



# Metaphysical Rationalism Requires Grounding Indeterminism

**ABSTRACT:** *Metaphysical rationalism is the view that, necessarily, every fact that stands in need of a metaphysical (grounding) explanation has one. Varieties of metaphysical rationalism include classical theism, Spinozism, spacetime priority monism, and axiarchism. Grounding indeterminism is the view that the same ground, in precisely the same circumstances, might not have grounded what it in fact grounds. I argue that a plausible defense of any form of metaphysical rationalism requires a commitment to grounding indeterminism.*

**KEYWORDS:** grounding, explanation, principle of sufficient reason, necessitarianism, contingency

*Rationalism* is the view that, necessarily, everything that stands in need of explanation has an explanation. *Metaphysical* rationalism is the view that, necessarily, everything that stands in need of metaphysical explanation is metaphysically explained—or, equivalently, that whatever is apt for grounding is grounded (Dasgupta 2016). Varieties of metaphysical rationalism include classical theism, Spinozism, spacetime priority monism, and axiarchism.

By ‘grounding’ I mean the relation or family of relations whereby less fundamental entities arise from more fundamental entities. By ‘metaphysical explanation’ I mean the kind of explanation that is given by citing the ground(s) of the explanandum. It is therefore definitional, in my usage, that something is grounded iff it is metaphysically explained.

Grounding indeterminism is the view that a total ground, even together with its total circumstances, need not necessitate what it grounds.<sup>1</sup> Grounding indeterminism is not a popular view in the recent grounding literature.<sup>2</sup> The dominant view is, rather, grounding necessitarianism, which holds that grounding always involves metaphysical necessitation.

In this article, I argue that metaphysical rationalism requires grounding indeterminism. In §1, I offer a more precise account of metaphysical rationalism. In §2, I offer a more precise account of grounding indeterminism. With these accounts in hand, §3 presents my main argument. The most controversial premises of my argument are that all autonomous (ungrounded) facts are necessary and that some substantive (grounded) facts are contingent. I defend these premises in §§4 and 5, respectively. In §6, I discuss a strategy for escaping

<sup>1</sup> I thank two anonymous referees for suggesting improvements to this formulation.

<sup>2</sup> A few recent defenses are noted in §2, below.



the argument by positing a plurality of ultimate grounds that do their grounding work only in the presence of certain enabling conditions. I conclude that such a view is deeply implausible, especially for those who are moved by rationalist intuitions, and that the rationalist must therefore accept the conclusion that grounding may be indeterministic.

Some philosophers will likely think that grounding indeterminism is absurd or that it undermines the motivation for metaphysical rationalism, so that if my argument is convincing, metaphysical rationalism must be rejected. I conclude, in §7, with a brief response to these concerns.

## 1. Metaphysical Rationalism

Shamik Dasgupta characterizes metaphysical rationalism as the view “that every substantive fact has an autonomous ground.” A fact is substantive “if the question of what grounds it can legitimately be raised and admits of a sensible answer” and autonomous otherwise (Dasgupta 2016, 384, emphasis omitted).

Dasgupta’s account of metaphysical rationalism has been criticized by Glazier (2017, 2880–2882) and Raven (2020a, §4.1), who argue that Dasgupta has failed to clarify the crucial notion of autonomy. I find this notion sufficiently intuitive that I am unmoved by this criticism. However, the details of Dasgupta’s view are not central to the arguments of the present article. I require only that there is some distinctive class of facts that appropriately figure into what Glazier calls ‘ultimate explanations’—explanations with which even a rationalist should be content to stop. In what follows, I will call those facts that appropriately figure into ultimate explanations ‘autonomous’ but will not rely on the details of Dasgupta’s account of autonomy.<sup>3</sup>

Following Dasgupta, I understand metaphysical rationalism as a thesis about grounding relations among facts. This does require that talk of fact-grounding makes sense, but it is consistent with holding that such talk is analyzable in other terms, for instance by taking ‘grounds’ as a sentence operator (Dasgupta 2016, 381–382).

Metaphysical rationalism, as Dasgupta formulates it, presupposes that the fact-grounding hierarchy is well-founded and contains no cycles (Dasgupta 2016, 382–383). The hierarchy must therefore bottom out in autonomous facts.

What kinds of facts could be autonomous? Dasgupta plausibly suggests: definitions and, in particular, *real* definitions, i.e., statements of essences (Dasgupta 2016, 385–386). Even critics of Dasgupta’s system have often agreed that essentialist facts are uniquely well suited to figure into ultimate explanations (e.g., Glazier 2017; Miller, *forthcoming*). As Dasgupta points out, if existence facts can only be grounded in other existence facts, it will follow from his view that some existence facts are autonomous, and hence that some being’s essence includes existence (Dasgupta 2016, 397).

<sup>3</sup> If, as Glazier maintains, the ultimate explanations are not grounding explanations, then my argument could be escaped by positing indeterminism in these explanations, instead of grounding explanations. For reasons of space, this strategy will not be explored in the present paper.

Dasgupta's views that only real definitions are autonomous facts and that existence facts can only be grounded in other existence facts should not be regarded as part of the definition of 'metaphysical rationalism'. However, these are popular views among metaphysical rationalists, historically and at present. Since essentialist facts are necessary,<sup>4</sup> these views imply that all autonomous facts are necessary (Dasgupta 2016, 395–396). Further, many metaphysical rationalists are also *priority monists*, holding that everything is ultimately grounded in one Foundation. It is, therefore, a common view among metaphysical rationalists that all existence facts are ultimately grounded in the existence of some one necessary being.

With this in mind, let's return to the four examples of metaphysical rationalism I mentioned at the beginning. All four of these views are monistic, positing some one fact as The Foundation.

Classical theism and Spinozism are naturally interpreted as endorsing Dasgupta's two additional theses. According to these views The Foundation is the real definition of God, whose essence includes existence. Indeed, as ibn Sina famously and influentially suggested, these monistic views can go a step further and say that God's essence *just is* existence (ibn Sina, *Metaphysica*, ch. 24).<sup>5</sup> This is a difficult move for the pluralist to make because of the difficulty of individuating the pluralist's many essentially existing beings (see ibn Sina, *Metaphysica*, chs. 21–22; Hamri, in [preparation](#)). However, Leucippus and Democritus could perhaps be interpreted as pluralists who make this kind of move, since they reportedly identified atoms with being and void with non-being (Aristotle, *Metaphysics* A4 985b4–20).

Turning now to spacetime priority monism, Jonathan Schaffer, the chief proponent of this view today, usually formulates it in terms of thing-grounding: all things other than spacetime are grounded in spacetime (Schaffer 2009, 2010, 2013).<sup>6</sup> However, it is also possible to develop a fact-grounding version of spacetime priority monism, along the same lines as classical theism and Spinozism, by taking the real definition of spacetime as The Foundation and holding that the essence of spacetime includes existence (cf. Dasgupta 2016, 397–398).

In contrast to the other three examples, axiarchism is committed to rejecting both of Dasgupta's additional theses. According to this view, The Foundation is the principle that all things are for the best. This principle does not appear to be a real definition.<sup>7</sup> Further, the Principle of the Best is not an existence fact and yet, according to the axiarchist, it grounds all of the existence facts. Still, like the three

<sup>4</sup> This assumption has been questioned by Gorman (2014, 131), but even Gorman characterizes the notion of contingent essentials as 'surprising' and does not commit to their real possibility.

