



# Disjunction and the Logic of Grounding

Giovanni Merlo<sup>1</sup>

Received: 25 August 2018 / Accepted: 17 December 2019 / Published online: 14 February 2020  
© Springer Nature B.V. 2020

## Abstract

Many philosophers have been attracted to the idea of using the logical form of a true sentence as a guide to the metaphysical grounds of the fact stated by that sentence. This paper looks at a particular instance of that idea: the widely accepted principle that disjunctions are grounded in their true disjuncts. I will argue that an unrestricted version of this principle has several problematic consequences and that it's not obvious how the principle might be restricted in order to avoid them. My suggestion is that, instead of trying to restrict the principle, we should distinguish between metaphysical and conceptual grounds and take the principle to apply exclusively to the latter. This suggestion, if correct, carries over to other prominent attempts at using logical form as a guide to ground.

Many philosophers have been attracted to the idea of using the logical form of a true sentence as a guide to the metaphysical grounds of the fact stated by that sentence. Consider, for instance, the widely accepted principle that disjunctive facts are grounded in their true disjuncts—or, more accurately, that, whenever it's the case that  $\phi$ , the fact that  $\phi$  fully grounds the fact that  $\phi \vee \psi$ . Since we know nothing about the fact that  $\phi$  and the fact that  $\phi \vee \psi$  except that the sentence stating the first occurs as a disjunct in the sentence stating the second, in applying the principle we are effectively inferring something about the grounding ties holding between two facts based on the logical form of the sentences stating those facts. I shall call *Logicism* the general view that there are true informative principles of this sort—in a slogan, that logical form can be a guide to ground. Other instances of this view include the principle that conjunctive truths are partially grounded in their conjuncts and that universal and existential truths are, respectively, partially and fully grounded in their instances.

The main aim of this paper is to argue that, despite its widespread appeal, there are serious reasons for being sceptical of Logicism. The grounds of a fact are supposed to provide us with a metaphysical explanation of why that fact holds. The

---

✉ Giovanni Merlo  
giovanni.merlo@stir.ac.uk

<sup>1</sup> University of Stirling, Room A94, Pathfoot Building, Stirling FK9 4LA, Scotland, UK

logical form of a sentence is that aspect of its linguistic meaning which is responsible for its entering certain logical inferences rather than others. Even on the most fine-grained view of facts, it is not obvious why a *linguistic* property of “ $\varphi$ ”—such as its being disjunctive, conjunctive, existential or universal—should be of any relevance to the *metaphysical* question of why the fact that  $\varphi$  holds. Perhaps in certain cases the logical form of a sentence does not reflect the nature of the underlying fact. Perhaps in some such cases logical form is not a reliable guide to ground. Logicism is no doubt an attractive view, but, unless we assume an unduly optimistic picture of the relationship between reality and our linguistic representations of it, it may be just too good to be true.

To focus the discussion and bring out these worries more vividly, I shall concentrate my attention on the principle that disjunctive facts are fully grounded in their true disjuncts (hereafter, the ‘Disjunction Principle’). Reflection on the truth-conditions for disjunction would seem to support an unrestricted version of this principle, applying to any disjunction whatsoever. However, the unrestricted version has several problematic implications, and it is not obvious how one might restrict the principle in order to avoid them. My suggestion will be that, instead of trying to restrict the principle, we should distinguish between *metaphysical* and *conceptual* grounds and take the principle to apply exclusively to the latter. This suggestion, if correct, is likely to carry over to the other logicist principles I mentioned, blocking any attempt at ‘reading off’ the metaphysical grounds of a fact from the logical form of the sentence stating it.

Logicism has not gone entirely unquestioned. In discussing some ‘puzzles of ground’ that bear close resemblance to the paradoxes of self-reference, Fine (2010) has shown that (given some highly plausible extra-logical assumptions) the logicist principles conflict with those of classical logic. According to Fine, however, Logicism should not be given up. At most, “we need to achieve some kind of reflective equilibrium between the two sets of principles” (Fine 2010, 97). My position is different. I think that, when interpreted as rules for metaphysical grounding, the principles of Logicism are not as compelling as they are usually thought to be—my goal is precisely to bring out some of the most basic and intuitive reasons why we might want to reject them. If I’m right that the principles are valid when interpreted as rules for conceptual grounding, Fine’s puzzles can still be expected to arise at this level. Whether and how they can be solved are questions on which I will remain neutral.

## 1 Grounding and Disjunction

When metaphysicians speak of ‘ground’, they have in mind the way in which what is metaphysically more fundamental determines what is metaphysically less fundamental. Intuitively, the fact that snow is white is metaphysically more fundamental than the fact that the sentence “Snow is white” is true. Moreover, the fact that snow is white appears to determine the truth of the sentence “Snow is white”. Therefore, metaphysicians say that the fact that snow is white *grounds* the fact that the sentence

“Snow is white” is true.<sup>1</sup> Likewise, they say that the fact that the poker’s molecules are in motion grounds the fact that the poker is hot and that the fact that Socrates exists grounds the fact that the singleton {Socrates} does.<sup>2</sup>

As these familiar examples suggest, it is natural to take the grounds of a fact to necessitate that fact.<sup>3</sup> However, grounding does not reduce to necessitation, for “in addition to the modal connection, there would also appear to be an explanatory or determinative connection—a movement, so to speak, from antecedent to consequent” (Fine 2012, 38). The question I will focus on in this paper is whether this ‘explanatory or determinative connection’—the one which intuitively occurs between the fact that snow is white and the truth of the sentence “Snow is white”—also occurs between the fact stated by a disjunction and the facts stated by its true disjuncts (if it has any).<sup>4</sup>

Some might be tempted to think that the answer to this question is obvious. In “The Question of Realism”, Fine writes that “we appear to be in possession of a wealth of intuitions concerning what does or does not ground what. [...] [Among these, there is the intuition that] what grounds the truth of a disjunction is the truth of those of its disjuncts that are true” (Fine 2001, 21–22).<sup>5</sup> In a similar vein, Rosen says that he finds it “quite clear that if there are disjunctive facts, then a disjunctive fact is grounded in its true disjuncts” (Rosen 2010, 117). Even Audi, who treats grounding as a relation among facts and denies the existence of disjunctive facts, admits that “if one allows the disjunctive fact, there is no question that it will be posterior to the fact that at least one of its disjuncts holds” (Audi 2012a, 115).<sup>6</sup> The same opinion is shared by many contemporary advocates of grounding—including

<sup>1</sup> Here and in the rest of this paper, I use sentences in quotes to refer to semantically individuated sentence *types* and take the relevant notion of ground to be that of *full* ground. These specifications will be implicit hereafter. For the distinction between partial and full grounds, see Fine (2012, 50). Since my target in this paper is the view that logical form is a guide to ground, I will work on the assumption that grounding claims are intelligible and truth-evaluable. For scepticism about grounding, see Daly (2012) and Wilson (2014).

<sup>2</sup> There is a debate as to whether grounding claims are best expressed in terms of a relational predicate flanked by referring expressions (as in “The fact that p grounds the fact that q”) or rather in terms of some operator flanked by sentences (as in “p because q”) (see Correia and Schnieder 2012b and Bliss and Trogdon 2016). Though I will later on adopt a sententialist regimentation, nothing crucial hinges on this choice and I will switch back and forth freely between sententialist and predicationalist locutions.

