

7 The Epistemology of Empty-Base Explanation

The topic of this chapter is the epistemology of empty-base explanation. In the literature on zero-grounding (which provides one kind of empty-base explanation), several methods and kinds of arguments to establish instances of zero-grounding can be found (rather than being completely distinct, some of these overlap to an extent):

1. Extrapolation and application of general principles of grounding to the limiting cases with zero grounds.

As we have seen earlier, Fine (2012) takes a general principle of grounding and observes that the principle has a limiting instance which corresponds to an instance of zero-grounding, in Fine's case the zero-grounding of the empty conjunction.

2. Deriving instances of zero-ground within an explanatory calculus.

Litland (2017) argues for a calculus of explanatory inference rules and shows that given this calculus, the zero-grounding of non-factive grounding claims can be established.

3. Arguing both that a given proposition is grounded and possesses no grounds.

Muñoz (2020) argues for the (contingent) zero-grounding of negative existential facts by first arguing that negative existential facts cannot have grounds and then arguing that they must be grounded, leaving their being zero-grounded as the only option.

From the previous chapters, we can furthermore extract the following approaches:

4. Arguing first that a given (kind of) proposition has a certain kind of explanation and then arguing that this explanation is zero-ground (or more generally empty-base) explanation.

If we can argue that a given proposition has an explanation by status (for example, in the case of essentialist explanation, this idea seems to be backed by intuition), then given that I have argued in chapter 3 that such explanations should be understood as empty-base explanations, this amounts to an argument for an instance of the latter. Relatedly, in chapter 4 I have relied on a mix of intuition and theoretical considerations to argue that logical theorems possess a special

kind of explanation that outstrips their ordinary grounding explanations, and then I have argued that either zero-grounding or other empty-base explanations provide such an explanation.

5. Using the notion of zero-ground together with the familiar (mixture of) philosophical methods of conceptual analysis, Carnapian explication, and abductive theorizing.

What I have done in chapters 3, 4, and 6 is an instance of this kind of general methodology. A further example is provided by De Rizzo (2020), who uses zero-ground to give an account of the grounds of necessities. Moreover, presumably, the other methods will have to be accompanied by a mixture of familiar philosophical methods as well: As Rodriguez-Pereyra, Lo, and Skiles (manuscript) argue, the extension of familiar grounding principles to edge cases may yield a set of extended principles which together are inconsistent. In such a case, abduction or considerations concerning theoretical usefulness may help.²³²

More generally, we can observe that empty-base explanation is a type of explanation, and that the involved explanatory notions are the same notions that also figure in ordinary cases of explanation. For example, these are grounding in the case of zero-grounding explanations and laws of nature in the case of empty-base explanation involving a law of nature as link. Therefore, it is to be expected that the epistemology of empty-base explanation is an extension or part of the epistemology of ordinary explanations. Thus, however we can come to know ordinary grounding explanations presumably is also (or at least closely related to) how we can come to know zero-grounding explanations. Indeed, the methods mentioned above conform to this idea.

In this chapter I will focus on the epistemology of grounding explanations. Not much has been written explicitly about the epistemology of grounding and grounding explanations specifically, and I will take some steps towards remedying this situation. The goal is to explore the prospects of an account of how inference to the best explanation can establish grounding explanations. Some assumptions concerning inference to the best explanation will be developed that show how it might be used to establish empty-base explanations in general and zero-grounding explanations in particular. Of course, there may well be other (basic) methods of acquiring knowledge of grounding facts, but in the following I want to focus on inference to the best explanation.

This is the plan for the chapter: In section 7.1, to approach the use of inference to the best explanation (IBE) in a metaphysical context, I present and develop Stephen Biggs' account of how IBE can provide knowledge of metaphysical modalities on the

²³² Thanks to Jonas Werner for discussion here.

basis of non-modal propositions, and formulate a dilemma for the account. In section 7.2 I argue that the problem raised by the dilemma for an abductive epistemology of metaphysical modality can be avoided by an abductive epistemology for explanatory notions such as grounding. I take some steps towards a theory of how inference to the best explanation can establish grounding claims on the basis of metaphysically innocuous, e.g. empirical claims. In section 7.3 I discuss how inference to the best explanation might establish identities and what a unified account of inference to the best explanation that can establish both grounding claims and identities might look like. In section 7.4 I make some suggestions as to how to flesh out and develop the account further, and I discuss the application of IBE vis-à-vis the PSR and a distinctive problem that arises for IBE given the existence of empty-base explanation.

7.1 Abductive modal epistemology and a dilemma for Biggs' account

Stephen Biggs (2011) has argued that IBE can be used to establish metaphysical necessities on the basis of non-modal premises.²³³ At the core of his proposal lies the assumption that metaphysical necessities, such as $[\Box \forall x \text{ is scarlet} \rightarrow x \text{ is red}]$, sometimes provide the best explanation for their non-modal counterparts, in this case $[\forall x \text{ is scarlet} \rightarrow x \text{ is red}]$. I argue that the account fails because the relevant necessities cannot explain their non-modal counterparts. Instead, I suggest that IBE might play a fruitful role in the epistemology of *explanatory* metaphysical notions such as grounding.

