

# How (not) to Argue Against Brute Fundamentalism

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ABSTRACT: This paper is a response to (MCKENZIE, 2017). I argue that the case she presents is not a genuine counterexample to the thesis she labels *Brute Fundamentalism*. My response consists of two main points. First, that the support she presents for considering her case a *metaphysical* explanation is misguided. Second, that there are principled reasons for doubting that partial explanations in Hempel’s sense, of which her case is an instance, are genuinely explanatory in the first place. Thus McKenzie’s attack on *Brute Fundamentalism* fails.

## 1 Introduction

In (MCKENZIE, 2017), the author argues against the thesis she labels *Brute Fundamentalism* (*Brutalism*, for short), the view that “every fundamental fact, feature, or entity is wholly lacking in metaphysical explanation.” (MCKENZIE, 2017, p. 235). *Brutalism* is claimed to be a “metaphysical proclivity”, a view which “seems to get reflexive endorsement by metaphysicians, and is supported by a cluster of ideas circulating around the concept of grounding” (MCKENZIE, 2017, p. 233). In this, she is right: *Brutalism* finds considerably wide support in recent literature on metaphysical explanation, especially on grounding.<sup>1</sup> Thus her argument, if sound, would have far reaching consequences to how philosophers in this field tend to conceive of fundamentality, a notion most of them in last years came to recognize as crucial to their enterprise.

McKenzie’s argument goes by way of a counterexample: she proposes a case of a partial metaphysical explanation of a purported fundamental fact. In the following, I put this argument to dispute.

My response proceeds in two steps. First, I will argue that the reason she advances for considering her case a *metaphysical* explanation fails in that

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<sup>1</sup>McKenzie provides an extensive list of partisans of *Brutalism*. See p. 331f.

it overgenerates metaphysical explanations. Second, drawing from plausible characteristics of explanations in general, I will suggest that the case she presents is not genuinely explanatory in the first place. (To be clarified in due course.) Hence her case has no bearing on *Brutalism*.

The text is structured as follows. In section 2, I will set the stage with some preliminary clarifications and provide an overview of the argument in McKenzie’s paper. In section 3, I will develop the steps announced. The final section concludes.

## 2 McKenzie’s argument

McKenzie’s aim is to refute a thesis she labels *Brute Fundamentalism*, or *Brutalism* for short. The thesis might be formulated thus:

*Brutalism*: For every fact  $f$ ,  $f$  is fundamental  $\leftrightarrow$  there is no metaphysical explanation of  $f$ .<sup>2</sup>

Let us be clearer on the notions employed in this formulation. Following (SCHNIEDER, 2015, p. 137), let us distinguish between three senses of “explanation”. In its first sense, this term amounts to a type of communicative act; in its second sense, it amounts to the linguistic vehicles used to perform such act; in its third sense, it amounts to the content of, i.e. what is expressed by, such vehicles. In the present context, the last sense will be at stake. In addition, it will be assumed that explanations are objective in that they are not relativized to subjective or pragmatic standards. This agrees with McKenzie’s text and the vast majority of authors working on metaphysical explanation she engages with.

Furthermore, I will assume that because-sentences – i.e. sentences resulting from the concatenation of a declarative sentence with “because”, followed by one (or many) declarative sentence(s) – is one of the linguistic vehicles capable of expressing explanations. Thus for example “Socrates died because he drank the hemlock.”; “The Titanic sank because it collided with an iceberg.”; “{Quine} exists because Quine exists.”; and “It is sunny or it is raining because it is raining.” plausibly express explanations thus understood.

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<sup>2</sup>In some passages, McKenzie suggests stronger readings, i.e. as the claim that every fundamental fact *cannot* be explained; or that the fundamental is *identified* with that which has no explanation. Although perhaps these claims do find support in the literature she engages with, her counterexample objects to the weaker thesis – as a matter of fact, the left to right direction of the biconditional stated – which is arguably a consequence of the other two.

Importantly, these sentences might express only *partial* explanations. For instance, it is raining and Quine is an american philosopher because it is raining. This is an explanation of why the conjunction holds. However, that it is raining is only part of why the conjunction is the case, given that, plausibly, a full explanation would have to cite the other conjunct, i.e. that Quine is an american philosopher. (The latter is one of the reasons why it is usually allowed for a plurality of sentences to appear on the right-hand side of “because”.) I will suppose that “explanation” in the formulation of *Brutalism* covers partial explanations in this sense as well. That is, *Brutalism* claims that fundamental facts are neither fully nor partially metaphysically explained. As it makes the scope of *Brutalism* wider, this concession favors McKenzie’s side.

For the purposes of this response, I will follow McKenzie in leaving to some extent open what exactly the qualification “metaphysical” in “metaphysical explanations” amounts to. It is common ground that this type of explanation is non-causal, i.e. contrasts with more familiar cases of explanations having something to do with causal relations investigated by natural sciences. (For illustration, the first two examples of the foregoing paragraph qualify as causal explanations, the latter two as explanations of a non-causal, metaphysical sort.) Although enthusiasts of metaphysical explanation have in past years concentrated on grounding, in what follows, again siding with McKenzie, I will not restrict metaphysical explanations to those falling under this rubric.