<sup>3</sup> See Leuenberger (2014) and Skiles (2015) for reasons to doubt that grounds necessitate the facts they ground.

<sup>4</sup> On some accounts, ‘ $p \vee \sim p$ ’ can be true even if neither of its disjuncts is, for example if ‘p’ is a future contingent or a sentence involving the ascription of a vague predicate to a borderline case. The parenthetic proviso is meant to exclude such cases from our focus and will be left implicit hereafter.

<sup>5</sup> One should not be distracted by reference to truth here. As Fine says elsewhere, “what matters is not so much that the truth of p should help ground the truth of p & q but that p should help ground p & q” (Fine 2010, 106). The same applies to the case of disjunction.

<sup>6</sup> Philosophers who agree with Audi that grounding is a relation between facts and that there are no disjunctive facts can identify the Disjunction Principle precisely with this conditional thesis. In the rest of the paper, I will be working on the simplifying assumption that there are disjunctive facts.

Barker (2012), Correia (2005), Krämer & Roski (2017), Litland (2017), Raven (2013) and Schnieder (2011; 2016), to mention but a few.

I take this wide consensus to show that the slogan “Disjunctions are grounded in their disjuncts” has much intuitive appeal—and I will have more to say about why this might be in Sect. 5. Still, I think it would be incautious to take the truth of the Disjunction Principle for granted.

When we look at many actual examples of grounding claims motivated by the principle, these do not sound particularly good. Grounding claims may be expressed in ordinary language by a variety of locutions, including ‘because’ and ‘in virtue of’.<sup>7</sup> Thus we can say:

- (1) “Snow is white” is true *because* snow is white
- (2) The poker is hot *because* its molecules are in motion
- (3) {Socrates} exists *because* Socrates exists
- (4) “Snow is white” is true *in virtue of* the fact that snow is white
- (5) The poker is hot *in virtue of* the fact that its molecules are in motion
- (6) {Socrates} exists *in virtue of* the fact that Socrates exists

In everyday contexts, we seldom speak of sentences, molecules and singletons. Yet (1)–(3) and (4)–(6) sound just as natural and true as many ordinary-language claims involving ‘because’ and ‘in virtue of’. By contrast, consider:

- (7) Either Smith is ill or Jones is at home *because* Jones is at home
- (8) Either Smith is ill or Jones is at home *in virtue of* the fact that Jones is at home

Even if it is assumed that Jones is at home, neither (7) nor (8) sound very natural, let alone true or self-evident.<sup>8</sup> Pointing out that Jones is at home may be an appropriate way of answering the question *whether* Smith is ill or Jones is at home, but it is not (or, at any rate, not always) an appropriate way of answering the question *why* (or *in virtue of what*) either Smith is ill or Jones is at home.

This datum may be explained away in at least two ways. One is to say that our intuitions conflate truth with pragmatic acceptability: statements like (7) and (8) are ones that, in ordinary contexts, we would find trivial and uninformative<sup>9</sup>; furthermore, there may be something strange or infelicitous about asserting a disjunction (even if just to explain it) in a context in which it is known which of its disjuncts holds. The other option is to say that our intuitions conflate different semantic interpretations of (7) and (8)—specifically, one may appeal to the availability of evidential and causal (rather than strictly metaphysical) readings of ‘because’ and ‘in

<sup>7</sup> Some philosophers deny that grounding is ever expressed in ordinary language (Hofweber 2009; Daly 2012). The kind of examples discussed by Witmer et al. (2005, 335–338) seem to me to suggest that this extreme position is misguided. See also (Audi 2012b) and (Krämer and Roski 2015, 60) for discussion.

<sup>8</sup> For other examples, see Tsohatzidis (2015, 47–48).

<sup>9</sup> See Schnieder (2016).

virtue of’ and of exclusive (rather than disjunctive) readings of ‘either...or’, suggesting that, under (some combination of) these readings, (7) and (8) strike us as either dubious or outright false.<sup>10</sup>

We need not investigate these options too closely: even if we take them on board, the point remains that one could hardly make a case for the Disjunction Principle based on the initial intuitiveness of (7) or (8). Perhaps these grounding statements are true, but it should be conceded that, for one reason or another, they are not *obviously* true, nor as intuitive as (1)–(6). If anything, examples like these invite us to consider more carefully the idea that *all* disjunctions are grounded in their disjuncts. Aside from its initial plausibility, is there any good reason to endorse this idea?

## 2 The Argument from Truth-Conditions

One natural reason for believing that all disjunctions must be grounded in their disjuncts has to do with the idea that “the classical truth-conditions should provide us with a guide to ground” (Fine 2010, 105). Classically, disjunction is defined as a truth-functional connective that takes two sentences as inputs and generates as output a sentence true if and only if one of the original sentences is. But if “the truth of a disjunction is a “matter” of one of the disjuncts being true”, it’s hard to see “how the truth of a disjunct [can] fail to be a ground for the disjunction” (ibid.). The very notion of disjunction seems to force upon us the Disjunction Principle through the constraints it places on truth-conditions.<sup>11</sup>

The idea is simple but requires some unpacking. Given the truth-conditions for disjunction, the fact that  $\phi$  will no doubt *necessitate* the fact that  $\phi \vee \psi$ . The question, though, is why the fact that  $\phi$  should be a genuine *ground* for the fact that  $\phi \vee \psi$ , rather than a mere necessitating factor. It is not enough to point out that, since the truth of the disjunction is a “matter” of one of the disjunct being true, the truth of disjunct *explains* the truth of the disjunction. For “explains” can be read in different ways. Every logical proof “explains” its conclusion, in the sense that it provides one with incontrovertible reasons for believing it if one believes the premises. But we need an argument that, given the truth-conditions for disjunction, the truth of the disjunct is a metaphysical ground of—and not just incontrovertible evidence for—the truth of the disjunction.

<sup>10</sup> According to some, ‘either...or’ admits of an ‘exclusive’ reading on which ‘either p or q’ is false if both p and q are true. For discussion of the relationship between ‘either...or’ and logical disjunction, see Jennings (1994). For discussion of the distinction between metaphysical, causal and evidential readings of ‘because’, see Schnieder (2011).

<sup>11</sup> Rosen (2010, 131) offers a closely analogous argument, based on the ‘essence’ of disjunction. I will focus on the argument from truth-conditions because I find the invocation of ‘essence’ problematic in this context (see McSweeney (forthcoming a) for discussion). Schnieder (2016) suggests that denying the logicist principles leads to results that are implausible or theoretically costly—I will discuss these claims in Sect. 4.

I am not aware of any explicit attempt to offer such an argument, so I will outline what seems to me to be a promising strategy to construct one. Let us use ‘<’ as a connective linking the sentence (or sentences) stating the ground (on the left) with the sentence stating what it is grounded (on the right), and let us stipulate that, from now on, the locution ‘either...or’ should always be understood under its disjunctive (i.e. non-exclusive) reading. Assuming that Jones is at home, consideration of the truth-conditions for disjunction seem to provide immediate support for

(i) “Jones is at home” is true < “Either Smith is ill or Jones is at home” is true

(i) says that the sentence “Either Smith is ill or Jones is at home” is true in virtue of the fact that sentence “Jones is at home” is true. This much seems to follow from the disjunctive nature of the first sentence. Meanwhile, the widely accepted principle that truth is grounded in reality (of which (1) is itself an instance) gives us:

(ii) Either Smith is ill or Jones is at home < “Either Smith is ill or Jones is at home” is true.