<sup>5</sup> Ibn Sina famously denies that the existence/essence distinction is applicable to God. However, this is not to deny that the divine essence exists. Rather, it is to say that the divine essence just is God. On this kind of view, the fact *that God exists* may likewise be identified with God, so that the distinction between fact-grounding and thing-grounding breaks down in the case of God. What I assume here is that the classical theist takes *God exists* to be either an essentialist fact or a necessary consequence of an essentialist fact. I thank Noël Saenz for pressing me to clarify these points.

<sup>6</sup> It is controversial whether entities other than facts can be grounds. See Wilhelm 2020; Lo 2022; Mehta 2023.

<sup>7</sup> Perhaps, however, it could be interpreted as a real definition of *existence*. Leibniz sometimes suggests ideas along these lines. See, e.g., Leibniz 1890, 195. For discussion, see Adams 1994, 164–170.

other rationalist views discussed above, axiarchism is monistic. Further, although the Principle of the Best does not appear to be an essentialist fact, proponents of axiarchism have often taken it to be a necessary truth (e.g., Leslie 1997, 222–224; Rescher 2000, 157).

Each of these four versions of metaphysical rationalism has defenders today.<sup>8</sup> However, I will argue that a plausible defense of any version of metaphysical rationalism requires grounding indeterminism. I turn now to a more careful account of grounding indeterminism.

## 2. Grounding Indeterminism

The standard view of the relationship between grounding and modality is grounding necessitarianism which holds that complete grounds metaphysically necessitate. That is, necessarily, if some facts  $\Gamma$  ground some fact  $F$  then, necessarily, if all the facts in  $\Gamma$  hold so does  $F$  (Skiles 2020, 148).

Most grounding theorists simply *assume* grounding necessitarianism. Those who have offered explicit defenses of it have usually relied (directly or indirectly) on an intuition about complete explanation. To cite a total ground is to provide a complete explanation. But a complete explanation must rule out all metaphysically possible alternatives. Hence if the facts in  $\Gamma$  provide a total ground of  $F$  then  $\Gamma$  must rule out all metaphysically possible alternatives to  $F$ , and therefore metaphysically necessitate  $F$  (deRosset 2010; Trogdon 2013, 479–480n3; Dasgupta 2016, 382, 393; Raven 2020b, 8).

The denial of grounding necessitarianism is known as ‘grounding contingentism’, and has received a number of recent defenses (e.g., Leuenberger 2014; Skiles 2015; Cohen 2020; Richardson 2021; Baron-Schmitt 2021). However, the majority of these defenses have endorsed *grounding circumstantialism* (for discussion, see Skiles 2020, 155–158). Some theories of causation distinguish between causes and background conditions: for instance, the striking of the match causes it to light but only if certain background conditions, such as the presence of oxygen, obtain. Analogously, grounding circumstantialism allows that total grounds may require certain background conditions. Thus, for instance, the fact that a statue exists may be wholly grounded in the fact that the clay is shaped thus and so, but the intentions of an artist, the way the object is regarded by the art world, and so on, may serve as background conditions for this grounding relation. Hence, on this view, the *grounding* fact might obtain without the *grounded* fact obtaining, if the background conditions failed to hold.

Grounding necessitarianism and grounding circumstantialism are both versions of (what I here dub) *grounding determinism*, the view that a total ground together with its total circumstances necessitates what it grounds. Grounding indeterminism is the denial of grounding determinism.

<sup>8</sup> For classical theism (formulated in terms of grounding) see, e.g., Pearce 2017. For Spinozism, see, e.g., Della Rocca 2003. For spacetime priority monism, see Schaffer 2010. For an overview of contemporary defenses of axiarchism, see Mulgan 2017.

Although grounding indeterminism is not a popular view in the literature, it has been defended by Ryan Wasserman (2017) and Lei Zhong (2021), and I have previously argued that libertarians about free will should find it plausible (Pearce 2022b, §5). Additionally, Nina Emery's account of how laws (including indeterministic laws) ground their instances (Emery 2019), Ralf Bader's theory of 'stochastic grounding' (Bader 2021), and Fatema Amijee's account of how necessary facts can ground contingent ones (Amijee 2021) all appear to require grounding indeterminism.<sup>9</sup>

To sum up: metaphysical rationalism is the view that every fact that is apt for grounding is grounded. Grounding indeterminism is the view that grounds, even in conjunction with their total circumstances, need not necessitate what they ground. I turn now to a general argument that any plausible form of metaphysical rationalism must endorse grounding indeterminism.

### 3. The Argument

It is well-known that metaphysical rationalism threatens modal collapse (see, e.g., van Inwagen 1983, 202–204; Pruss 2006, ch. 6; Dasgupta 2016, 393; Andani 2022). My central argument can therefore be stated quite simply: the conjunction of metaphysical rationalism and grounding determinism implies necessitarianism, but necessitarianism is far more implausible than grounding indeterminism. Therefore, those who wish to maintain metaphysical rationalism should endorse grounding indeterminism.

It will be useful to state the argument from metaphysical rationalism for grounding indeterminism more precisely, in order to see what ways of escape might be available. The argument can be expressed as follows:

1. All substantive facts are wholly grounded in autonomous facts. (Metaphysical Rationalism)
2. All autonomous facts are necessary. (Assumption)
3. Some substantive facts are contingent. (Assumption)
4. If any contingent fact is wholly grounded in necessary facts, then total grounds, even given all relevant circumstances, do not always necessitate what they ground. (Assumption)
5. Therefore, total grounds, even given all relevant circumstances, do not always necessitate what they ground. (Grounding Indeterminism)

The argument has three independent premises. I proceed to defend each in turn.

### 4. Necessity

According to premise 2, all autonomous facts are necessary. As observed above, if we follow Dasgupta in taking autonomous facts to be essentialist facts, this premise will follow immediately.

<sup>9</sup> Emery (2020, 444–445) has explicitly recognized this consequence of her view.

Even supposing this assumption is rejected, there is a very general reason for supposing that autonomous facts must be necessary: one good reason for wondering why a fact obtains is that we have in mind some alternative to it. An adequate grasp of an autonomous fact should lead us to see that this apparently conceivable alternative is somehow defective—e.g., to think of water without hydrogen is to misunderstand what water is. But if the alternative is genuinely possible then the conception is not mistaken in the relevant way, and so it appears *arbitrary* that the fact in question obtains rather than the alternative (cf. Dasgupta 2016, 387).<sup>10</sup>

One might think that this kind of arbitrariness will attach to contingent truths no matter what. After all, if  $p$  obtains when  $\neg p$  was also possible, then there must be some arbitrariness somewhere! However, I will argue below (§7) that this is not the case. Indeterministic explanations may be complete explanations, and so remove arbitrariness. Nevertheless, for contingent truths the arbitrariness is, as it were, there to be removed. Hence, an unexplained contingent fact would be arbitrary in precisely the way an autonomous fact shouldn't be.<sup>11</sup>

Our conclusion, then, is that *if a fact is contingent, it makes sense to ask why that fact obtains*. This principle is equivalent to premise 2 (cf. Dasgupta 2016, 393).