As a last point of clarification, I shall not adopt any particular conception of facts. To make sense of the formulation, I shall contend that a fact can be explained, in the sense that a sentence expressing a fact can figure on the left-hand side of a true because-sentence expressing an explanation; and that facts can explain, in the analogous sense that a sentence expressing a fact can figure on the right-hand side of a true because-sentence expressing an explanation. Thus e.g. since “{Quine} exists because Quine exists.” is true and succeeds in expressing an explanation, then the fact that {Quine} exists is explained, and the fact that Quine exists explains in this sense. I will fill in more clarifications as we proceed.

McKenzie’s strategy is to show that *Brutalism* is in conflict with *Physicalism*. She introduces this latter view by a quote of (LOEWER, 2001). Accordingly, *Physicalism* states that “the fundamental properties and facts are physical and everything else obtains in virtue of them.” After the quote, she continues: “As such, in worlds in which physicalism holds sway it is up to physics to discover what these fundamental facts and properties are.” (MCKENZIE, 2017, p. 233). For the purposes of presenting McKenzie’s

argument, I will adopt the following formulation of *Physicalism*:

*Physicalism*: For every fact  $f$ ,  $f$  is fundamental  $\leftrightarrow$  ( $f$  concerns exclusively fundamental entities of completed fundamental physics  $\wedge$   $f$  is logically atomic).<sup>3</sup>

Some comments of motivation for this formulation are in order. Firstly, since it has no bearing for the purposes of McKenzie’s argument or my response, for brevity we might drop the conjunct “and everything else obtains in virtue of them” from Loewer’s quote.<sup>4</sup>

Secondly, this conjunct aside, the quote still might be taken to suggest something weaker, namely that for every fact, if it is fundamental, then it is physical. If we take this reading of *Physicalism* for granted, however, McKenzie’s argument loses much of its bite. For McKenzie’s main contention, in a nutshell, is this: there is a fact to be deemed fundamental by the lights of *Physicalism* for which a metaphysical explanation is available. As already noted above, the author is clear that the strength of her case rests on a conflict between *Brutalism* and *Physicalism*.<sup>5</sup> That is, because of a conflict with such a widely held thesis, *Brutalism* should be given up. Now since the weaker reading of *Physicalism* we are considering presents no sufficient condition for fundamentality, it leaves open for the brutalist physicalist – that is, someone endorsing both theses – to simply deny that McKenzie’s proposed counterexample concerns a fundamental fact after all.<sup>6</sup> In other words, since *Physicalism* on this reading cannot render any fact fundamental, a brutalist need not accept, *by being a physicalist*, that her purported example enjoys this status. Thus to make the point stronger, ideally one would hope for a formulation of *Physicalism* which would by its own lights render the explainable fact she proposes fundamental. The stronger formulation proposed above is meant to fulfill this role.

Finally, the restriction to logically atomic facts might seem at first sight

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<sup>3</sup>In the same text quoted by McKenzie, we also read: “Physicalism claims that all facts obtain in virtue of the distribution of the fundamental entities and properties– whatever they turn out to be– of completed fundamental physics.” (LOEWER, 2001, p. 37). Note that the use of “fundamental” in “fundamental entities” and “fundamental physics” is distinct from its metaphysical use, when applied to facts, at play in *Brutalism*. I shall assume that context disambiguates the sense intended.

<sup>4</sup>Of course, I do not want to suggest by this that this conjunct is not constitutive of the physicalist thesis as usually understood.

<sup>5</sup>“Prompting the worry is the fact that brutalism appears, on the face of it at least, to be in tension with another orthodox metaphysical doctrine, namely, the doctrine of physicalism.” (MCKENZIE, 2017, p. 233)

<sup>6</sup>Note that, if *Brutalism* is cashed out in stronger terms, namely as *defining* fundamentality, this would be an obvious route for the brutalist to take.

unnatural, but it is arguably called for in the present context. For, under plausible assumptions, the formulation without the restriction leaves room for ‘cheap’ counterexamples to *Brutalism* from the start. Thus consider a disjunction of two sentences expressing facts each exclusively concerning entities of fundamental physics. Were we to take the biconditional without the restriction on board, the fact expressed by the disjunction would then be fundamental. Now McKenzie wants her case to have a bearing on brutalists working with the notion of *grounding*. But it is a widely accepted principle of the logic of grounding that a disjunction is grounded in its disjuncts (FINE, 2012, p. 58). Thus we would already have a counterexample to *Brutalism*. Admittedly, imposing this particular restriction might not be the most elegant fix, but it suffices for present purposes. I shall grant throughout the text that McKenzie’s particular case, to be presented shortly, concerns a logically atomic fact.

