a full or complete explanation. This is Cameron's concern, namely, that infinite successive explanations without a fundamental ground can, at best, only offer us an incomplete explanation of the existence of the plurality of dependent facts. If that is true, then infinitism may be able to offer only a partial explanation of the existence of dependent facts, rather than a full explanation.

But what reason do we have to think that the infinitist can only offer an incomplete explanation of the plurality of dependent facts? If every dependent fact has a full ground on infinitism, why does the plurality of dependent facts fail to receive a full ground? It seems perfectly legitimate for the infinitist to maintain that if every member of the plurality of dependent facts has a

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[14] See also Swinburne (2004: 140–2) for a similar suggestion. And Pruss & Rasmussen (2018) argue, 'no facts about the existence or activities of contingent instances of *F* can, by themselves, explain why *there exist* those things that are *F*. To be clear, the *F*s may also be *G*s, and perhaps their being *G* explains their being *F*; even still, their being *G* doesn't explain their very existence; an external explanation is required' (p. 45).

ground, then the plurality itself has a full ground. We need some reason from the foundationalist to think this claim is problematic.

One reason is that the infinitist's claim sounds a lot like HEP and many have argued that this principle is false. In the next section, I offer an explicit formulation of HEP in terms of ground. If this version of HEP is plausible, there is neither a worry of incomplete nor circular explanations for infinitism.

VI. THE HUME-EDWARDS PRINCIPLE

In the previous section, I suggested that it seems perfectly legitimate for the infinitist to maintain that if every member of the plurality of dependent facts has a full ground, then the plurality itself has a full ground. Those familiar with David Hume's response to the cosmological argument will recognize this claim as a variation of what has come to be called HEP. Hume, who was perhaps reacting to Samuel Clarke's version of the cosmological argument, famously argued,

> Also: in such a chain or series of items, each part is caused by the part that preceded it, and causes the one that follows. So where is the difficulty? But the *whole* needs a cause! you say. I answer that the uniting of these parts into a whole, like the uniting of several distinct counties into one kingdom, or several distinct members into one organic body, is performed merely by an arbitrary act of the mind and has no influence on the nature of things. If I showed you the particular causes of each individual in a collection of twenty particles of matter, I would think it very unreasonable if you then asked me what was the cause of the whole twenty. The cause of the whole is sufficiently explained by explaining the cause of the parts. (1779: Part IX)

Paul Edwards also invoked a similar criticism of the cosmological argument, arguing that 'If the existence of every member of a set is explained, the existence of that set is thereby explained' (1959: 113–14). William Rowe later came to refer to this criticism as the 'Hume-Edwards Principle', which I've adopted here.

In the context of cosmological arguments, HEP is intended as an objection to the theist's claim that there must be a cause of the universe itself in addition to the universe's individual parts, states, or events each having a cause. However, we should note that HEP comes in different forms and the initial plausibility of HEP, thus, depends upon how the principle is interpreted. Interpreted as a claim about sets, fusions, or conjunctions, HEP is arguably unproblematic. As we've seen above, a common assumption regarding ground is that sets, fusions, and conjunctions are grounded in their members, parts, and conjuncts, respectively. Interpreted as a claim about highly unified wholes, such as biological organisms for example, then HEP perhaps has less plausibility because we might think that a full explanation of the whole organism cannot be achieved solely in terms of its parts.

In the context of the externality argument, the explanatory target under consideration is a plurality of facts, dd, and the notion of explanation in question is metaphysical rather than causal. So, our interest here is in a version of HEP that is interpreted accordingly. These differences between our version of HEP and more traditional versions notwithstanding, the question at hand is the same one that Hume raised, namely, whether explaining the individual members of a collection in terms of further members is sufficient to explain them all. I say that it is. As a result, we get the following ground-theoretic version of HEP, which I label 'G-HEP'.[15]

> **G-HEP** The plurality of all dependent facts, dd, are fully grounded iff, for each fact x among dd, there are Γ such that Γ fully grounds x.

Since the foundationalist is concerned with the *existence* of dependent facts, I assume here that the existence of a fact is explained if that fact has full grounds. I discuss this assumption in more detail below in Section VII.