## 5. Contingency

According to premise 3, some substantive fact is contingent. This is, of course, a deeply intuitive premise: as Leibniz pointed out, it's difficult to believe that it's necessary that Spinoza died at the Hague (Leibniz [1710] 1985, §§173–174). However, many metaphysical rationalists—including Spinoza and Dasgupta—have embraced the contrary view with full awareness of how counterintuitive it is. Therefore, in this section, I defend an argument for the reality of contingency. The argument can be stated as follows:

- 1' Some substantive fact is physically contingent.
- 2' Whatever is physically contingent could have been otherwise (metaphysically).
- 3' Therefore, some substantive fact could have been otherwise (metaphysically).

In what follows, I offer two distinct lines of evidence in favor of premise 1', an argument from the nature of physical laws and an argument from the content of our current best physical theories. Then I consider and reject some strategies necessitarians have employed to deny premise 2' by developing a notion of

<sup>10</sup> Dasgupta's claim that autonomous facts must be necessary *because* they are autonomous is criticized by Miller (forthcoming, 13–15). However, the central argument of this paper requires only that the facts which figure into ultimate explanations are necessary—a claim accepted by Miller, and also by Glazier (2017).

<sup>11</sup> Some proponents of axiarchism have thought that the Principle of the Best was self-explanatory, rather than autonomous (e.g., Rescher 2000, 156–158). (It is, after all, for the best that all things should be for the best!) However, metaphysical rationalism rejects explanatory cycles, and self-explanatoriness is the tightest of explanatory cycles.

physical contingency (or something near enough) that is compatible with metaphysical necessity.

### 5.1. Argument From Lawhood

The argument from lawhood is straightforward: both science and commonsense recognize a distinction between *lawlike generalizations*, such as ‘nothing moves faster than light’, and accidental generalizations, such as ‘no mountain on earth is more than 9,000m in elevation’.<sup>12</sup> These are distinguished because lawlike generalizations possess a kind of *necessity* (physical necessity) that accidental generalizations lack (see, e.g., Lewis 1973, §3.3; Armstrong 1983; Maudlin 2007, ch. 1; Lange 2009).

Additionally, this distinction plays an important practical role, for instance in engineering. To show that a certain task (e.g., to build a spacecraft that arrives at Alpha Centauri within two years, earth time) would violate some lawlike generalization is to show that the task is *impossible*, even in principle, so that pursuing it is pointless. However, the whole point here is to distinguish a class of tasks that are impossible from a class of tasks that are possible, at least in principle (even if not with current technology, within the available resources, etc.). Hence, the practical use of lawlike generalizations implies that not all facts are physically necessary, i.e., some are physically contingent.

### 5.2. Arguments from Physics

In addition to the argument from lawhood, physical contingency is supported (though admittedly not decisively) by our best current physical theories.

First, and most obviously, standard interpretations of quantum physics involve indeterministic causation, and indeterministic causation requires physical contingency. For causation to be indeterministic just is for there to be more than one physically possible effect of the same cause in the same total circumstances. So it will be physically contingent that, for instance, the electron was measured spin up rather than spin down.

However, there are non-standard interpretations of quantum mechanics that do not have this result. In addition to ‘hidden variable’ interpretations, there are so-called ‘many worlds’ interpretations. According to these interpretations, physical reality is fundamentally described by the fully deterministic evolution of the Schrödinger equation and the apparent indeterminism of quantum physics is accounted for by the fact that (in our previous example) the experimenter winds up in a superposition of measuring spin up and spin down. Thus, although these interpretations still predict our observations only probabilistically, they do not involve fundamental indeterminism and therefore do not yield physical contingency (Maudlin 2019, chs. 5 and 6). Hence, although currently standard interpretations of quantum physics support  $\tau$ , not all interpretations do so.

<sup>12</sup> I thank an anonymous referee for suggesting the use of this general line of argument here.

There is, however, another argument from physics for physical contingency, this one stemming from the other basic theory of modern physics, General Relativity. The fundamental equations of General Relativity, known as Einstein's Field Equations, admit of multiple global solutions. Each global solution appears to describe a complete way spacetime could be. For instance, the universe could begin with a Big Bang and continue expanding forever, or it could begin with a Big Bang and end with a Big Crunch (perhaps followed by another Bang), or the universe could be stable and flat, with no expansion or contraction. Additionally, there are a variety of so-called 'pathological' solutions, such as Gödel's notorious 'time travel' solutions (Malament 1984; Maudlin 2012, 155–165). Many of these solutions are already known by observation not to describe our universe, and yet there has been vigorous debate over the past several decades, among physicists and philosophers of physics, about which of these solutions have 'physical significance'. For instance, are the time travel solutions 'physical'? (Earman 1995; Arntzenius and Maudlin 2013) This debate is best understood as a debate over whether these solutions describe physical possibilities. It is presupposed, in these debates, that the non-pathological solutions *do* describe physical possibilities, and hence that there is more than one physically possible shape for spacetime (cf. Pearce 2017, 262–263; 2022a, 61–63).

While the argument from quantum physics hinges on a controversial interpretive question, the argument from General Relativity does not. Instead it can be seen as a specific application of the argument from lawhood. The equations of the physical theory set the bounds of physical possibility and do not rule out all of the scenarios that are known empirically to be non-actual.<sup>13</sup>

These arguments do not, of course, settle the matter. There is room for dispute about the interpretation of the physics and there is always the possibility that future physics might point in a different direction. However, our current best physics suggests that  $\tau$  is true, and this certainly provides it with a measure of support. Thus, we may say at least that the opponent of physical contingency is fighting an uphill battle against our intuitions, against our concept of laws of nature, and against the most straightforward interpretations of our best current physics.

### 5.3. Ersatz Contingency?

So far in this section, we have seen four sources of support for the reality of contingency: intuition, the distinction between lawlike and accidental generalizations, the indeterminism found in quantum physics, and the fact that relativistic physics permits alternative total shapes for spacetime. I have admitted that none of these sources of support is decisive. However, I expect that, for most philosophers, each of them will have at least some weight. In fact, those philosophers—historically and at present—who have been ready to give up on contingency have usually not been ready to go 'cold turkey', but instead have sought some form of ersatz contingency, to fill at least some of these roles. The general strategy is to reject

<sup>13</sup> I thank an anonymous referee for suggesting that the argument may generalize beyond General Relativity.



premise 2' by allowing some form of physical contingency that will fill the roles described above without admitting metaphysical contingency.

In what follows, I consider three theories of ersatz contingency. I argue that none of these theories succeeds in 'softening the blow' of necessitarianism: the necessitarian must reject our intuitions, take the notion of a lawlike generalization to be flawed, and give non-standard interpretations of quantum and relativistic physics. I do not claim that this is a conclusive refutation, but I do claim that this shows that necessitarianism comes at a very high cost for the rationalist.

5.3.1. *Extrinsic Necessity.* It comes as a surprise to those trained in analytic philosophy that the chapter of ibn Sina's *Metaphysica* entitled "Finding the nature of contingent being" begins by affirming, "The existence of that which is contingent in itself is necessitated... by something other than itself" (ibn Sina, *Metaphysica*, ch. 20; translator's parentheticals omitted). How can anything be both *necessitated* and *contingent*? The possible worlds semantics, certainly, allows no such thing.