The same principle, applied to the sentence “Jones is at home”, yields:

(iii) Jones is at home < “Jones is at home” is true

If grounding is assumed to be transitive, (i) and (iii) entail:

(iv) Jones is at home < “Either Smith is ill or Jones is at home” is true

At this point, we find ourselves with *two* distinct grounds for the truth of “Either Smith is ill or Jones is at home”: the fact that either Smith is ill or Jones is at home (by (ii)) and the fact that John is at home (by (iv)). Plausibly, these grounds should somehow be ‘chained’, for it seems odd to think that the truth of “Either Smith is ill or Jones is at home” should be, as it were, overdetermined by two independent grounds whenever Jones is at home (of course, if grounding claims like (i) are correct, the truth of a disjunctive sentence will be overdetermined in all those cases in which it is assumed that *both* of its disjuncts are true; but no such assumption has been made in the present case). Since it is clear that the fact that either Smith is ill or Jones is at home does *not* ground the fact that John is at home, only one possibility remains:

(v) Jones is at home < Either Smith is ill or Jones is at home

This is what we aimed to show: from a claim stating the grounds of the *truth* of “Either Smith is ill or Jones is at home” we extracted a claim stating the grounds of the *fact* that either Smith is ill or Jones is at home.

Let us call *argument from truth-conditions* the kind of argument exemplified by (i)–(v). Since the argument applies to *any* disjunctive statement whatsoever, it supports an *Unrestricted Disjunction Principle* (hereafter: ‘UDP’), according to which:

[UDP] For any  $\varphi$  and any  $\psi$  whatsoever:

- if  $\varphi$ , then  $\varphi < \varphi \vee \psi$
- if  $\psi$ , then  $\psi < \varphi \vee \psi$

It is this unrestricted thesis that many logicians have in mind when defending the slogan that disjunctions are grounded in their true disjuncts. Consider, for example, the following schematic formulas and rules of inference (where metaphysical grounding is expressed, respectively, with ‘<’, ‘because’, ‘←’ and ‘makes-the-case’; and ‘the fact that p’ is abbreviated either as ‘[p]’ (Rosen) or as ‘F[p]’ (Barker)):

$$\text{If } p \text{ is true, then } [p \vee q] \leftarrow [p]$$

(Rosen 2010, 117)

$\varphi$	$\psi$
$(\varphi \vee \psi)$ because $\varphi$	$(\varphi \vee \psi)$ because $\psi$

(Schnieder 2011, 449)

$A < A \vee B$	$B < A \vee B$
----------------	----------------

(Fine 2012, 58)

$$Fp \text{ makes-the case } F[p \vee q]$$

(Barker 2012, 284)

Since to accept a schematic formula (or rule of inference) is to accept the truth (or validity) of all its instances, it is easy to see that philosophers who accept the schemas above are committed to the truth of UDP, the principle that every disjunction is metaphysically grounded in its true disjuncts.

Importantly, this is exactly what one should believe if one buys into the idea that classical truth-conditions provide us with a guide to ground: since the classical truth-conditions for disjunction apply to every disjunctive statement, they give us reason to think that some disjunctions are grounded in their true disjuncts if and only if they give us reason to think the all of them are. The question at this point is: can UDP be plausibly upheld? Does the argument from truth-conditions

really prove that *every* true disjunction is metaphysically grounded in its true disjuncts?

### 3 Against UDP

While UDP will strike many as the most natural and plausible version of the Disjunction Principle, saying that *every* disjunction is grounded in its true disjuncts has some problematic implications. This section illustrates these problematic implications with three examples; the next section explains why advocates of UDP cannot satisfactorily deal with such examples by appealing to the distinction between fine- and coarse-grained conceptions of facts.

The first example is a grounding statement of the form ' $\varphi < \varphi \vee \varphi$ ':

(Caesar) Caesar was murdered  $<$  Either Caesar was murdered or Caesar was murdered

The reason why this statement is problematic is obvious. As we've seen in Sect. 1, grounds are supposed to explain or determine the facts they ground. But, on the face of it, the fact that Caesar was murdered does not explain or determine the fact that either he was murdered or he was murdered any more than it explains or determines itself—which, of course, it does not do at all. If (UDP) holds, (Caesar) should be true—and yet it does not seem to be.

Similarly, consider a grounding statement of the form ' $\varphi < \varphi \vee \sim\varphi$ ':

(Bill Gates) Bill Gates is rich  $<$  Either Bill Gates is rich or it is not the case that Bill Gates is rich

Assuming that Bill Gates is rich and that (UDP) is correct, (Bill Gates) should be just as true as any other grounding claim connecting a disjunctive truth with one of its true disjuncts. Intuitively, though, the fact that either Bill Gates is rich or he isn't has nothing to do with how much money Bill Gates has in his bank account: we wouldn't say that it is because (or in virtue of the fact that) Bill Gates is rich that either he is rich or he isn't. Importantly, affirming that (Caesar) and (Bill Gates) are awkward and counterintuitive is not denying the appeal of 'because' statements like:

(Caesar\*) "Either Caesar was murdered or Caesar was murdered" is true because "Caesar was murdered" is true

(Bill Gates\*) "Either Bill Gates is rich or it is not the case that Bill Gates is rich" is true because "Bill Gates is rich" is true

The point is that our intuitions seem to discriminate between the two cases. While there is a clear sense in which *the truth* of "Caesar was murdered" explains *the truth* of "Either Caesar was murdered or Caesar was murdered", there is no obvious sense in which *Caesar's having been murdered* explains the fact that *either he was murdered or he was murdered*. It seems fair to say that, if we didn't have any prior



commitment to UDP, we wouldn't have any temptation to endorse (Caesar) rather than limiting ourselves to accepting (Caesar\*). And similarly with (Bill Gates) and (Bill Gates\*).

(Caesar) and (Bill Gates) may be dismissed as minor wrinkles in the logicist account. As we'll see in the next section, considerations of theoretical simplicity and overall coherence may be taken to suggest that we should live with the consequences of UDP even if, occasionally, these strike us as less than intuitive. Let me anticipate that I don't think we can rest fully satisfied with this kind of reaction. Coherence and theoretical simplicity should be valued when a theory does a good job at explaining the data, or a significant portion thereof. But, given what has been said in Sect. 1, it is, at the very least, unclear whether there are any incontrovertible 'data' that UDP does a good job at explaining: even claims like (7) and (8), which do not share the peculiar logical form of (Caesar) and (Bill Gates), can hardly be described as intuitive. At any rate, I want to suggest that a third kind of case makes trouble for UDP—one that casts even more serious doubt on its trustworthiness as a guide to ground. Let me introduce it with the help of an example that Jerry Fodor uses to argue for the causal inefficacy of certain highly gerrymandered properties (Fodor 1987, 33).