The foundationalist's worry here will be that G-HEP is false. Even though every member of the plurality has a ground on infinitism, the foundationalist worries that the plurality itself lacks a ground. So, by the foundationalist's lights, infinitism fails to explain the existence of why there are any dependent facts at all, construed as a plurality. But this seems odd. How are we to make sense of a situation where each individual fact has a ground while the plurality, dd, does not? Interestingly, we can make sense of it with a non-distributive or collective notion of plural ground.

As I've formulated it above, distributivity holds for G-HEP. If it is true to say of every individual x that is a member of dd that x is fully grounded, then the plurality thereby has a full ground. Compare with saying, 'The boys are tall'. If it is true of every boy among the group that he is tall, then the boys *plurally* are tall. For distributivity to fail, it would have to be true of the dependent facts collectively that they are fully grounded but not true of any individual dependent fact that is a member of the plurality. Compare with saying, 'The boys surrounded the building'. It is true of the boys as a group even though no individual boy surrounds the building.

Jon Litland (2016: 534) has proposed a non-distributive notion of plural ground, one which allows a plurality, Γ, to ground another plurality, $\delta_0, \delta_1, \ldots$ even though every Γ' that is a subset of Γ is such that for no δ_i does Γ' ground δ_i. In other words, Γ grounds the plurality, $\delta_0, \delta_1, \ldots$ even though no particular member of that plurality is grounded by Γ. The foundationalist's worry, then, constitutes the converse of this scenario, where every member of the plurality is grounded whilst the plurality itself is not.[16]

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[15] Thanks to an anonymous referee for help formulating G-HEP.

[16] Litland (2016: section 2.5) points this out within the context of the cosmological argument.

Contrast this with a distributive notion of plural ground. Following Fine (2012: 54), if Δ distributively grounds Γ, then 'there is a decomposition of Δ into subsets $\Delta_1, \Delta_2,\ldots$ (with $\Delta = \Delta_1 \bigcup \Delta_2 \bigcup \ldots$) and a corresponding decomposition of Γ into members $C_1, C_2,\ldots$ (with $\Gamma = \{C_1, C_2,\ldots\}$) such that $\Delta_1 < C_1, \Delta_2 < C_2,\ldots$', where '$<$' denotes strict full ground. In other words, given two pluralities of facts, distributivity entails that individual members of each are grounded in individual members of the other. G-HEP will be false, then, on the non-distributive or collective notion of plural ground. For even if every fact has a ground, if distributivity fails then it does not follow that the plurality has a full ground as well.

So, we can make sense of the foundationalist's worry by adopting a non-distributive notion of plural ground. How should the infinitist respond? My main concern here is that a failure of distributivity is unmotivated. Challenges to distributivity in the literature are typically quite targeted. Thinkers like Litland (2016) and Dasgupta (2014) provide independent motivation for adopting and developing non-distributive notions of ground for certain purposes. For example, Dasgupta (2014) motivates a plural non-distributive notion of ground by suggesting it is required to properly formulate certain structuralist views like *qualitativism*, the view that the fundamental truths are qualitative, and *comparativism* about mass, the view that truths about masses of individual objects are grounded in mass relations.

However, it is unclear how these sorts of challenges to distributivity are relevant to the externality argument. After all, the foundationalist did not begin with the contention that all the dependent facts require a *non-distributive* ground. Nor was there any puzzle the foundationalist presented us with that adopting a non-distributive notion of ground could potentially solve. As it stands, it seems the only motivation for adopting this notion of ground would be to make sense of the foundationalist's worry in the first place, that each individual fact has a ground while the plurality does not. And this would be question-begging against the infinitist. This is not to repudiate a non-distributive notion of ground. It is only to say that it must be independently motivated within the dispute between foundationalists and infinitists.

However, a more cautious approach might be wise here. Challenges to distributivity in the context of the dispute between foundationalists and infinitists are currently underexplored terrain. Thus, I am willing to concede that it may be possible to transpose extant challenges to distributivity into the externality argument. Though I currently see no good reason to, let's suppose for the sake of argument that there is. Even still, we might grant that on infinitism there is no non-circular answer to what grounds the plurality of dependent facts but that this is not an explanatory burden that infinitists should shoulder.[17]

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[17] Thanks to Jon Litland for mentioning this option to me. Cameron (2022) makes a similar argument in favour of infinitism.