However, ibn Sina's usage is consistent with another notion of contingency, contingency as *dependence* (see Andani 2022). On ibn Sina's necessitarian view,<sup>14</sup> the idea that everything has a sufficient reason is understood to imply that everything must be somehow necessary. A distinction can nonetheless be drawn between the Necessary Existent and contingent beings: the Necessary Existent is "necessary in itself due to its own nature," while every other being is "contingent due to itself and necessary due to the condition that its cause exists" (ibn Sina, *Metaphysica* ch. 18; translator's parentheticals omitted; cf. Andani 2022, 10–11). Similarly, Leibniz describes God as "a necessary being, carrying the reason of its existence with itself" (Leibniz 1989, 210). Various interpreters have found a distinction between intrinsic and extrinsic necessity in both Spinoza and Leibniz.<sup>15</sup>

This theory maintains, as a metaphysical fact independent of the state of our knowledge, that some things are necessary *in themselves* (intrinsically or *per se*) and others are not. A being necessary in itself will be one whose essence includes or implies existence. All things that are not intrinsically necessary are, according to this theory, *extrinsically* necessary, i.e., the reason for their necessity lies outside themselves.

The account can also be extended to facts. We may say that all autonomous facts are intrinsically necessary, and that a substantive fact is intrinsically necessary iff it is wholly grounded in autonomous facts about only the entities involved in it. This account will be most plausible if we construe 'entity' extremely broadly. For instance, we will want to say that the fact that *either dinosaurs exist or dinosaurs do not exist* is

<sup>14</sup> On ibn Sina's theory of necessity and contingency, see Wisnovsky 2003, Part II; Ruffus and McGinnis 2015.

<sup>15</sup> That both Spinoza and Leibniz are necessitarians of this sort is argued in detail by Griffin 2013, ch. 3. For Spinoza, also see Spinoza 1985, 1:306; (1677) 1985, 1p335r, IVd3; Newlands 2010. For Leibniz, also see Leibniz 1989, 19–23; Adams 1994, 10–22; Newlands 2010. Note, however, that Adams attributes the theory of extrinsic necessity to Leibniz only in the early period, while Newlands maintains that, for both Spinoza and Leibniz, the essences involved here are *our concepts*. If Newlands is right, then Spinoza and Leibniz are closer to Dasgupta's hybrid metaphysical/epistemic view, discussed in §5.3.2, below.

wholly grounded in autonomous facts about disjunction, and therefore intrinsically necessary.

The first thing to notice about this theory is that extrinsic necessity cannot be understood as a species of contingency as contemporary modal logic understands it. In contemporary modal logic, a proposition  $A$  is said to be contingent iff  $\diamond A \wedge \diamond \neg A$ . However, even  $\mathbf{K}$ , the weakest system of modal logic, includes the Distribution Axiom:  $\Box(A \rightarrow B) \rightarrow (\Box A \rightarrow \Box B)$ . According to the theory of extrinsic necessity, every intrinsically contingent fact is ultimately necessitated by some intrinsically necessary fact. Suppose  $A$  is an intrinsically necessary fact (i.e.,  $\Box A$ ) and  $A$  necessitates some fact  $B$  ( $\Box(A \rightarrow B)$ ). Then, by the above axiom,  $B$  is also intrinsically necessary ( $\Box B$ , i.e.,  $\neg \diamond \neg B$ ). Thus, no system based on  $\mathbf{K}$  can say that an extrinsically necessary proposition is possibly false.<sup>16</sup> The theory of extrinsic necessity should therefore be regarded as an error theory about our modal intuitions. According to this view, things seem contingent to us because their opposites are intrinsically possible. However, an adequate knowledge of The Foundation would show that these things are extrinsically necessary, and their opposites extrinsically impossible. Thus, according to Spinoza, “a thing is called contingent only because of a defect in our knowledge” (Spinoza [1677] 1985, Ip33s1).

The theory of extrinsic necessity openly rejects our modal intuitions. However, I conceded above that intuition was the weakest of the sources of support for the reality of contingency. Against the argument from lawhood and the argument from physics, the theory appears to be in a stronger position. This is because the theory may hold that natural laws are grounded in essences (see Lin 2012, 444). Thus, the essences of spacetime and of motion may permit objects to be in a variety of states of motion, but prevent them from moving faster than light. Further, the essence of spacetime may permit it to have a variety of shapes, different from the actual, as described by the various solutions to Einstein’s Field Equations. Finally, it may be consistent with the essence of an electron that (given a certain prior state) it be measured either spin up or spin down. More generally, the proponent of this view may say that a state of affairs is physically possible iff it is consistent with the essences of certain fundamental physical entities. Such a state of affairs may nonetheless be metaphysically impossible due to inconsistency with certain facts more fundamental than these—for instance, facts about the nature of the Necessary Existent.

Though this view appears promising, it faces four difficulties: (1) explaining how these intrinsically contingent facts are extrinsically necessitated; (2) making sense of quantum probabilities; (3) providing a plausible metaphysics of essence and ground; (4) explaining the role of laws in practical and theoretical reasoning.

Solutions to problem (1) will be very different for different versions of rationalism, but at least some versions appear to have good responses. For instance, classical theists may hold that these facts (e.g., that on this occasion the electron was measured spin up) are necessitated by God’s choice of the best possible world. I will therefore not insist on this objection.

<sup>16</sup> For a summary of contemporary modal systems and their axioms, see Garson 2021, §2. On the rejection of the Distribution Axiom in the theories of extrinsic necessity developed by Spinoza and Leibniz, see Lin 2012; Griffin 2013, 60–68, 72–73.

Problem (2) is a difficult issue for any metaphysical theory, and I will not pursue it here.

Problems (3) and (4) seem to me to be the strongest reasons for rejecting the theory of extrinsic necessity.

Regarding problem (3), recall that, according to the theory under discussion, a fact is intrinsically necessary iff it is either autonomous or is wholly grounded in autonomous facts about only the entities it involves. It is widely held that the notions of ground and essence are intimately connected. The exact nature of this connection is, however, disputed (for an overview, see Zylstra 2020). According to Audi (2012, 108), “facts are suited to stand in a relation of grounding only if their constituent properties are *essentially connected*.” Similar principles are advocated by Trogdon (2013) and O’Conaill (2018, §3). Fine (2012, 75–76) advocates a somewhat more complicated principle: “whenever a given truth C is grounded in other truths, then there is a generalization of the particular connection of ground that will hold in virtue of the nature of C (or of the items it involves).” (Note that Fine uses ‘essence’ and ‘nature’ interchangeably.)

With these views in mind, consider the fact that my desk exists. On ibn Sina’s account, it is part of the essence of any contingent being (such as a desk) to exist through the agency of the Necessary Existent. On Spinoza’s account, a finite being, such as a desk, is a *mode* and therefore “can neither be nor be conceived without substance,” i.e., God-or-Nature (Spinoza [1677] 1985, IP15dem). These claims suggest a view of the grounding-essence link similar to Audi’s: in order to ground the existence of the desk in some ultimate Foundation, some ‘essential connection’ between the essence of the desk and the essence of the Foundation (or the essences of the properties that figure in the foundational fact) must be found.

On Fine’s view, the matter is a bit more complicated, but the general pattern still holds: the connection between the existence of my desk and the Foundation will have to be found, somehow, in the essence of my desk.