Consider a dime that has only two configurations, heads-up and tails-up. Define the predicate 'is an H-electron' so that it's satisfied by a particle at a time  $t$  if and only if the particle is an electron and the dime is heads-up at  $t$ . Similarly, define the predicate 'is a T-electron' so that it's satisfied by a particle at a time  $t$  if and only if the particle is an electron and the dime is tails-up at  $t$ . Suppose that Sparky is an electron and that the dime is heads-up. Given the truth-conditions for disjunction, there is a clear sense in which:

(Sparky\*) "Either Sparky is an H-electron or Sparky is a T-electron" is true because "Sparky is an H-electron" is true

But UDP implies:

(Sparky) Sparky is an H-electron < Either Sparky is an H-electron or Sparky is a T-electron

Now, while (Sparky\*) is no more problematic than (Caesar\*) and (Bill Gates\*), (Sparky) strikes me as a bad grounding claim.

To see why, compare the fact that Sparky is an H-electron with the fact that it is either an H- or a T-electron and ask yourself which of these two facts is more gerrymandered—or, in Lewis's (1983) terminology—*less natural* than the other. (Lewis takes naturalness to be a property of properties, but the notion can easily be extended to facts—one simple way to do so is to construe fact as properties of possible worlds, or 0-nary properties). It seems quite clear that the less natural fact is the first. For Sparky to be *either* an H- or a T-electron it is only necessary that Sparky is an electron and that the dime has the configurations heads-up and tails-up, whereas for Sparky to be an H-electron it is necessary that Sparky exists and that the dime is in the configuration heads-up. Intuitively, the latter is a more *arbitrary* combination of circumstances than the former—one that makes for *less* resemblance across

worlds, that is *less* likely to figure in the laws of nature and *less* plausible a candidate for linguistic reference (these being three standard criteria for determining the degree of naturalness of a property or fact).<sup>12</sup>

As we have seen in Sect. 1, grounding is a determinative connection occurring between more fundamental phenomena and less fundamental ones. But consider the following principle relating naturalness and fundamentality:

*Naturalness/Fundamentality Principle:* If the fact that  $\phi$  is less natural than the fact that  $\psi$  then the fact that  $\phi$  is less fundamental than the fact that  $\psi$ .<sup>13</sup>

If the principle is true and the fact that Sparky is an H-electron is less natural than the fact that it is either an H- or a T-electron, the former fact is also less fundamental than the latter. Which means that—contrary to (Sparky)—it should not figure among its grounds. Again, this is bad news for UDP.

#### 4 Facts: Fine-and Coarse-Grained

Advocates of Logicism have not been insensitive to the difficulties raised by UDP. In particular, consider again:

(Caesar) Caesar was murdered < Either Caesar was murdered or Caesar was murdered

Here the problem is often said to depend on which conception of facts one adopts. On a relatively *coarse-grained* conception, the fact that Caesar was murdered and the fact that either Caesar was murdered or Caesar was murdered are one and the same, so the first cannot explain the second, on pain of circularity. But on a *fine-grained* conception, the fact that Caesar was murdered and the fact that either Caesar was murdered or Caesar was murdered are distinct, so there is no obvious reason to regard the truth of (Caesar) as problematic.<sup>14</sup>

This kind of response points to a hidden assumption in the argument from truth-conditions. In arguing that the fact that  $\phi$  should ground the fact that  $\phi \vee \psi$  we assumed that it would be undesirable to let the truth of “ $\phi \vee \psi$ ” be *over-determined* by the fact that  $\phi \vee \psi$  and the fact that  $\phi$  (see Sect. 2). But on a coarse-grained conception the latter cannot be assumed to be *two* facts—at least

<sup>12</sup> An alternative argument would proceed by comparing the property of being an H-electron with the property of being either an H- or a T-electron: given some suitable principles connecting property-naturalness with fact-naturalness, one could plausibly show that, since the first property is less natural than the second, the fact that Sparky is an H-electron is less natural than the fact that it is either an H- or a T-electron.

<sup>13</sup> For a different but related principle connecting naturalness (hence, fundamentality) with grounding, see Bricker (2006, 271). Bennett argues that “naturalness is not obviously a unified phenomenon, and it is also a poor fit for our pretheoretic relative fundamentality concepts” (Bennett 2017, 140). However, her worries can be at least partly assuaged by taking the criteria mentioned above to provide only sufficient and other-things-being-equal conditions for greater/lesser naturalness.

<sup>14</sup> Instances of this reply can be found in the work of Correia (2010), Krämer and Roski (2015) and Correia and Schnieder (2012b, 18).

not in cases where ‘ $\varphi$ ’ and ‘ $\psi$ ’ have been replaced by the same sentence. Thus, a logicist may say that we are left with two equally good alternatives: adopting the coarse-grained conception on which (Caesar) is false (and the argument from truth-conditions gives us no reason to think it’s true) or adopting the fine-grained conception on which (Caesar) is unproblematically true (and the argument from truth-conditions correctly implies this result). Can this strategy be extended to (Bill Gates) and (Sparky)?

Considering the possibility that, on at least some conceptions of facts and for at least some replacements of ‘ $\varphi$ ’ and ‘ $\psi$ ’, the fact that  $\varphi$  and the fact that  $\varphi \vee \psi$  might count as identical, the argument from truth-conditions supports the following, qualified version of the unrestricted Disjunction Principle:

[UDP\*] For any  $\varphi$  and any  $\psi$  whatsoever:

- if  $\varphi$ , then  $\varphi < \varphi \vee \psi$ , unless the fact that  $\varphi$  and the fact that  $\varphi \vee \psi$  are one and the same
- if  $\psi$ , then  $\psi < \varphi \vee \psi$ , unless the fact that  $\psi$  and the fact that  $\varphi \vee \psi$  are one and the same

Now take a coarse-grained conception on which the fact that  $\varphi$  and the fact that  $\varphi \vee \varphi$  are one and the same. On this conception, UDP\* does *not* imply (Caesar). But assuming that Bill Gates is rich and that the dime is heads-up, it still implies:

(Bill Gates) Bill Gates is rich  $<$  Either Bill Gates is rich or it is not the case that Bill Gates is rich

(Sparky) Sparky is an H-electron  $<$  Either Sparky is an H-electron or Sparky is a T-electron

After all, no plausible conception of facts is *so* coarse-grained as to count the fact that Bill Gates is rich as identical to the fact that either he is rich or he isn’t, nor the fact that Sparky is an H-electron as identical to the fact that it is either an H- or a T-electron. Thus, adopting the coarse-grained conception and replacing UDP with UDP\* will not help with these cases. If there’s a way to deal with all three counterexamples, it must be by adopting a fine-grained conception on which the fact that  $\varphi$  and the fact that  $\varphi \vee \varphi$  count as distinct. Since, on this conception, UDP\* *does* imply (Caesar), what must be said is that, insofar as we conceive of facts as fine-grained, (Caesar) is a perfectly good grounding claim—and so are (Bill Gates) and (Sparky).