It is important to note that this is not a concession. Infinitism exhibits no explanatory failure if the explanatory demand in question is not one that infinitism is obligated to meet in the first place. Recall that premise 1 of Bliss' externality argument says there is an explanation for why there are any dependent facts whatsoever. As Bliss herself notes, this is a result of some implicit version of the PSR. Just how this version of the PSR should be formulated, and whether the infinitist ought to be committed to it, will likely be a legitimate area of dispute between foundationalists and infinitists. So, we should perhaps not expect that infinitists will automatically acquiesce to the explanatory demands of foundationalists. Even if the foundationalist demands a non-distributive ground for the plurality of dependent facts, the infinitist is not necessarily obligated to meet this demand, at least not without further argument from the foundationalist. Much more could be said about these important issues. But I haven't the space here.

We can see now why the infinitist does not face any worry of circularity. G-HEP says that the plurality of dependent facts, dd, has a full ground. We can regiment this grounding claim by saying, Δ (fully) grounds dd. As per Fine's notion of distributive ground, if Δ *distributively* grounds dd, that just means there is a decomposition of Δ into subsets and a corresponding decomposition of dd into members, such that the subsets of Δ ground the members of dd. So, for any x among dd, take the full ground, Γ, of x. Δ corresponds to the union of full grounds for every member of dd, which simply will be dd. So, if every member of dd has a ground, dd thereby has a ground. Just as the boys (plurally) are tall iff each individual boy is tall, so too the dependent facts (plurally) have a ground iff each individual dependent fact has a ground.

VII. OBJECTIONS

I want to conclude by responding to objections to G-HEP. A more general version of HEP will say that if one has explained each conjunct of a proposition or each member of an aggregate, then one has explained the conjunction or whole. Many counterexamples to this general version of HEP have been offered over the years.[18] My view is that these counterexamples aren't relevant to G-HEP. While I can't address them all here, consider perhaps the most common criticism of HEP, that explanation is not *agglomerative*.[19] Take the conjunction of a series of facts that need explaining. Explanation is agglomerative if by explaining the individual conjuncts, we have thereby explained the conjunction. Pruss gives the following counterexample to explanation being agglomerative.

[18] See Gale (1991), Cain (1995), and Pruss (1998).
[19] See Gale (1991: 254–5).

> For instance, even if one had explained why one Mason was at the corner in terms of his desire to buy bread at the bakery on the corner, and why another Mason was at the corner in terms of his desire to eat at the café on the corner, and why a third Mason was at the corner in terms of its being his usual way to work, and why a fourth Mason was at the corner in terms of his having to get his watch repaired at the jeweler's there, it does not follow that one would thereby have explained why the four Masons were there. For all of the preceding is compatible with the proper explanation of the conjunction's being a *Masonic conspiracy* that took them to that location, and ensured that the fourth went to this jeweler rather than to another, and so on. (Pruss 2006: 41-42)

Here we have a case where HEP seems to be false. Does this objection apply to G-HEP? I don't think so. These sorts of counterexamples rely on cases where it is already known or assumed that there is an explanation external to the collection. But when it comes to the issue at hand, namely, whether each dependent fact having a ground results in the plurality having a ground, simply assuming there is an external explanation will beg the question against the infinitist. As I mentioned earlier, interpreted as a claim about sets, fusions, and conjunctions, HEP is quite plausible. These sorts of collections arguably do not require an external explanation but are explained in terms of their members.

So, the prior question should be this. If we form a collection of all the facts that are members of a non-well-founded chain of ground, is that collection explained in terms of its members? To point out that there can be collections where there is an external explanation is irrelevant to the case at hand. Given that distributivity holds for G-HEP, no external explanation is required. That there might be pluralities of facts that have an external explanation is neither here nor there. If the foundationalist wants to deny G-HEP, then she needs to say why my characterization of her explanatory target is problematic.