These views about the essence-ground connection undermine the distinction between intrinsic and extrinsic necessity. If, e.g., it lies in the essence of my desk to be a mode of God-or-Nature, and it is in the essence of any such mode that its existence “follow[s]... from the necessity of [God’s] essence” (Spinoza [1677] 1985, IP15schol), then it will be not only necessary but *intrinsically* necessary—its reason for existence will be internal to its essence. It follows that intrinsic necessity *does* obey the Distribution Axiom, and the distinction between intrinsic and extrinsic necessity collapses. If, then, the theory of extrinsic necessity is to succeed, it is incumbent upon its proponents to develop a metaphysics of essence and ground different from the popular one outlined above.

Regarding problem (4), the issue is that the theory of extrinsic necessity makes every non-actual occurrence impossible with (as it were) equal ‘modal force’. In this way, the non-actual occurrence of a spacecraft arriving at Alpha Centauri within two years is no different from my not eating breakfast tomorrow. Yet, from the perspective of practical deliberation, the former course of action is closed and the latter is open. This is because the former violates the laws and the latter does not. The purely metaphysical distinction drawn by the theory of extrinsic necessity fails to capture this difference.

5.3.2. *Relative Necessity*. A natural response to the fourth difficulty is to incorporate epistemic or pragmatic features into the theory. Such a strategy is suggested by Dasgupta.

Dasgupta begins by generalizing the theory of intrinsic and extrinsic necessity into a theory of *relative* necessity. He gives the following definition:

it is *necessary relative to some things, the Xs, that  $\phi$*  iff either (i) it is essential to one or more Xs that  $\phi$ , or (ii) the fact that  $\phi$  is grounded in facts about the essences of one or more of the Xs. (Dasgupta 2016, 394)

Dasgupta then goes on to suggest that we may consider a fact contingent if its being otherwise is “possible *relative to everything we know*” (Dasgupta 2016, 394).

This approach appears promising as a solution to the fourth difficulty because essences are peculiarly invariable, compared with other facts. Thus, for instance, there is a common essence shared by all electrons. If a certain outcome is shown to be incompatible with that essence (i.e., necessary relative to the electrons), we can’t bring that outcome about just by trying a different electron. This is different from the breakfast case: there’s nothing in the essence of humans to guarantee that we all eat breakfast. Thus, knowledge of essences can be action-guiding in the way knowledge of law-like generalizations is supposed to be.

However, with regard to problem (3), Dasgupta is in the same boat as the theory of extrinsic necessity, and this in turn points to a difficulty for his solution to problem (4). Recall that the problem here is that grounds are widely supposed to be essentially connected with what they ground. As a result, Dasgupta is faced with a dilemma. When we relativize to ‘everything we know’, either we include the *full* essences of those things, or only the portion of the essence we know. If the former, then Dasgupta has failed to secure any form of contingency, since the full essence includes the necessitating grounds. However, if it’s only the portion of the essence known to us, then Dasgupta’s view is really a form of anti-realism about contingency, holding that our ascriptions of contingency do not carve at any metaphysical joints but are related solely to features of human knowers. We turn now to the examination of these sorts of theories.

5.3.3. *Fictionalism About Contingency*. According to anti-realist theories of physical contingency, physical contingency is not an objective feature of the world but instead somehow dependent on us. The most promising such view, for the necessitarian rationalist, is fictionalism. In general, fictionalism about a domain is the view that declarative sentences uttered in that domain, like those uttered in telling a fictional story, do not or should not aim to state truths (Kalderon 2005a). The necessitarian rationalist might adopt this approach toward all talk of physical possibilities other than the actual.

Note that this is a more radical view than the one that usually goes by the name ‘modal fictionalism’ in the literature (see Nolan 2022). Following Rosen (1990), self-described modal fictionalists have usually been fictionalists about possible worlds, understood after the manner of David Lewis’s modal realism (Lewis 1986). They have then analyzed ordinary modal statements, such as ‘Spinoza could have died in Amsterdam’, as statements about the possible worlds fiction. Such statements are

literally, non-fictionally true statements *about* a fiction, like the statement ‘there are many fictional alien species in *Star Trek*’. They are not statements offered *within* the fiction like ‘Betazoids are telepathic’.

This approach will not deliver what the necessitarian rationalist needs. The necessitarian rationalist is, after all, a necessitarian. She thinks contingentist claims are literally false. However, she needs a way of preserving the kind of contingentist talk discussed in §§ 5.1 and 5.2, above. In this respect, the necessitarian rationalist is in a similar position to those mathematical fictionalists who deny the existence of numbers but need to specify a sense in which such statements as ‘there are infinitely many prime numbers’ are acceptable. Thus, a fictionalism that is of use to the necessitarian rationalist must involve a fictionalist approach to possibility statements, and not just a fictionalist approach to the Lewisian ontology of possible worlds.

Fictionalism about contingency is subject to all of the standard objections to fictionalisms, but the standard replies are, of course, available (see, e.g., Kalderon 2005b; Eklund 2019). I focus here on two more specific objections, one related to modal semantics and one related to the role of claims of physical necessity in prediction.

Fictional statements do not, in general, differ in their semantics from non-fictional statements. For instance, the word ‘dragon’ has the same meaning in ‘Smaug is a dragon’ and ‘there are no dragons’. Thus, the necessitarian rationalist needs a semantics for claims of possibility and necessity on which (e.g.) it is *really* true that, necessarily, I ate toast for breakfast this morning, but *fictionally* true that, possibly, I skipped breakfast.

The Lewisian approach is a poor fit for the necessitarian rationalist’s view about real modality. The necessitarian rationalist thinks that there is only one possible world *because* of the necessitating explanatory relations whereby all things follow from The Foundation (see, e.g., Spinoza [1677] 1985, IP29). But on Lewis’s semantics, to say that these relations are *necessitating* just means that the consequence follows in every possible world. The necessitarian rationalist’s explanation of why necessitarianism is true would thus be vacuous on Lewis’s semantics.

Instead, the necessitarian rationalist should either take modal operators as primitive or analyze them in terms of essence and/or ground. The necessitarian rationalist would then hold that in fact these notions rule out all possibilities other than the actual, but fictionally accept some statements about such alternative possibilities.

One question here is whether the necessitarian rationalist considers the contingentist fiction to be coherent. If the necessitarian rationalist admits that contingency is coherent, she will be under additional pressure simply to endorse it, in light of the arguments above. Furthermore, the necessitarian rationalist’s arguments for her position are likely to commit her to the claim that contingency is somehow incoherent. (This is certainly the case for, e.g., Spinoza.) This problem may not be fatal to the fictionalist project, since fictions need not be coherent (Gendler 2000, § 5). However, it seriously exacerbates the problem of the role of this fiction in prediction, to which we now turn.

Knowing that something is physically impossible provides a basis for predicting, with very high confidence (perhaps even certainty), that it will not occur. This is why such statements play the practical, action-guiding role that they do. Accidental generalizations do not provide the same basis for prediction. If this distinction is purely fictitious, how can it justify these action-guiding predictions? This is connected with an issue close to the rationalist's heart: explanation. Why does the fact that something is physically impossible *explain* why it never occurs, while accidental generalizations do not provide this kind of explanation?