The problem is that it’s hard to see how this line could be plausibly sustained. Consider how (Caesar) can be expressed in natural language:

- (9) Either Caesar was murdered or Caesar was murdered *because* Caesar was murdered

It is not clear how adopting a fine-grained conception of facts could help remove the impression that, on the appropriate reading of ‘because’, (9) is a bad grounding

claim—and I say this in my capacity as metaphysician, not in my capacity as ordinary speaker of English. Strictly speaking, (9) concerns the murder of Caesar, not the *fact* that Caesar was murdered. Indeed, (9) does not mention facts at all. If one has the (metaphysical) intuition that, on the appropriate reading of ‘because’, (9) is a bad grounding claim, it is not by adopting one understanding of facts rather than another that one will get oneself in a position to revise that intuition.

Advocates of UDP\* may reply that, by adopting the fine-grained conception, one can make sense of claims like (10) without giving up the idea that grounding is irreflexive:

- (10) The fact that Caesar was murdered grounds the fact that either Caesar was murdered or Caesar was murdered.

But it is one thing to *make sense* of (10), and quite another to find (10) *plausible*. Our understanding of claims like (10) is mediated—or, at the very least, strongly influenced—by our understanding of claims like (9) on the appropriate reading of ‘because’. When one tries to be rigorous in one assessment of (10), one must go back to (9). And if (9) continues to strike one as false, the problem is not solved.

Nor is it obvious why adopting the fine-grained conception should help with cases like (Bill Gates). Schnieder suggests that our intuitions against such cases rest on a dubious metaphysical principle according to which necessary facts cannot hold on contingent grounds (Schnieder 2011, 457–458). The principle is indeed dubious, for, as Schnieder points out, the modal status of a fact seems irrelevant to the question of what grounds it (*ibid.*). But I am not sure that rejecting the principle removes the difficulty. We may not be able to articulate general philosophical reasons for denying grounding claims like (Bill Gates). But the question remains whether, once we adopt the fine-grained conception, we have any positive reasons for accepting them—that is, reasons independent of the alleged truth of UDP\* and strong enough to override our intuitions against them. My impression is that we don’t: thinking of the fact that either Bill Gates is rich or he isn’t as fine-grained doesn’t make it any more plausible to think that this fact holds because Bill Gates is rich.<sup>15</sup>

Reflection on these difficulties might push advocates of UDP\* in a slightly different direction. They might concede that, even on the fine-grained conception, claims like (Caesar) and (Bill Gates) remain somewhat counterintuitive. But they might argue that we should accept such claims on general theoretical grounds. The alternative to endorsing UDP\* and accepting these claims is to recognize the fundamentality of at least some disjunctive facts—for example, some facts of the form ‘ $\phi < \phi \vee \phi$ ’ and ‘ $\phi < \phi \vee \sim\phi$ ’ – and this result might seem undesirable. Specifically, Schnieder (2016) offers two reasons why we should avoid this result and stick to principles like UDP\*. The first is that “truth-functional compounds just do not seem to be fundamental descriptions of reality”—they seem “derivative” and treating

<sup>15</sup> I note in passing that Fine himself (Fine 2005, 324) is not entirely unsympathetic to the idea of treating facts of the form ‘ $\phi \vee \sim\phi$ ’ as fundamental. His only reason to resist this idea is that it conflicts with the Disjunction Principle.

them as fundamental is “bizarre”; the second is that “other things being equal, a reduction of fundamental truths is a theoretical virtue”, so a theory that incorporates principles like UDP\* and takes disjunctive facts to be grounded in their true disjuncts is “favoured by principles of theory choice” (Schnieder 2016, 167).

These considerations give pause, but I am not convinced we should be moved by them. Take the first point: I agree that, to the extent that we take them to be two distinct facts, the fact that either Caesar was murdered or Caesar was murdered appears to be “derivative” of the fact that Caesar was murdered. However, this is by itself no reason to think that we’re dealing with a case of *metaphysical* derivativeness. In the next section, I will suggest that we can take the fact that either Caesar was murdered or Caesar was murdered to be *conceptually* grounded in the fact that Caesar was murdered. Maybe this is not enough to account for the kind of derivativeness intuitions invoked by Schnieder—but, if so, more needs to be said about why it is not enough.

As to Schnieder’s appeal to principles of theory choice, it may be criticized for putting the cart before the horse. There is no doubt that, other things being equal, we should prefer a theory that explains more to a theory that explains less. But it would be cheating to allow bad explanations to matter for the purposes of theory choice. Advocates of UDP\* owe us an argument *before* they can invoke principles of theory choice to justify the adoption of UDP\* itself. (Compare: we wouldn’t prefer a physics theory to another just because it claims to explain things that the other theory treats as fundamental—that is to say, we wouldn’t do so *unless* we had reason to find the proposed explanation convincing or, at least, acceptable.)

What’s more, cases like (Sparky) give us strong theoretical reasons *against* adopting principles along the lines of UDP\*. Recall the shape of the case: if a principle like UDP\* is true and the dime is heads-up, the fact that Sparky is an H-electron grounds the fact that either Sparky is an H-electron or Sparky is a T-electron; yet the former fact seems less natural than the latter. If we take grounding to obey principles like UDP\*, we are forced to say that grounding and naturalness pull in opposite directions.

One might initially think that this problem only arises if we adopt a coarse-grained conception on which the disjunctive fact that either Sparky is an H-electron or Sparky is a T-electron is identical to the fact that Sparky is an electron. But it’s important to see that this is not so. Certainly, the coarse-grained conception makes the problem more pressing: we have a clear intuition that the fact that Sparky is an electron is more natural than the fact that it is an H-electron; thus, if the disjunctive fact that either Sparky is an H-electron or Sparky is a T-electron is identical to the fact that Sparky is an electron, we have reason to think that the disjunctive fact is more natural than the fact that Sparky is an H-electron.

But the problem doesn’t go away if we adopt a fine-grained conception on which the two facts are distinct. The naturalness criteria can be applied *directly* to the fact that Sparky is either an H- or a T-electron and they *still* make this fact more natural than the fact that Sparky is an H-electron: of the two facts, it is clearly the former that makes for *more* inter-world resemblance, that is *more* likely to figure in the

laws of nature, and that is a *more* plausible candidate as a candidate for linguistic reference.

As far as I can see, a defender of UDP\* may respond to this problem in two ways. One would be to insist that, on the fine-grained conception, the fact that Sparky is either an H- or a T-electron is *less* natural than the fact that Sparky is an H-electron precisely because the former, unlike the latter, is stated by a disjunctive sentence. This would require the truth of some principle along the lines of

*Naturalness/Disjunctiveness Principle:* For any  $\varphi$  and any  $\psi$  whatsoever, if it's a fact that  $\varphi$ , the fact that  $\varphi$  is more natural than the fact that  $\varphi \vee \psi$ .

The question is why such a principle should be trusted. It true that, on Lewis's own conception (as applied to facts), one can determine the degree of naturalness of two facts by comparing the logical complexity of the sentences stating those facts.<sup>16</sup> Crucially, though, this method is only valid when the sentences in question belong to a language in which, among other things, "all syntactically simple non-logical vocabulary expresses perfectly natural properties" (Dorr and Hawthorne 2013, 19). In a language containing atomic predicates for such gerrymandered properties as being an H-electron, there is no good reason to expect logical complexity to be a telling criterion. Cases like (Sparky) illustrate exactly this point.