With these formulations in place, the overall structure of McKenzie’s argument might then be formulated as a *reductio* of *Brutalism*:<sup>7</sup>

H. *Brutalism*: For every fact  $f$ ,  $f$  is fundamental  $\leftrightarrow$  there is no metaphysical explanation of  $f$ .

P1. *Physicalism*: For every fact  $f$ ,  $f$  is fundamental  $\leftrightarrow$  ( $f$  concerns exclusively fundamental entities of completed fundamental physics  $\wedge$   $f$  is logically atomic).

P2. *Counterexample*: There is a fact  $g$  and there is a fact  $h$ , such that  $h$  concerns exclusively fundamental entities of completed fundamental physics  $\wedge$   $h$  is logically atomic  $\wedge$   $g$  partially metaphysically explains  $h$ .

C1.  $h$  is a fundamental fact and there is a metaphysical explanation of  $h$ . (P1, P2)

C2. Contradiction. (H, C1).

C3. It is not the case that (for every fact  $f$ ,  $f$  is fundamental  $\leftrightarrow$  there is no metaphysical explanation of  $f$ ). (C2, H, Reductio)

The bulk of McKenzie’s argument is of course P2. Since it states a counterexample to *Brutalism*, and *Physicalism* earns its keep as a widely held metaphysical doctrine, the former thesis should be rejected.

Let us now present McKenzie’s concrete case in support of P2. The

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<sup>7</sup>“H” is short for “hypothesis”; “P” is short for “premise” and “C” is short for “conclusion”. Numbers indicate order of appearance. For simplicity, trivial logical steps and rules used are left implicit. To avoid further complication of notation, “ $h$ ” is used both as a variable and as a constant for a fact.

fundamental fact she claims to provide an explanation to is the fact that the fundamental physical kinds actually instantiated, whichever they turn out to be after further inquiry, are the fundamental physical kinds actually instantiated.<sup>8</sup> Henceforth I will refer to this fact by “ $\mathbb{F}$ ”.

The alleged metaphysical explanation she provides is a partial explanation in a specific sense proposed by C. G. Hempel. Since this is crucial for an understanding of what follows, a few words of clarification are called for.

On the Hempelian conception, explanations are given in the form of arguments, having a set of premises, which constitutes the explanans, and the conclusion, or explanandum. An important variety of explanations in this sense is labelled *deductive-nomological*. As a rule, in these explanations i) the conclusion is logically deducible from the premises; ii) the conclusion states that a particular event occurs (at least in the causal case); and iii) among the premises are general laws under which the particular event is to be subsumed. When the premises are true and thus the deductive-nomological argument is sound, the explanation of the conclusion by the premises is complete.

In (HEMPEL, 1965, p. 415f.), the author introduces some varieties of explanation which might be, in a sense, incomplete. One of these he labels *partial explanations*. Although the premises used in these explanations do not logically entail *that the particular event to be explained occurs*, they do entail *that the event falls within a wider class of events*. In terms of the deductive nomological model of explanation, a group of assumptions partially explains that a particular event occurs if and only if there is a deductive nomological argument (DN-argument, for short) from the same assumptions to a sentence stating that the particular event falls under a wider class of events.<sup>9</sup>

Hempel’s sole example of this is that of a particular slip of pen committed by Freud, namely the writing of the words “Thursday, October 20th” bracketed under the correct date of the month of September in a calendar ((HEMPEL, 1965, p. 415-416), quoted in full in (MCKENZIE, 2017, p. 252-253)). According to Hempel, there is no DN-argument for the claim that this

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<sup>8</sup>Of course, the first occurrence of “the fundamental physical kinds actually instantiated” is to be read as a *de re* claim, pertaining to the fundamental kinds themselves. For instance, if it turns out that the fundamental kinds are electrons, positrons and photons, then the fact in question is the fact that electrons, positrons and photons are the fundamental instantiated kinds.

<sup>9</sup>The first appearance of the notion is apparently (HEMPEL, 1962). Since the treatment is more detailed in (HEMPEL, 1965), I will refer to this text in what follows. Since partial explanations in Hempel’s sense importantly differ from the sense briefly discussed in the beginning of this section, I will attach a subscript “ $H$ ” to “partial explanations” whenever Hempel’s sense is intended.

particular event occurs, but only for the claim that some event satisfying a condition predicted by laws of psychoanalysis, i.e. that an event fulfilling the subconscious desire of meeting a certain patient occurs (HEMPEL, 1965, p. 416).

One might define partial explanations in Hempel’s sense (henceforth partial explanations<sub>H</sub>) schematically as follows:<sup>10</sup>

$A_1, \dots, A_n$  partially explain<sub>H</sub> that  $Pa_1, \dots, a_m \leftrightarrow_{df}$

i)  $A_1, \dots, A_n \vdash_{DN} Qa_1, \dots, a_m$ ; and

ii) the class of  $P$ s is a proper subclass of the class of  $Q$ s.<sup>11</sup>

In Hempel’s example, once the laws and initial conditions are in play, we arrive at the claim that an event occurred which expressed Freud’s subconscious desire to see his patient. The predicate “is an event expressing Freud’s subconscious desire to see the patient” plays here the role of “ $Q$ ” in the schema. The particular event was a writing of the words “Thursday, October 20th”. Given the initial conditions and the laws, this is a special case of an event expressing Freud’s subconscious desire to see his patient. According to the definition, the law, together with the initial conditions then partially explain<sub>H</sub> why the particular event occurred.