The most natural account of this asymmetry, for the metaphysical rationalist, is that laws ground their instances while accidental generalizations are grounded in their instances (Rosen 2010, 119–121; Emery 2019). Since grounding is hyperintensional, one might suppose that this move is amenable to the necessitarian: laws and accidental generalizations may be 'equally' necessary, but grounded differently. One might then adopt a fiction according to which (at least some of) the accidental generalizations are contingent.

This approach has the advantage of providing clear instructions about what fiction we should adopt. It does not, however, provide any clear rationale for *why* we should adopt that fiction. That is, why should the pretence that accidental generalizations could be otherwise, while laws could not, inform our actions and expectations? Again, this will be even more puzzling if contingentism is taken to be incoherent.

Insofar as the fictionalist with whom we are here concerned is a rationalist, she cannot merely say that we have found by experience that this procedure is beneficial, or (as Hume might say) that we cannot help expecting the laws to continue to hold. A rationalist must explain.

The strategy discussed in this subsection is not one that has been developed in detail in the existing literature. It therefore remains to be seen whether the problems I have described can be solved. However, the prospects for solving them in a way that will be satisfying to a rationalist appear dim.

Necessitarianism is deeply implausible, both intrinsically and in its consequences. No way of avoiding necessitarianism's unwholesome consequences has been identified. I conclude that necessitarianism should be rejected and, therefore, premise 3 stands.

## 6. Necessary Grounds of Contingent Facts

If the results of the previous two sections are correct, then the metaphysical rationalist is committed to the claim that there are contingent facts wholly grounded in necessary facts. We now turn to premise 4, which states that if any contingent fact is wholly grounded in necessary facts, then grounding indeterminism is true.

That accepting necessary grounds for contingent facts requires rejecting grounding necessitarianism can be seen by a trivial application of the Distribution Axiom. That axiom states that whatever is necessitated by a necessary truth is itself necessary. Thus, if full grounds necessitate, whatever is wholly grounded in necessary

facts is itself necessary. So, if some contingent fact is wholly grounded in necessary facts, then grounding does not necessitate.

However, the denial of grounding necessitarianism does not get us all the way to grounding indeterminism. This is because of the availability of the grounding circumstantialist position, which holds that grounds do not necessitate because *in different circumstances* they might not have grounded what they in fact ground. Can the rationalist stop at grounding circumstantialism, or must she proceed to grounding indeterminism?

Many rationalists will deny that the foundational level of the grounding hierarchy could be affected by extraneous circumstances—for instance, the classical theist will deny that there is anything external to God that could serve as ‘circumstances’ for God’s grounding the universe. On views like this, we get grounding indeterminism immediately: necessarily, the set of relevant circumstances is the null set, and different outcomes are possible in these same (null) circumstances.

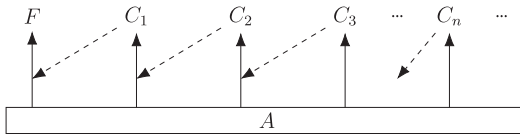
Suppose, however, that there are such circumstances. In order for this to save contingency, the circumstances will themselves need to be contingent. But all contingent facts are substantive. So the circumstances must be grounded in necessary autonomous facts. This appears simply to push the puzzle of contingency a step back.

Nevertheless, there are at least two strategies available to a metaphysical rationalist who wants to stop at circumstantialism. Metaphysical rationalism, by definition, bans cycles and infinite regresses of explanation. However, it need not ban cycles or regresses of *enabling circumstances*.

Consider the cycle case first. Suppose some autonomous fact *A* will ground *F* iff circumstance *F'* obtains. Further, suppose that some other autonomous fact, *A'*, will ground *F'* iff *F* obtains. The circumstantialist holds that *A* and *A'* are full grounds: they completely explain what they ground. But they do so only in certain specified circumstances. If a metaphysical rationalist allows cycles like this among the *circumstances* that enable grounding, then she may perhaps introduce contingency without grounding indeterminism, since it is possible for *F* and *F'* either both to obtain or both to fail to obtain. Note, further, that since the contingentist denies that the circumstances are part of the grounding explanation—they are merely the background conditions that enable the ground to explain—there is not an explanatory cycle here.

However, there may still be a problematic explanatory cycle in the background. This is because the circumstances might be thought to explain *why the grounding relation obtains*. If so, then we have *F obtains because A grounds F* and *A grounds F because F' obtains*. By transitivity, this will imply that *F obtains because F' obtains*. On the other side we have *F' obtains because A' grounds F'* and *A' grounds F' because F obtains*. Appealing again to transitivity, we have *F' obtains because F obtains*, and therefore an explanatory cycle.

There are a few ways of avoiding this cycle. First, one might deny that *F obtains because A grounds F* and stick simply to *F because A*. Alternatively, one could deny that the circumstances explain the grounding relation. Finally, one could deny transitivity *across different types of explanations*, and maintain that the



**Figure 1.** A Regress of Circumstances. Solid lines indicate grounding relations, dashed lines indicate enabling circumstances for those relations.

explanation of grounding relations by circumstances is not itself a grounding explanation.

Similar moves can be made involving an infinite regress rather than a cycle, as shown in [Figure 1](#).<sup>17</sup> Let *A* be an autonomous fact, and suppose that *F* is grounded in *A* given enabling conditions *C*<sub>1</sub>. Now suppose that *C*<sub>1</sub> is grounded in *A* given enabling conditions *C*<sub>2</sub>, and *C*<sub>2</sub> is grounded in *A* given enabling conditions *C*<sub>3</sub>, and so on.<sup>18</sup> There is no infinite regress of grounds here. Indeed, each grounding chain bottoms out after just one step. However, one might maintain that a different infinite chain of circumstances is possible. The same strategies employed above to avoid an explanatory circle could also be employed here to avoid an explanatory regress. For instance, one could insist that each of *F*, *C*<sub>1</sub>, *C*<sub>2</sub>, and so on is fully explained by *A*, and the enabling relation does no further explanatory work.

Both the cycle strategy and the regress strategy, however, violate metaphysical rationalism by introducing an ungrounded substantive fact: the fact that *this particular cycle or regress obtains*. This fact cannot be autonomous since it is *ex hypothesi* contingent and, as I argued above (§4), autonomous facts must be necessary. Perhaps, at this point, the grounding circumstantialist will try to ground this fact by constructing another cycle or regress, to explain the first. But such a strategy would have to be repeated *ad infinitum*. Even if this is coherent (which is questionable), it adds enormous (indeed, infinite) metaphysical complexity.

The grounding indeterminist is not faced with this problem, since she can maintain that everything is directly grounded in the Foundation, without appeal to further circumstances, and yet some things remain contingent.

## 7. Is Grounding Indeterminism Absurd?

The key reason for rejecting grounding indeterminism has been a view about the logic of explanation: that a *complete* explanation must rule out all metaphysically possible alternatives (deRosset 2010; Trogdon 2013, 479–480n3; Dasgupta 2016, 382, 393; for criticism, see Skiles 2015, §§5.4–5.5; Richardson 2021, §3.1). But this view is suspect on two counts.

In the first place, if this view were true then quantum physics (at least under indeterministic interpretations) would not provide a complete explanation of our experimental results. For instance, the fact that Higgs bosons were created in particle collisions in the Large Hadron Collider would not fully explain the physicists'

<sup>17</sup> I thank Louis DeRosset for this point.