The alternative response would be to question the *Naturalness/Fundamentality Principle*, i.e. to allow that a fact can be less natural than another *without* being less fundamental than it (see Sect. 3). This is a legitimate move, but it comes at a considerable price. Lewis used "fundamental" as synonymous with "perfectly natural", and this is not just a terminological coincidence. As Dorr and Hawthorne observe:

The theoretical work that is supposed to be done by locutions [like 'fundamental', 'in reality' and 'in virtue of'] has much in common with the work that is supposed to be done by 'natural': it is far from clear what point there would be in distinguishing the question whether the property of being F is perfectly natural from the question whether Fness is fundamental, or whether it is (or could be) true in reality that things are F, or whether things that are F are F in virtue of nothing. (Dorr and Hawthorne 2013, 72)

If Dorr and Hawthorne are right, questions of Lewisian naturalness and questions of fundamentality are intimately linked. An approach that forces us to drive a wedge between them can hardly be described as theoretically virtuous.

To sum up, I don't think that invoking a distinction between coarse- and fine-grained facts will remove the difficulties raised by (Caesar), (Bill Gates) and (Sparky). The coarse-grained conception helps with (Caesar), but not with (Bill Gates) or (Sparky). The fine-grained conception leaves room for claiming that we should endorse UDP\* on general theoretical grounds—but, among other things, the fact that advocates of UDP\* can only accommodate cases like (Sparky) by severing the connection between naturalness and fundamentality makes this claim highly

<sup>16</sup> See (Lewis 1986, 61, 1999, 66).

questionable. Whether facts are fine- or coarse-grained, the Disjunction Principle is in trouble.

## 5 Metaphysical Grounds and Conceptual Grounds

Let us take stock. What I have argued so far is that an unrestricted version of the Disjunction Principle has some problematic implications (Sect. 3). I have also suggested that such implications cannot be avoided or made more acceptable by adopting one conception of facts rather than another (Sect. 4).

One possible reaction to these results might be to try to *restrict* the Disjunction Principle. The idea would be to say that it is not disjunctive facts in general that are grounded in their true disjuncts, but only disjunctive facts that satisfy certain special criteria.

I see two challenges for this kind of ‘restrictive’ approach. The first is to explain *how*, exactly, the restriction should be carried out so as to avoid the problems raised by (Caesar), (Bill Gates) and (Sparky). The first two cases are relatively easy, for one could simply exclude disjunctions of the form ‘ $\phi \vee \phi$ ’ and ‘ $\phi \vee \sim\phi$ ’ from the domain of application of the principle. But cases like (Sparky) raise a special difficulty. In principle, one could say that, though disjunctive facts are usually grounded in their disjuncts, this rule admits of exceptions when, by naturalness standards, the disjuncts are less fundamental than the disjunction. Unfortunately, I do not know how suggestions along these lines could be carried out without making the possibility of applying the principle to any two facts contingent on a prior assessment of their naturalness. One obvious risk is to make the principle trivial, uninformative or somehow ad hoc.

The second challenge concerns the *motivation* for accepting a restricted version of the Disjunction Principle. In Sect. 2, I articulated an argument that, based on the truth-conditions for disjunction, motivates the idea that disjunctive facts are grounded in their disjuncts. Now—to repeat a point I briefly made at the end of that section—it is crucial to see that an argument of that sort can only provide us with reason to endorse the Disjunction Principle if the latter is understood as *unrestricted*. For example, if it’s because of the very *truth-conditions* of disjunction that we must take the fact stated by the disjunct to ground of the fact stated by the disjunction, we should *not* discriminate between the case where the disjunct is more natural than the disjunction and the case in which it isn’t—the truth-conditions are the same in both cases. This means that, even if there are restricted versions of the Disjunction Principle capable of avoiding the problems raised by (Caesar), (Bill Gates) and (Sparky), we need a different reason to accept them than the kind of reason grounding theorists have given us so far. And it is unclear what the alternative reason might be.

This is not the place to discuss how advocates of Logicism might deal with these two challenges. Instead, I want to sketch the contours of a different, ‘non-restrictive’ approach—one that gives up the idea of reading off the metaphysical grounds of a disjunctive fact from the logical form of the sentence stating it,

while allowing us to respect the intuition that all disjunctive facts are in some sense “derivative” of their true disjuncts.

It has been pointed out that—alongside the notion of metaphysical fundamentality—there is also a notion of conceptual fundamentality, so that, corresponding to the relation of *metaphysical grounding* we can recognize a relation of *conceptual grounding*.<sup>17</sup> A picturesque way of putting the difference may be the following. In asking about the *metaphysical* grounds of the fact that  $p$ , we are asking about the facts that God brings about to make it the case that  $p$ . For example, to make it the case that the singleton {Socrates} exists, God brings about the fact that Socrates exists; hence, the fact that Socrates exists is a metaphysical ground of the fact that the singleton {Socrates} does. In asking about the *conceptual* grounds of the fact that  $p$ , we are asking about the facts that God relies on, among the facts they know, to arrive at the conclusion that  $p$ . For example, to arrive at the conclusion that “Either Smith is ill or Jones is at home” is true, God relies on their knowledge of the fact that “Jones is at home” is true; hence, the fact that “Jones is at home” is true is a conceptual ground of the fact that “Either Smith is ill or Jones is at home” is true.

The two metaphors work to the extent that we make certain intuitive assumptions about God’s way of doing and knowing things. Asking about the facts that God brings about to make it the case that  $p$  is a helpful intuitive guide to the metaphysical grounds of the fact that  $p$  provided we assume that:

- a. God’s way of doing things doesn’t leave room for failures (the metaphysical grounds of a fact metaphysically necessitate that fact)
- b. God has a bottom-up approach to building the world (the metaphysical grounds of a fact can’t be metaphysically less fundamental than the fact they ground)
- c. God doesn’t operate in unintelligible ways (the metaphysical grounds of a fact are not explanatorily irrelevant to that fact).

Similarly, asking about the facts that God relies on to arrive at the conclusion that  $p$  is a helpful intuitive guide to the conceptual grounds of the fact that  $p$  provided we assume that:

- A. God doesn’t take epistemic risks (the conceptual grounds of a fact provide conclusive a priori evidence in favour of that fact)
- B. God has a bottom-up approach to knowing things (the conceptual grounds of a fact can’t be conceptually less basic than the fact they ground)
- C. God doesn’t reason in unintelligible ways (the conceptual grounds of a fact are not explanatorily irrelevant to that fact).

<sup>17</sup> Cf. Chalmers (2012, 452–458); Correia (2013, 2), Dodd (2007), Correia and Schnieder (2012b, 21), Poggiolini (2016) and McSweeney (forthcoming b). For discussion of conceptual grounding and conceptual explanation, see also Schnieder (2006, 32–33) and Liggins (2012, 260–262). For some ways of understanding conceptual priority here, see Chalmers (2012, 307–308).



Just as (a), (b) and (c) are not meant to form the basis of an analysis of the notion of metaphysical grounding, (A), (B) and (C) are not meant to form the basis of an analysis of the notion of conceptual grounding: the conditions may be individually necessary without being jointly sufficient, and there may be no non-circular way of defining what kind of explanatory relevance matters to (c) and (C), respectively. For present purposes, what matters is that we get an intuitive handle on the two notions, not that we succeed in analysing them.