Let us call the statement corresponding to “ $Qa_1, \dots, a_m$ ” in the definition a *constraint* for the fact that  $Pa_1, \dots, a_m$ . Drawing from the overall structure of Hempel’s example, McKenzie provides the following DN-argument for a constraint for  $\mathbb{F}$ :

- 1 The fundamental kinds are all kinds of quantum fields. (Stipulation as to the sort of entities populating the fundamental level.)
- 2 Quantum fields are by their nature such as to evolve unitarily. (Stipulation as to the nature of quantum fields.)

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<sup>10</sup>Where “ $A_1, \dots, A_n$ ” are true sentences stating initial conditions and covering laws; “ $a_1, \dots, a_m$ ” are singular-terms;  $m$  is the arity of “ $P$ ” and “ $Q$ ”,  $m$  and  $n$  are natural numbers. Analogously to the DN model of explanation itself, I leave implicit the restriction to the effect that none of the “ $A_i$ ” in “ $A_1, \dots, A_n$ ” is identical to “ $Pa_1, \dots, a_m$ ” itself, in order to avoid unwanted self-explanatory cases. “ $\vdash$ ” is, as usual, a sign for an inference from the sentences on the left of it as premises, which are separate from one other by a comma or a semicolon, to the conclusion on the right. “DN” indicates that the argument conforms to the deductive nomological model.

<sup>11</sup>“Class” and “Subclass” are the terms used by Hempel, and I do not mean to rely on a technical notion here. I take ii) to simply amount to the following formula:  $\forall x_1 \dots \forall x_m (Px_1, \dots, x_m \rightarrow Qx_1, \dots, x_m) \wedge \neg(\forall x_1 \dots \forall x_m (Qx_1, \dots, x_m \rightarrow Px_1, \dots, x_m))$ .

- 3 The fundamental level is one in which the fundamental kinds accord with fundamental laws. (Definition of ‘fundamental level’.)
- 4 Fundamental laws are laws that are consistent in the  $E \rightarrow \infty$  limit. (Requirement on a ‘fundamental law’ for quantum fields.)
- 5 Fundamental laws of evolution must be unitary. (From 2 and 3)
- 6 Laws featuring a combination of kinds  $K_1, \dots, K_n$  not satisfying the Goldilocks principle are not norm-preserving in the high-energy limit.
- C The fundamental kinds must belong to the class of combinations compatible with the Goldilocks principle (From 3, 4, 5, and 6).(McKENZIE, 2017, p. 255)<sup>12</sup>

For the sake of argument, I grant that this presents a DN-argument and that the conclusion is a constraint on  $\mathbb{F}$ . Thus applying the definition, we get that 1-6 partially explain<sub>H</sub> $\mathbb{F}$ .

Before we proceed, a few words on the grammar of explanations are called for. As we just saw, according to Hempel, and McKenzie on his side, explanations are given in the form of arguments. Now most of the authors working on *Brutalism* share the assumption that metaphysical explanations are given, perhaps paradigmatically, by means of sentences, be it by means of “because”, or by means of predicates “causes”, “grounds”, or hybrids such as “in virtue of”, “because of”, and so on. Thus for the purposes of evaluation of McKenzie’s case it is reasonable to devise a way of formulating because-sentences from DN-arguments. Here is a natural method of doing so. The because-sentences *resulting from* a DN-argument are those which result from the concatenation of the sentence expressing the conclusion, followed by the connective “because”, followed by some of the sentences in the premises.<sup>13</sup>

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<sup>12</sup>The enumeration is the original in McKenzie’s text. It is not clear how the modalities in [5] and in the conclusion [C], expressed by “must”, should be understood. Since she grants that it is not metaphysically necessarily the case that the fundamental kinds are all kinds of quantum fields (p. 238-9), it seems that, read metaphysically, [5] is too strong for her purposes, and simply does not follow from premises [1], [2] and [3]. (Her indication of the premises on which [5] depends is incomplete – it needs premise [1] – even considering [5] unmodalized.) For her purposes, the conclusion itself need not be taken to be metaphysically necessary. For these reasons, I think it is suggestive to read these modalities epistemically, or else to read the “must” simply as an inference marker. Be that as it may, I shall not place much weight on this in what follows.