Finally, William Vallicella (1997) offers an interesting critique of the more general version of HEP that is, I think, relevant to G-HEP. A brief look at his critique will help further motivate our grounding-based version of the principle. In the context of the cosmological argument, Vallicella thinks several prominent objections against HEP are unsuccessful. Nonetheless, he argues the following.

> We may grant that to explain the members of the universe is to explain the universe, if what this means is that the universe is not something in addition to its members requiring a separate causal explanation. And we may grant that each member is explainable in terms of a preceding member together with the laws of nature. But what explains the fact that there are any members in the first place? What explains the *existence* of the members of the universe, and thus the existence of the universe itself? (1997: 430)

Vallicella argues that several prominent nomological theories of event or state causation are not existentially productive, that is, they cannot account for the

very *existence* of some state or event of the universe.[20] Vallicella examines three accounts of laws: the Humean or regularity view, the Hempelian or covering law view, and the nomological view that takes laws to be relations between universals. He argues that all three forms of nomological causation are relations that connect events whose existence or occurrence is logically independent of their standing in a causal relation. While the proponent of HEP can explain later states of the universe in terms of earlier ones, she cannot maintain that the very *existence* of later states of the universe is brought about by the causal activity of earlier states. Vallicella concludes that the proponent of HEP cannot explain the very existence of the universe itself by simply explaining later states in terms of earlier states ad infinitum. Applying Vallicella's objection to our case, we might worry that while the infinitist can explain any given fact in terms of other facts, she cannot explain the very existence of those facts in terms of other facts, and so cannot explain the very existence of any dependent facts at all.

For the sake of argument, let's grant Vallicella the even stronger claim that there is no plausible account of causation that is existentially productive. Interestingly, G-HEP avoids this objection because many, in fact, do conceive of ground as an existentially productive or generative relation.[21] For example, Kelly Trogdon writes, 'a relation is generative just in case its instantiation brings things into existence. Grounding is generative given that grounded entities exist *due to grounding*' (2018: 189). Sara Bernstein says, 'production does play an implicit role in concepts and elucidations of grounding which take it to be a kind of synchronic generation or "bringing into existence". We might consider production to undergird a "thick" concept of grounding according to which grounders transfer being to their groundees' (2016: 23). And for Jonathan Schaffer, when *x* grounds *y*, *y depends* for its nature and existence upon *x* (2010b: 345). If we accept this conception of ground, then the infinitist has no problem accounting for the very existence of any dependent facts whatsoever because the very existence of any given dependent fact is produced or generated from its antecedent grounds.

But suppose instead that ground is merely a non-causal explanatory connection between facts whose existence is independent of their standing in that relation of ground to begin with. In that case, the infinitist may have a tough time meeting the explanatory demand of the externality argument. For while every fact is explained on infinitism, we wouldn't get an explanation for the very existence of any dependent facts, as Vallicella worries. But this worry poses no unique challenge to infinitism. If ground is not a productive relation,

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[20] Vallicella seems to be confusing analyses of causation with laws. However, this oversight doesn't impact my larger point.

[21] Of course, proponents of the operator view of ground would not accept this characterization.

then the foundationalist's fundamental facts can't account for the existence of the derivative facts either. Of course, this doesn't mitigate the problem for infinitism. But it would motivate both foundationalists and infinitists to take up the common cause of defending ground as a productive or generative relation. Doing so, however, is beyond the purview of this paper.

We've seen no good reason to think that the infinitist is incapable of offering a non-circular and full or complete explanation of the externality argument's explanatory target. In so far as every fact has a full ground, the plurality of all dependent facts has a full ground.

VIII. CONCLUSION

I've argued in this paper that the externality argument for metaphysical foundationalism is ultimately unconvincing. To be clear, I have not shown that the externality assumption is necessarily false, only that foundationalists have hitherto failed to offer convincing justification for it. As a result, we've seen no good reason to think that infinitism cannot offer a non-circular and full explanation of the existence of dependent facts. Hence, there is no work for fundamental facts. This gives us indirect reason to believe that infinitism is, at the very least, possible.[22]

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