Now, insofar as we distinguish conceptual and metaphysical grounding, it is natural to suppose that one might not go hand in hand with the other. For example, as Chalmers notes,

A claim about a table might be metaphysically grounded by microphysical truths about charge, spin, and the like, but it is not plausibly conceptually grounded in those truths. The truth that an entity has a certain charge may be conceptually grounded in the claim that it has a property that plays a certain role, but (at least on some views) it will not be metaphysically grounded in that truth. (Chalmers 2012, 453)

The suggestion I want to put forward is that (Caesar), (Bill Gates) and (Sparky) might provide further illustration of how the two types of grounding can come apart: in each of these examples, a fact which is not a good metaphysical ground for another fact seems, nonetheless, a good conceptual ground for it.<sup>18</sup>

Take the case of Caesar's murder. It seems outlandish to say that bringing about the fact that Caesar was murdered is God's way of ensuring that either Caesar was murdered or Caesar was murdered—even if we think of the two facts as distinct, there does not seem to be any clear sense in which one fact *metaphysically* determines the other. By contrast, it is not implausible to think that the disjunctive fact is *conceptually* determined by the non-disjunctive one: among the fact they know, God relies on the fact that Caesar was murdered to arrive at the conclusion that either Caesar was murdered or Caesar was murdered. Thus, we can take the fact that Caesar was murdered to be a *conceptual* ground of the fact that either Caesar was murdered or he was murdered, even if it is not among its *metaphysical* grounds. Similarly, the fact that Bill Gates is rich is a conceptual (but not metaphysical) ground of the fact that either he is rich or he isn't, and the fact that Sparky is an H-electron is a conceptual (but not metaphysical) ground of the fact that Sparky is either an H- or a T-electron.

Consideration of these cases supports a general hypothesis. Compare two schematic versions of the argument from truth-conditions. The first version, corresponding to the argument discussed in Sect. 2, employs the notion of metaphysical grounding (marked by '<'):

- (a) " $\phi$ " is true < " $\phi \vee \psi$ " is true (by the truth-conditions for disjunction)
- (b)  $\phi \vee \psi$  < " $\phi \vee \psi$ " is true (by the truth-grounded-in-reality principle)

<sup>18</sup> Richardson's (2018) notion of 'how-grounding' might provide the basis for an alternative treatment of (one or more of) these cases. I won't explore this strategy here.

- (c)  $\varphi < \text{“}\varphi\text{”}$  is true (by the truth-grounded-in-reality principle)
- (d)  $\varphi < \text{“}\varphi \vee \psi\text{”}$  is true (from (a) and (c), by transitivity)
- (e)  $\varphi < \varphi \vee \psi$  (only plausible chaining of (b) and (d))

The second version employs the notion of conceptual grounding (marked by ‘ $\leftarrow$ ’):

- (A) “ $\varphi$ ” is true  $\leftarrow$  “ $\varphi \vee \psi$ ” is true (by the truth-conditions for disjunction)
- (B)  $\varphi \vee \psi \leftarrow$  “ $\varphi \vee \psi$ ” is true (by the truth-grounded-in-reality principle)
- (C)  $\varphi \leftarrow$  “ $\varphi$ ” is true (by the truth-grounded-in-reality principle)
- (D)  $\varphi \leftarrow$  “ $\varphi \vee \psi$ ” is true (from (A) and (C), by transitivity)
- (E)  $\varphi \leftarrow \varphi \vee \psi$  (only plausible chaining of (B) and (D))

It may be suggested that, while the first version of the argument fails, the second succeeds. The metaphysical version fails because the truth-conditions for disjunctions support (A) but not (a): the truth of a disjunct conceptually grounds the truth of the disjunctive sentence, but whether this is also an instance of metaphysical grounding will depend on the details of the case. By contrast, the conceptual version of the argument succeeds because (B) and (b) are both true: truth is both conceptually and metaphysically grounded in reality, meaning that the fact that  $\varphi$  is both God’s means of making it the case that “ $\varphi$ ” is true and God’s basis for knowing that this is so.<sup>19</sup>

If the hypothesis is correct, UDP and UDP\* can be replaced by a conceptual version of the Disjunction Principle:

[CDP] For any  $\varphi$  and any  $\psi$  whatsoever:

- if  $\varphi$ , then  $\varphi \leftarrow \varphi \vee \psi$
- if  $\psi$ , then  $\psi \leftarrow \varphi \vee \psi$

The truth of CDP would explain the perceived contrast between (Caesar) and (Caesar\*), (Bill Gates) and (Bill Gates\*) and (Sparky) and (Sparky\*) (see Sect. 3): the fact that (Caesar\*), (Bill Gates\*) and (Sparky\*) are concerned with explaining the truth of representational items like sentences makes the conceptual reading (on which they are true) more salient than the metaphysical one (on which they are false). More importantly, the truth of CDP would account for the initial appeal of the slogan that disjunctions are grounded in their disjuncts (see Sect. 2) as well as for the intuition, invoked by Schnieder (2016), that truth-functional compounds are, in some important sense, “derivative” (see Sect. 4).

More should certainly be said to precisify and corroborate the hypothesis. The notion of conceptual grounding requires further investigation. The plausibility of CDP must be carefully evaluated. But the general line is clear, and not altogether

<sup>19</sup> For a defence of (B), see Künne (2003, 154–155) and Dodd (2007, 399–400). For additional reasons to regard the kind of grounding involved in logical cases as different from the kind of grounding involved in metaphysical cases, see Koslicki (2015, 317–318) and McSweeney (forthcoming b).

implausible: classical truth-conditions are a guide to conceptual ground, without being a guide to metaphysical ground. It is only if we overlook the distinction between conceptual and metaphysical grounding that we get ourselves into trouble.

## 6 Another Look at Logicism

I started this paper by raising some concerns about Logicism, the view that logical form can be used as a guide to ground. One key tenet of Logicism is the principle that every disjunctive fact is metaphysically grounded in its true disjuncts (Sects. 1 and 2). I argued that this principle leads to implausible results no matter what conception of facts we adopt (Sects. 3 and 4). I also suggested that, rather than trying to restrict the principle, we should take it to apply exclusively to conceptual (rather than metaphysical) grounds (Sect. 5). One advantage of this ‘non-restrictive’ approach is that it allows us to retain the idea that it’s because of the very truth-conditions for disjunction that disjunctive facts are “derivative” of their true disjuncts— an idea that can only be used to motivate *unrestricted* versions of the principle.

This line of thought can be extended to other attempts at reading off the grounds of a fact from the logical form of the sentence stating that fact. Taking *all* conjunctive facts to be metaphysically grounded in their conjuncts and *all* universal and existential truths to be metaphysically grounded in their instances is likely to commit us to results that are either implausible or incompatible with our intuitions about Lewisian naturalness.<sup>20</sup> Restricting these principles would be at odds with our motivation for endorsing them in the first place. Better to keep the principles unrestricted, while taking them to concern conceptual (rather than metaphysical) grounding.