<sup>13</sup>Its simplicity notwithstanding, it might turn out that this procedure does not always give rise to because-sentences which express explanations in our sense. For one, DN-arguments cite laws as premises, and it is not obvious that the resulting because-sentences in which laws figure succeed in expressing reasons why the conclusion obtains. For



In order to have a bearing on *Brutalism*, the explanations generated by McKenzie’s case must qualify as *metaphysical*; and must be genuinely *explanatory* of why  $\mathbb{F}$  holds, in a sense to be discussed in due course. In the next section, I shall provide reasons for doubting that it is either. I will begin by showing that a consideration raised by McKenzie in favor of classifying her case as metaphysical goes amiss. Then I shall cast doubt on the explanatory force of partial explanations<sub>H</sub> in general.

### 3 Response

#### 3.1 Metaphysical explanations abound?

Let us begin by considering McKenzie’s claim that the case she puts forward qualifies as a metaphysical, as opposed to a causal explanation. She seems to buttress this claim by the fact that her argument “crucially” rests on an essential claim about quantum fields (premise [2]). In response, I will highlight two points. First, the criterion suggested by McKenzie at this point overgenerates metaphysical explanations in an unacceptable way. Second, it remains unclear in what sense the appeal to the essential claim is crucial to the argument.

In a nutshell, the suggested criterion reads: if crucial appeal to an essential claim, i.e. a claim pertaining to the nature of entities, is made in the course of an explanatory argument, then the explanation is metaphysical.

As I understand it, McKenzie supports the criterion by means of an analogy. Since in the case of grounding, it is “widely held” that appeals to natures of the entities involved is that which turns a mere entailment into a *metaphysical* explanation; and since her argument makes such an appeal in a premise, by analogy her explanatory argument should have the right to same status. (MCKENZIE, 2017, p. 254 f.)

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instance, if “because”, in its explanatory use, tracks dependency relations (cf. (KIM, 1994)), one plausibly has to make sense of a relation distinct from causality and grounding to accommodate these cases. Be that as it may, a thorough examination of this issue is beyond the scope of the present text, and it will not play a determining role in what follows. When giving examples, I will concentrate on the resulting because-sentences which do not cite laws. For discussion, see (SKOW, 2016), esp. Chapter 4. Note that (WILSCH, 2016), one of the only authors to try to adapt DN-arguments to the context of grounding, does not treat laws as grounds. The famous discussion between Scriven and Hempel – see (SCRIVEN, 1962) – is also worth of mention in this context.

I hasten to add at this point that what she takes to be widely held is far from such. In the grounding literature thus far, only rarely do we find support for the claim that entailment plus some form of essential claim are sufficient for a grounding claim to hold, or even that grounding owes its metaphysical status to such appeals.<sup>14</sup>

Apart from inadequacy of the analogy, the criterion suggested is arguably too weak. For, on its basis, we get a suspicious proliferation of metaphysical arguments across the board. Consider, for instance, the following:

1. It is essential to water that it is H<sub>2</sub>O; the observer, the oar and the rowboat have positions  $a$ ,  $b$ ,  $c$ , respectively; H<sub>2</sub>O in liquid form has refractive index  $i$ ; light incides with angle  $j$ ; Snell's law  $\vdash_{DN}$  The lower part of the oar in a rowboat which is immersed in water appears to be bent upwards.
2. It is essential to water that it is H<sub>2</sub>O; thermal coefficients of H<sub>2</sub>O and glass are  $c_1$  and  $c_2$ ; the beer in a bottle in the freezer is 90% water; the volumes of the bottle and the beer are  $v_1$  and  $v_2$ ; the temperature in the freezer sinks to 4 degrees celsius; thermal expansion laws  $\vdash_{DN}$  the bottle in the freezer breaks.
3. It is essential to pain that it is unpleasant; unpleasant feelings generate a certain type  $T$  of responses; Sarah has pain  $\vdash_{DN}$  Sarah has a response of type  $T$ .

It is reasonable that if McKenzie's case is to be classified as a DN-argument, these cases are as well. Should they turn out to be *metaphysical* explanations? Not many would feel inclined to hold that, in spite of the appeal to essences therein. For the DN-arguments resulting from these examples by leaving out any talk of essences or natures are paradigms of causal explanations. If the criterion is taken for granted, one cannot help but worry that metaphysical explanations turn out too easy to come by.

Turning to the second point, I doubt that the essential claims in each case play a distinct role than the second premise in McKenzie's case does. She claims that the argument "relies crucially on such appeals", but it remains unclear what exactly this should mean. As far as the logical derivation of the conclusion goes, it is plain that one does not need the strength of the essential claim: that quantum fields are, in actuality, such as to evolve unitarily is already sufficient for such purposes. (If the "must" in the conclusion is read as expressing metaphysical necessity, then that quantum fields are necessarily

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<sup>14</sup>For a suggestion along the lines of the first claim, see (CORREIA, 2013).

such as to evolve unitarily would again suffice.) Arguably, in the cases just put forward, one could also leave talk of essences out without loss in the derivation. But I fail to see that there is any other sense in which appeal to essences is more crucial to her argument than to the ones just listed.