<sup>18</sup> Perhaps something like this occurs in Spinoza's account of finite modes. See Spinoza (1677) 1985, IP26–28.




observations, since it was metaphysically possible for those particles to be created without yielding those observations. Further, as Zhong (2021, 1534–1535) points out, this would violate the causal completeness of physics by denying that the observations have a complete physical cause. It is much better to say: the Higgs particles were total causes of certain behaviors in the apparatus, and total causes completely explain their effects even if they are indeterministic. In other words, we should admit that an indeterministic cause can be a total cause, and hold that a total cause always provides a complete explanation. But once we have accepted this thesis about causation, our logic of explanation no longer prohibits grounding indeterminism (cf. Pearce 2022b, §§2, 5).

For those who believe in libertarian free will, an analogous point can be made even more strongly. In order for an event to be an action of mine, I need to figure into the explanation of that event in the right sort of way. If indeterminism makes the event less fully explained, or less dependent on me, this would appear to undermine my free will rather than enhance it. The libertarian should therefore hold that there is a complete explanation of my actions, but this explanation involves indeterministic causation. Again, however, the view that indeterministic causation is consistent with complete explanation involves the rejection of the logic of explanation that was motivating grounding necessitarianism (again, see Pearce 2022b, §§2, 5).

It seems, then, that grounding necessitarianism rests on a questionable assumption. The metaphysical rationalist's demand for complete metaphysical explanation therefore need not undermine contingency.

Still, it may be suggested that the motivation for metaphysical rationalism has been undermined.<sup>19</sup> However, at least one crucial motivation for rationalism remains. Even opponents of the Principle of Sufficient Reason generally agree that we should, *ceteris paribus*, prefer views on which more things are explained over those on which fewer things are explained. For instance, Kleinschmidt (2013, 77) argues that we should accept that a fact has no explanation only when positing an explanation would “have disastrous theoretical consequences.” However, if complete explanations may be indeterministic, then we may affirm without disaster that every substantive fact is completely explained. Thus, the combination of metaphysical rationalism with grounding indeterminism opens the door to a maximally satisfying explanatory structure.<sup>20</sup>

KENNETH L. PEARCE 

JAMES MADISON UNIVERSITY

[pearcekl@jmu.edu](mailto:pearcekl@jmu.edu)

<sup>19</sup> I thank an anonymous referee for raising this issue.

<sup>20</sup> Some of the material in this paper was presented (in a rather different form) at the Global Philosophy of Religion Project Online Conference, 23 June 2021. I thank the participants for helpful discussion. A shorter version of the paper was also presented at the American Philosophical Association Central Division Conference in Chicago on 25 February 2022. I thank all of the participants—especially my commentator Bradley Rettler—for helpful discussion. Finally, I thank Noël Saenz, Caleb Cohoe, John Divers, Dar Triffon Reshef, and several anonymous referees for helpful comments on previous drafts of this paper.

## References

- Adams, Robert Merrihew. 1994. *Leibniz: Determinist, Theist, Idealist*. New York: Oxford University Press.
- Amjeeb, Fatema. 2021. "Explaining Contingent Facts." *Philosophical Studies* 178 (4): 1163–1181.
- Andani, Khalil. 2022. "Divine Simplicity and The Myth of Modal Collapse: An Islamic Neoplatonic Response." *European Journal of Analytic Philosophy* 18 (2).
- Aristotle. 1984. *Metaphysics*. Translated by W. D. Ross. In *The Complete Works of Aristotle: The Revised Oxford Translation*, edited by Jonathan Barnes. 2 vols. Princeton: Princeton University Press.
- Armstrong, D. M. 1983. *What Is a Law of Nature?* Cambridge Studies in Philosophy. Cambridge: Cambridge University Press.
- Arntzenius, Frank, and Tim Maudlin. 2013. "Time Travel and Modern Physics." In *The Stanford Encyclopedia of Philosophy*, Winter 2013, edited by Edward N. Zalta. <https://plato.stanford.edu/archives/win2013/entries/time-travel-phys/>.
- Audi, Paul. 2012. "A Clarification and Defence of the Notion of Grounding." In *Correia and Schnieder* 2012, 101–121.
- Bader, Ralf. 2021. "The Fundamental and the Brute." *Philosophical Studies* 178 (4): 1121–1142.
- Baron-Schmitt, Nathaniel. 2021. "Contingent Grounding." *Synthese* 199:4561–4580.
- Cohen, Shlomit Wygoda. 2020. "Not All Partial Grounds Partly Ground: Some Useful Distinctions in the Theory of Grounding." *Philosophy and Phenomenological Research* 100 (1): 75–92.
- Correia, Fabrice, and Benjamin Schnieder, eds. 2012. *Metaphysical Grounding: Understanding the Structure of Reality*. Cambridge: Cambridge University Press.
- Dasgupta, Shamik. 2016. "Metaphysical Rationalism." *Noûs* 50 (2): 379–418.
- Della Rocca, Michael. 2003. "A Rationalist Manifesto: Spinoza and the Principle of Sufficient Reason." *Philosophical Topics* 31 (1): 75–93.
- deRosset, Louis. 2010. "Getting Priority Straight." *Philosophical Studies* 149 (1): 73–97.
- Earman, John. 1995. *Bangs, Crunches, Whimpers, and Shrieks: Singularities and Acausalities in Relativistic Spacetimes*. New York: Oxford University Press.
- Eklund, Matti. 2019. "Fictionalism." In *The Stanford Encyclopedia of Philosophy*, Winter 2019, edited by Edward N. Zalta. Metaphysics Research Lab, Stanford University. <https://plato.stanford.edu/archives/win2019/entries/fictionalism/>.
- Emery, Nina. 2019. "Laws and Their Instances." *Philosophical Studies* 176 (6): 1535–1561.
- Emery, Nina. 2020. "Laws of Nature." In *Raven* 2020c, 437–448.
- Fine, Kit. 2012. "Guide to Ground." In *Correia and Schnieder* 2012, 37–80.
- Garson, James. 2021. "Modal Logic." In *The Stanford Encyclopedia of Philosophy*, Summer 2021, edited by Edward N. Zalta. Metaphysics Research Lab, Stanford University.
- Gendler, Tamar Szabó. 2000. "The Puzzle of Imaginative Resistance." *Journal of Philosophy* 97 (2): 55–81.
- Glazier, Martin. 2017. "Essentialist Explanation." *Philosophical Studies* 174 (11): 2871–2889.
- Gorman, Michael. 2014. "Essentiality as Foundationality." In *Neo-Aristotelian Perspectives in Metaphysics*, edited by Daniel D. Novotný and Lukáš Novák, 119–137. Routledge Studies in Metaphysics. New York and Oxford: Routledge.
- Griffin, Michael V. 2013. *Leibniz, God and Necessity*. Cambridge: Cambridge University Press.
- Hamri, Soufiane. In preparation. "Fundamentality and Essential Existence."
- ibn Sina, Abu Ali al-Husayn. 1973. *The Metaphysica of Avicenna (ibn Sīnā): A Critical Translation-Commentary and Analysis of the Fundamental Arguments in Avicenna's Metaphysica in the Dānīsh Nāma-i 'alā'ī (The Book of Scientific Knowledge)*. Translated by Parviz Morewedge. Persian Heritage Series 13. London: Routledge.
- Kalderon, Mark Eli. 2005a. Introduction to *Fictionalism in Metaphysics*. Edited by Mark Eli Kalderon. Oxford: Clarendon Press.
- Kalderon, Mark Eli, ed. 2005b. *Fictionalism in Metaphysics*. Oxford: Clarendon Press.
- Kleinschmidt, Shieva. 2013. "Reasoning Without the Principle of Sufficient Reason." In *The Puzzle of Existence: Why Is there Something Rather Than Nothing?*, edited by Tyron Goldschmidt, 64–79. New York: Routledge.