**Acknowledgements** Some of the research for this study was conducted as part of my work for the project ‘Knowledge Beyond Natural Science’ (KBNS), which was funded by the John Templeton Foundation at the University of Stirling from March 2017 to November 2019. A first version of this paper was presented at the philosophy Institutskolloquium of the University of Hamburg on 13 April 2016 and at the ‘Metaphysics of Grounding’ workshop held at TU Dresden on 29–30 April 2016—thanks to the participants in these events for their comments and criticisms. I am very grateful to Philipp Blum, Michael Clark, Fabrice Correia, Ryan Cox, Yannic Kappes, Martin Lipman, Stefan Roski, Benjamin Schnieder, Moritz Schulz, Nathan Wildman, and two anonymous referees for their feedback on subsequent versions.

## References

- Audi, P. (2012a). A clarification and defense of the notion of grounding. In F. Correia & B. Schnieder (Eds.), *Metaphysical grounding: Understanding the structure of reality* (pp. 101–121). Cambridge: Cambridge University Press.
- Audi, P. (2012b). Grounding: Toward a theory of the *In-virtue-of* Relation. *The Journal of Philosophy*, 109(12), 685–711.
- Barker, S. (2012). Expressivism about making and truth-making. In F. Correia & B. Schnieder (Eds.), *Metaphysical grounding: Understanding the structure of reality* (pp. 272–293). Cambridge: Cambridge University Press.
- Bennett, K. (2017). *Making things up*. Oxford: Oxford University Press.

<sup>20</sup> See McSweeney (forthcoming a) for discussion of these cases.

- Bliss, R., & Trogon, K. (2016). Metaphysical Grounding. In E. N. Zalta (Ed.), *The Stanford Encyclopedia of Philosophy* (Winter 2016 Edition ed.). Oxford: Oxford University Press.
- Bricker, P. (2006). The relation between general and particular: Entailment vs. supervenience. In D. Zimmerman (Ed.), *Oxford Papers in Metaphysics* (Vol. 3, pp. 251–287). Oxford: Oxford University Press.
- Chalmers, D. (2012). *Constructing the world*. Oxford: Oxford University Press.
- Correia, F. (2005). *Existential dependence and cognate notions*. Munich: Philosophia Verlag.
- Correia, F. (2010). Grounding and Truth-Functions. *Logique et Analyse*, 53, 251–279.
- Correia, F., & Schnieder, B. (Eds.). (2012a). *Metaphysical grounding: Understanding the structure of reality*. Cambridge: Cambridge University Press.
- Correia, F., & Schnieder, B. (2012b). Grounding: An opinionated introduction. In F. Correia & B. Schnieder (Eds.), *Metaphysical grounding: Understanding the structure of reality* (pp. 1–36). Cambridge: Cambridge University Press.
- Daly, C. (2012). Scepticism about Grounding. In F. Correia & B. Schnieder (Eds.), *Metaphysical grounding: Understanding the structure of reality* (pp. 81–100). Cambridge: Cambridge University Press.
- Dodd, J. (2007). Negative truths and Truthmaker Principles. *Synthese*, 156(2), 383–401.
- Dorr, C., & Hawthorne, J. (2013). Naturalness. In K. Bennett & D. Zimmerman (Eds.), *Oxford Studies in Metaphysics* (Vol. 8, pp. 3–77). Oxford: Oxford University Press.
- Fine, K. (2001). The question of realism. *Philosopher's Imprint*, 1(1), 1–30.
- Fine, K. (2005). "Necessity and non-existence". In his *Modality and Tense: Philosophical Papers*, Oxford: OUP.
- Fine, K. (2010). Some puzzles of ground. *Notre Dame Journal of Formal Logic*, 51(1), 97–118.
- Fine, K. (2012). Guide to Ground. In F. Correia & B. Schnieder (Eds.), *Metaphysical grounding* (pp. 37–80). Cambridge: Cambridge University Press.
- Fodor, J. (1987). *Psychosemantics: The problem of meaning in the philosophy of mind*. Cambridge: MIT Press.
- Hofweber, T. (2009). Ambitious Yet Modest Metaphysic. In Chalmers, et al. (Eds.), *Metametaphysics* (pp. 260–289). Oxford: Oxford University Press.
- Jennings, R. E. (1994). *The genealogy of disjunction*. Oxford: OUP.
- Koslicki, K. (2015). The coarse-grainedness of grounding. *Oxford Studies in Metaphysics*, 9, 306–344.
- Krämer, S., & Roski, S. (2015). A note on the logic of worldly ground. *Thought: A Journal of Philosophy*, 4(1), 59–68.
- Krämer, S., & Roski, S. (2017). Difference-making grounds. *Philosophical Studies*, 174(4), 1191–1215.
- Künne, W. (2003). *Conceptions of Truth*. Oxford: Clarendon Press.
- Leuenberger, S. (2014). Grounding and necessity. *Inquiry*, 57(2), 151–174.
- Lewis, D. (1983). New work for a theory of universals. *Australasian Journal of Philosophy*, 61, 343–377.
- Lewis, D. (1986). *On the Plurality of Worlds*. Oxford: Blackwell.
- Lewis, D. (1999). Putnam's paradox. *Metaphysics and Epistemology* (pp. 56–77). Cambridge: Cambridge University Press.
- Liggins, D. (2012). Truthmakers and Dependence. In F. Correia & B. Schnieder (Eds.), *Metaphysical grounding: Understanding the structure of reality* (pp. 254–271). Cambridge: Cambridge University Press.
- Litland, J. (2017). Grounding ground. In K. Bennett & D. Zimmerman (Eds.), *Oxford Studies in Metaphysics* (10th ed.). Oxford: Oxford University Press.
- McSweeney, M. M. (forthcoming a). Grounding Logically Complex Facts. *Routledge Handbook of Grounding*, Routledge.
- McSweeney, M. M. (forthcoming b). Debunking logical ground: Distinguishing metaphysics from semantics. *Journal of the American Philosophical Association*
- Poggiolini, F. (2016). On defining the notion of complete and immediate formal grounding. *Synthese*, 193, 3147–3167.
- Raven, M. J. (2013). Is ground a strict partial order? *American Philosophical Quarterly*, 50(2), 193–201.
- Richardson, K. (2018). Grounding pluralism: Why and how. *Erkenn.* <https://doi.org/10.1007/s10670-018-0083-8>.
- Rosen, G. (2010). Metaphysical dependence: Grounding and reduction. In B. Hale & A. Hoffmann (Eds.), *Modality: Metaphysics, logic, and epistemology* (pp. 109–136). Cambridge: Oxford University Press.
- Schnieder, B. (2006). Truthmaking without truthmakers. *Synthese*, 152(1), 21–46.
- Schnieder, B. (2011). A logic for 'because'. *Review of Symbolic Logic*, 4(3), 445–465.
- Schnieder, B. (2016). In defence of a logic for 'because'. *Journal of Applied Non-Classical Logics*, 26(2), 160–171.

- Skiles, A. (2015). Against grounding necessitarianism. *Erkenntnis*, 80(4), 717–751.
- Tsohatzidis, S. L. (2015). A problem for a logic of 'because'. *Journal of Applied Non-Classical Logics*, 25(1), 46–49.
- Wilson, J. (2014). No work for a theory of grounding. *Inquiry*, 57(5–6), 1–45.
- Witmer, D. G., Butchard, W., & Trogon, K. (2005). Intrinsicity without naturalness. *Philosophy and Phenomenological Research*, 70(2), 326–350.

**Publisher's Note** Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.