Hence appeal to essences in one of the premises of an explanatory argument is not sufficient for it to be classified as metaphysical. In that the criterion suggested by McKenzie overgenerates metaphysical explanations, it underwrites an all too lenient standard for classifying them as such, which brutalists and non-brutalists alike have principled reasons to reject offhand. Since she rests her claim solely on this criterion, I conclude that McKenzie has not provided enough justification for classifying her case as a *metaphysical* explanation.

Admittedly, that the proposed criterion fails by itself falls short of showing that McKenzie’s case misses its target. Given the current state of inquiry, it is far from clear that one could come up with a consensual criteria for an explanation to count as *metaphysical* in the first place, and solely in light of this subsection it might of course turn out that her case satisfies these criteria, whatever they might in the end analysis be. The considerations that follow make a case for the stronger claim that McKenzie’s example fails to qualify as explanatory in any sense relevant to the present context.

### 3.2 Are metaphysical partial explanations<sub>H</sub> explanatory?

There are two groups of considerations which cast doubt on the explanatory value of partial explanations<sub>H</sub>. Firstly, the because-sentences resulting from them clash with plausible assumptions regarding the logic of “because”. Secondly, many of those cases do not qualify as genuinely explanatory on other grounds. I will elaborate on each of these points in turn.

The connective “because”, when used to express objective explanations, is usually taken to be asymmetric. That is, if  $A$  because  $B$ , then it is not the case that  $B$  because  $A$ .<sup>15</sup> Taking this widespread assumption for granted, it is relatively straightforward to see that partial explanations<sub>H</sub> pose difficulties.

On the face of it, the definition, as it stands, allows for any fact to explain any other fact. For, given an actually satisfied “ $Q$ ”, the class of  $P$ s is a proper subclass of the class of  $P \vee Q$ s.<sup>16</sup> Thus if one can devise a DN-argument from

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<sup>15</sup>See (SCHNIEDER, 2015) for discussion.

<sup>16</sup>For simplicity’s sake, I am sloppy here about “ $\vee$ ” as a predicate forming and a sentential operator.

the assumption that  $a$  is  $Q$  to the conclusion that  $a$  is  $P \vee a$  is  $Q$ , by the definition of partial explanations<sub>H</sub> and the relation between these and the because-sentences they generate suggested at the beginning we get that  $a$  is  $P$  because  $a$  is  $Q$ . Not only does this make explanations ‘cheap’, but it also clashes with the asymmetry of “because” just stated. For, by an analogous line of reasoning, we also arrive at the result that  $a$  is  $Q$  because  $a$  is  $P$ .<sup>17</sup>

There are further cases which cause trouble to the account. Plausibly attributions of determinables obtain because attributions of their determinates obtain. Thus take a scarlet object  $a$ . Now  $a$  is red because  $a$  is scarlet; and  $a$  is colored because  $a$  is red. One can regard these because-claims as resulting from DN- arguments. Thus, the latter claim results from the following inference:

$a$  is red;  $\forall x(x \text{ is red} \rightarrow (x \text{ is colored because } x \text{ is red})) \vdash_{DN} a \text{ is colored}$

But we have also that  $\forall x(x \text{ is scarlet} \rightarrow x \text{ is colored})$ . That is, colored things constitute a wider class under which scarlet things fall. Applying the definition of partial explanation<sub>H</sub>, we have it that  $a$  is red and  $\forall x(x \text{ is red} \rightarrow (x \text{ is colored because } x \text{ is red}))$  partially explain<sub>H</sub> that  $a$  is scarlet. From this one might extract that  $a$  is scarlet because  $a$  is red. But since “because” is asymmetric, and it is the case that  $a$  is red because  $a$  is scarlet, this latter claim is false.<sup>18</sup>

Now maybe the definition might be altered so as to deal with such problematic cases. However, I think there are more serious reasons, not unrelated to the difficulties just stated, which speak against taking partial explanations<sub>H</sub> as a viable source of objective explanations, in the sense relevant to *Brutalism*. This brings me to the second point announced.

It is fairly conceded that metaphysical explanations aim at explaining *why*

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<sup>17</sup>Hempel was aware of the difficulty disjunctive predicates pose to his account. See (HEMPEL, 1965, p. 417, footnote). However, in the same text he does not propose any amendment to it. Rather, he seems just to acknowledge that these partial explanations<sub>H</sub> are not “fruitful”. I will come back to some of Hempel’s remarks on this class of explanations shortly.

<sup>18</sup>As it happens, since these because-sentences are usually taken to express grounding claims, these considerations might supply further reasons for doubting that McKenzie’s case concerns a grounding explanation. Although she shows sympathy for this, her reasons for doing so are distinct from the one just stated, namely that there is no partial grounding except as a part of a full ground and that there is no indeterministic grounding. (She mistakenly attributes the first view to (FINE, 2012), whose definition of strict partial ground actually allows for cases which cannot be completed to a full strict ground.) The asymmetry of “because” seems more robust than either of these.

the explanandum obtains.<sup>19</sup> With respect to these cases, the explanation can be regarded as an answer to a why-question. For example, one might ask “Why does {Quine} exist?” and get as answer “{Quine} exists because Quine exists”. This also applies to cases of partial explanations. Thus one might ask “Why does this table exist?” and obtain the answer “this table exists because its parts exist”. (One can also make it more explicitly partial by setting “partially” before “because”.)