- Lange, Marc. 2009. *Laws and Lawmakers: Science, Metaphysics, and the Laws of Nature*. New York: Oxford University Press.
- Leibniz, G. W. (1710) 1985. *Theodicy: Essays on the Goodness of God and the Freedom of Man in the Origin of Evil*. Translated by E. M. Huggard. La Salle, Ill.: Open Court.
- Leibniz, G. W. 1890. *Die philosophischen Schriften*. Edited by C. I. Gerhardt. Vol. 7. Berlin: Weidman.
- Leibniz, G. W. 1989. *Philosophical Essays*. Edited and translated by Roger Ariew and Daniel Garber. Indianapolis: Hackett.
- Leslie, John. 1997. "A Neoplatonist's Pantheism." *The Monist* 80 (2): 218–231.
- Leuenberger, Stephan. 2014. "Grounding and Necessity." *Inquiry: An Interdisciplinary Journal of Philosophy* 57 (2): 151–174.
- Lewis, David. 1973. *Counterfactuals*. Malden, MA: Blackwell.
- Lewis, David. 1986. *On the Plurality of Worlds*. Malden, MA: Blackwell.
- Lin, Martin. 2012. "Rationalism and Necessitarianism." *Noûs* 46 (3): 418–448.
- Lo, Tien-Chun. 2022. "In Defense of Fact-Only Grounding." *Philosophical Studies* 179:2891–2899.
- Malament, David B. 1984. "'Time Travel' in the Gödel Universe." *PSA: Proceedings of the Biennial Meeting of the Philosophy of Science Association*, 91–100.
- Maudlin, Tim. 2007. *The Metaphysics Within Physics*. Oxford: Oxford University Press.
- Maudlin, Tim. 2012. *Philosophy of Physics: Space and Time*. Princeton Foundations of Contemporary Philosophy. Princeton and Oxford: Princeton University Press.
- Maudlin, Tim. 2019. *Philosophy of Physics: Quantum Theory*. Princeton Foundations of Contemporary Philosophy. Princeton: Princeton University Press.
- Mehta, Neil. 2023. "Grounding Identity in Existence Facts: A Reply to Wilhelm." *Analysis* 83 (3): 500–506.
- Miller, Taylor-Grey. Forthcoming. "Nothing Explains Essence." *Inquiry: An Interdisciplinary Journal of Philosophy*, <https://doi.org/10.1080/0020174X.2023.2269576>.
- Mulgan, Tim. 2017. "Beyond Theism and Atheism: Axiarchism and Ananthropocentric Purposivism." *Philosophy Compass* 12 (6): e12420.
- Newlands, Samuel. 2010. "The Harmony of Spinoza and Leibniz." *Philosophy and Phenomenological Research* 81 (1): 64–104.
- Nolan, Daniel. 2022. "Modal Fictionalism." In *The Stanford Encyclopedia of Philosophy*, Spring 2022, edited by Edward N. Zalta. Metaphysics Research Lab, Stanford University. <https://plato.stanford.edu/archives/spr2022/entries/fictionalism-modal/>.
- O'Connell, Donnchadh. 2018. "Grounding, Physicalism and Necessity." *Inquiry: An Interdisciplinary Journal of Philosophy* 61 (7): 713–730.
- Pearce, Kenneth L. 2017. "Foundational Grounding and the Argument from Contingency." *Oxford Studies in Philosophy of Religion* 8:245–268.
- Pearce, Kenneth L. 2022a. "Classical Theism: An Exposition and Defense." In *Is There a God? A Debate*, by Graham Oppy and Kenneth L. Pearce, 11–91. New York: Routledge.
- Pearce, Kenneth L. 2022b. "Foundational Grounding and Creaturely Freedom." *Mind* 131 (524): 1108–1130.
- Pruss, Alexander R. 2006. *The Principle of Sufficient Reason: A Reassessment*. Cambridge Studies in Philosophy. New York: Cambridge University Press.
- Raven, Michael J. 2020a. "Explaining Essences." *Philosophical Studies* 178 (4): 1043–1064.
- Raven, Michael J. 2020b. *Introduction to The Routledge Handbook of Metaphysical Grounding*. Edited by Michael J. Raven. New York and London: Routledge.
- Raven, Michael J. ed. 2020c. *The Routledge Handbook of Metaphysical Grounding*. New York and London: Routledge.
- Rescher, Nicholas. 2000. *Nature and Understanding: The Metaphysics and Method of Science*. New York: Oxford University Press.
- Richardson, Kevin. 2021. "Grounding is Necessary and Contingent." *Inquiry: An Interdisciplinary Journal of Philosophy* 64 (4): 453–480.
- Rosen, Gideon. 1990. "Modal Fictionalism." *Mind* 99 (395): 327–354.

- Rosen, Gideon. 2010. "Metaphysical Dependence: Grounding and Reduction." In *Modality: Metaphysics, Logic, and Epistemology*, edited by Bob Hale and Aviv Hoffman, 109–136. Oxford University Press.
- Ruffus, Anthony, and Jon McGinnis. 2015. "Willful Understanding: Avicenna's Philosophy of Action and Theory of the Will." *Archiv für Geschichte der Philosophie* 97 (2).
- Schaffer, Jonathan. 2009. "Spacetime the One Substance." *Philosophical Studies* 145 (1): 131–148.
- Schaffer, Jonathan. 2010. "Monism: The Priority of the Whole." *Philosophical Review* 119 (1): 31–76.
- Schaffer, Jonathan. 2013. "The Action of the Whole." *Aristotelian Society Supplementary Volume* 87 (1): 67–87.
- Skiles, Alexander. 2015. "Against Grounding Necessitarianism." *Erkenntnis* 80 (4): 717–751.
- Skiles, Alexander. 2020. "Necessity." In *Raven* 2020c, 148–163.
- Spinoza, Benedict de. (1677) 1985. *Ethics*. In *Spinoza* 1985.
- Spinoza, Benedict de. 1985. *The Collected Works of Spinoza*. Translated by Edwin Curley. Princeton: Princeton University Press.
- Trogdon, Kelly. 2013. "Grounding: Necessary or Contingent?" *Pacific Philosophical Quarterly* 94 (4): 465–485.
- van Inwagen, Peter. 1983. *An Essay on Free Will*. Oxford: Clarendon Press.
- Wasserman, Ryan. 2017. "Vagueness and the Laws of Metaphysics." *Philosophy and Phenomenological Research* 95 (1): 66–89.
- Wilhelm, Isaac. 2020. "An Argument for Entity Grounding." *Analysis* 80 (3): 500–507.
- Wisnovsky, Robert. 2003. *Avicenna's Metaphysics in Context*. London: Duckworth.
- Zhong, Lei. 2021. "Physicalism Without Supervenience." *Philosophical Studies* 178 (5): 1529–1544.
- Zylstra, Justin. 2020. "Essence." In *Raven* 2020c, 324–335.