Now why-questions set constraints on admissible answers, if they are to turn out genuinely explanatory (BROMBERGER, 1966). If I ask “Why are the Smiths home?” and obtain the answer “Because the light in their living room is on.”, intuitively I do not get a *genuine explanation why* to my question. Instead, I get evidence for the claim that the Smiths are home, or a reason to come to believe that this is the case.<sup>20</sup> In contrast, if one responds by uttering “Because they are expecting a delivery.”, one does express a genuine explanation for the same question. In other words, that they are expecting a delivery is a factor which objectively brings it about – plausibly, causally, in this case – that the Smiths are home. A tentative way of fleshing out a necessary condition for genuinely explanatory, or non-evidential, answers to why-questions is the following: a genuinely explanatory answer to a question “why  $p$ ?” provides a *reason why  $p$*  (SKOW, 2016).

With this condition in play, there are strong reasons to deny that partial explanations<sub>H</sub> in general give rise to answers to questions why which qualify as genuine explanations of what they purport to explain. Put in somewhat more precise terms, it seems the premises on the basis of which we arrive at constraints on the answers to why  $p$  are not in general reasons why  $p$  holds.

Let us illustrate this first with a very simple case. Suppose that we have a portion of euclidean tridimensional space, say a small room, of  $8m^3$ . Let us suppose that there are  $n$  objects in this room which do not overlap, that is, none of them shares a part with any other object. Now suppose we want to know the portion of space occupied by the sum of these  $n$  objects. From plausible assumptions, together with the size of the room, we arrive at the conclusion that the portion of space occupied by this sum is less than  $8m^3$ . For the room contains such objects, and the portion of space occupied by an object cannot be larger than the size of a space containing them. We might

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<sup>19</sup>Perhaps a further class of metaphysical explanations explain *how* the explanandum obtains (see (LITLAND, 2013)), but still the main interest of the notion of metaphysical explanation seems to be directed towards explanations why.

<sup>20</sup>On the evidential use of “because”, see (HEMPEL, 1965, p. 334 f.); (SCHNIEDER, 2015), p. 148 f.; (MORREALL, 1979).

thus construct a DN-argument from these claims to the former constraint.<sup>21</sup> Now suppose that we discover by further inspection that the space occupied by the sum is  $4m^3$ . Objects occupying a portion of space of  $4m^3$  constitute a subclass of objects occupying a portion of space less than  $8m^3$ . Thus, applying the definition of partial explanations<sub>H</sub>, we get that the premises used partially explain<sub>H</sub> that the sum of  $n$  objects occupies  $4m^3$ . Now do the same premises present us with reasons why this latter conclusion holds? It does not seem so. For intuitively, no assumption on euclidean spaces, or characteristics of the room, play a role in making it the case that the sum of those  $n$  objects occupies  $4m^3$ . More plausibly, an admissible explanation would cite the sizes of each of them, material from which they are constituted, and so on.

One might provide slightly more complicated examples as well. For instance, take the set of every prime number. By standard Cantorian reasoning, one arrives at the claim that the cardinality of this set is the first aleph, that of the natural numbers. We thus explain a non-trivial constraint on the set, namely that it falls under the wider class of sets of cardinality  $\aleph_0$ .<sup>22</sup> Assume that we ask why this set is the set of the prime numbers (or, alternatively, why its members are the prime numbers). Do the premises in the Cantorian reasoning help explain why this is the case in any way? One might reasonably deny this. For facts about the existence of bijections do not in general have a bearing on the condition by which the set is defined, nor on why its members satisfy such a condition.

In such cases, the premises might help exclude, or place constraints on the admissible answers to the question of why  $p$ . But, even then, it is not guaranteed that these premises also qualify as answers to the same question. Plausibly, most of them will not. In the ideal case, the premises used in the proofs of these constraints might help put us in a position to recognize *that*  $p$  holds. But in the majority of cases, as illustrated by the foregoing cases, there is no reason to expect that they suffice to put us in a position to recognize *why*  $p$  holds.

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<sup>21</sup>To state the DN-argument explicitly:

The room is  $8m^3$  large; the geometry of the room is euclidean; in euclidean spaces, no object occupies a portion of space larger than a space wholly containing it; the room wholly contains the sum  $\vdash_{DN}$  the portion of space occupied by the sum is less than  $8m^3$ .

<sup>22</sup>To state the DN-argument explicitly:

If there is a bijective function between two sets, then they have the same cardinality; there is a bijective function from the set of natural numbers to the set of prime numbers (e.g. the function  $f$  such that i)  $f(0) = 2$ ; ii)  $f(n+1) =$  the smallest prime larger than  $f(n)$ , for  $n$  a natural number); the set of natural numbers has cardinality  $\aleph_0 \vdash_{DN}$  the set of prime numbers has cardinality  $\aleph_0$ .

If this is right, we have no guarantee whatsoever that McKenzie’s case provides us with an explanation of why  $\mathbb{F}$  holds. Indeed, plausibly, it does not. For, ideally, the premises help explain why the fundamental kinds obey a constraint, namely that they belong to the class of combinations compatible with the Goldilocks principle. But, as just highlighted, we have serious grounds to doubt that the same premises provide us with reasons why  $\mathbb{F}$  is the case. Thus the partial explanation<sub>H</sub> presented by McKenzie, and the because-sentences resulting from it, still do not provide us with a partial explanation of a fundamental fact in the sense proper to *Brutalism*, and the support for the second premise of her main argument presented at the beginning breaks down.

As a matter of fact, there is textual evidence that Hempel himself was aware of the limitations of partial explanations<sub>H</sub> as far as their explanatory value goes. Thus he writes of these explanations exhibiting “a more serious kind of incompleteness”; and that “the explanatory force of the argument [presenting a partial explanation] is less than what it claims or appears to be.” (my square brackets). Perhaps even more telling in this context is the end of a footnote, where he writes: “I simply wish to call attention to the fact that many explanatory accounts offered in the literature of empirical science have the formal characteristics of partial explanations, *and that, as a consequence, they overstate the extent to which they explain a given phenomenon.*” (my highlights) (HEMPEL, 1965, p. 416f.). Thus Hempel himself would seemingly not endorse the claim that partial explanations<sub>H</sub> succeed in properly *explaining why* their purported explananda hold.

It is important to note that by observing that partial explanations<sub>H</sub> fall short of being genuinely explanatory, one does not deprive partial explanations<sub>H</sub> of the role they might play in scientific inquiry. By deriving constraints on answers, one naturally narrows down the possibilities, raises evidence and epistemic probability for others, and that is doubtless a crucial component of scientific endeavor. However, as I hope to have shown, there is no justifiable ground on which to expect that the premises which support these constraints provide us with genuinely explanatory answers to the original why-questions.

Let me finish by suggesting a more positive diagnosis of the status of McKenzie’s partial explanation<sub>H</sub>. Consider the following example. Suppose a detective working on a murder case gets to the crime scene and sees footprints. From further indications, she can be certain that the footsteps were left by the murderer. (Say that the images of the front camera of a time just before the murder show someone walking in the place in the same direction and leaving the crime scene just after it happened.) The footprints are big, sharp

and suggest that the murderer limped. On the basis of these premises, she concludes several constraints on the identity of the murderer: s/he must be close to 1.5 meters high; s/he must weigh more than 70 kilograms; s/he must have used a boot of size number 43, and so on. Now as it turns out, the murderer was a man named Smith. Now let us ask the question “Why is Smith the murderer?”. If partial explanations<sub>H</sub> are answers to questions why, the following should classify as good answers: Smith is the murderer because the murderer’s footprints are big, sharp and the murderer limped. (Maybe one would want to add the datum that Smith matches these constraints, e.g. that he limps, and so on.) But these are *not* reasons why Smith is the murderer. Again, they might rather specify how one comes to recognize *that* Smith is a murderer, but that is a wholly distinct matter.

I suggest that something similar is going on in McKenzie’s example. Imagine that the point comes where fundamental physics is completed. McKenzie’s prediction that the fundamental kinds are kinds of quantum fields is confirmed. Suppose physics then provides us with an inventory of fundamental kinds. Let us ask why those cited in the inventory are the fundamental kinds. Would the assertion of any of the premises of McKenzie’s argument constitute an acceptable answer? Again, it does not seem that it would. Optimistically, they might help put us in a position to know *that* those are the fundamental kinds. But this is a wholly distinct issue from the question of *why* those are the fundamental kinds.<sup>23</sup> In the end, it might turn out that this has no answer – good news for physicalists holding to *Brutalism* – or it might turn out that physics (or metaphysics) has something to offer in the end. McKenzie’s argument, as it stands, is far from settling the matter.

## 4 Conclusion

McKenzie proposes a counterexample to *Brutalism*. I have presented reasons for doubting that the case she puts forward constitutes a genuine counterexample. This, of course, leaves the question around the truth of *Brutalism* open. For all I have said, it might turn out that, in light of further inquiry, *Brutalism* is false. But as far as McKenzie’s case goes, brutalists amongst us might just continue to believe in the metaphysical proclivity they advocate.<sup>24</sup>

<sup>23</sup>Note that a hallmark of evidential because-sentences is the presence of an epistemic modal in its main clause, as in the murder case presented. (SCHNIEDER, 2015, p. 148 f.), (MORREALL, 1979). This might shed light on the “must” in the formulation of the conclusion of McKenzie’s DN-argument.

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