While philosophers have sometimes offered abductive considerations in modal metaphysics, few accounts of this practice exist in the literature on the epistemology of modality. Some applications and discussions of abductive considerations in modal metaphysics can be found in Lewis (1986b), Block and Stalnaker (1999), Hill and McLaughlin (1999), Shalkowski (2010), Hale (2013) and Williamson (2013). Some of the literature on the question of why there is anything at all can also be considered to be employing abduction to infer necessities from non-modal premises, e.g. see Rundle (2004). Relatedly, Rayo (2013) and Greco (2015) suggest that abduction might establish 'just is'-statements on the basis of non-modal premises, and Fine (2001) suggests that IBE might be used to establish grounding facts, but he does not develop the idea. One notable exception to this shortcoming is Biggs' (2011) "Abduction and Modality",

²³³ A comment on terminology: As I use the term, 'metaphysical necessity' refers to claims, propositions or facts of the form ' $\Box P$ ', where ' P ' stands for an arbitrary proposition and ' $\Box$ ' expresses metaphysical necessity, as customary.

which contains an account of how IBE can establish metaphysical necessities, such as $[\Box \forall x(x \text{ is scarlet} \rightarrow x \text{ is red})]$, using non-modal premises, such as $[\forall x(x \text{ is scarlet} \rightarrow x \text{ is red})]$. Crucially, the account relies on the assumption that the relevant necessities can explain their non-modal counterparts.

I will now provide a sketch of Biggs' proposal and some questions it is confronted with. Under its alternative name 'abduction', Biggs characterizes IBE as follows:

Abduction can be thought of as consisting of three steps. First, identify a phenomenon that requires explanation. Second, generate theories that would explain the phenomenon. Third, choose the theory that best explains the phenomenon. Abduction, then, involves three main elements: the phenomenon to be explained (i.e. the explanandum), the competing theories qua explanations (i.e. the potential [explanantia]), and the principles for ranking theories. (Biggs 2011, 293)²³⁴

In accordance with this schema, Biggs proposes that metaphysical necessities can, in a nutshell, be established on the basis of non-modal premises along the following steps:

1. Identify non-modal explananda of the form ' $\forall x(Fx \rightarrow Gx)$ ', such as:

(RED)	$\forall x(x \text{ is scarlet} \rightarrow x \text{ is red})$
(WATER)	$\forall x(x \text{ is a quantity of H}_2\text{O} \rightarrow x \text{ is a quantity of water})$

2. Generate salient candidate explanantia. These come in the following forms:

(NOMOLOGICAL)	$\Box_N \forall x(Fx \rightarrow Gx)$
(METAPHYSICAL)	$\Box_M \forall x(Fx \rightarrow Gx)$
(IDENTITY)	Being $F =$ being G

3. Considerations of parsimony rank the candidate explanantia: Provided that all three candidates are compatible with the non-modal evidence, the relevant instance of IDENTITY is best. Provided that this candidate explanans is excluded by the non-modal evidence (for example in the case of RED provided by things that are crimson in color), the relevant instance of METAPHYSICAL is best. Inference to the best explanation allows us to infer the best candidate explanandum, for example [Being a quantity of water = being a quantity of H₂O] in case the explanans is WATER and $[\Box_M \forall x(x \text{ is scarlet} \rightarrow x \text{ is red})]$ in case it is RED.

²³⁴ A comment on terminology: Sometimes, it appears, 'abduction' is used in a sense in which it includes inferences on the basis of theoretical virtues such as simplicity and strength without any involvement of explanation (that is, at least not with any obvious or explicit such involvement). Biggs and I on the other hand are (at least initially) only concerned with IBE as characterized in the quote above. For a more thorough characterization of IBE see Lipton (2004).

Before I set up the dilemma for the assumption that the relevant instances of METAPHYSICAL are candidate explanantia for propositions such as RED and WATER, two comments are in order: First, I will postpone discussion of the case of IDENTITY until section 7.3. Second, Biggs' account raises a number of questions that his discussion leaves open, some of which are: (1) Can any arbitrary universally quantified conditional figure as a premise of an abductive argument as sketched above? (2) Is there a way to differentiate those that can from those that cannot? What kind of consideration allows to rank instances of NOMOLOGICAL higher than instances of METAPHYSICAL or IDENTITY? (3) What consideration guards against inferring necessities from contingent universal generalizations?

These questions need to be satisfactorily answered, not least to be confident that the sketched method does not objectionably overgenerate necessities; until then, the account remains incomplete. Biggs (2011, 312, fn. 26) seems confident that these questions can be answered using some ideas concerning theory choice from Lewis (1986b), but he does not provide details. We will come back to these questions in section 7.4, but for now, we turn our attention to a more fundamental flaw than incompleteness that Biggs' account suffers from: The alleged candidate explanantia are none, or so I will argue.

To set up the dilemma that confronts Biggs' account, I have to introduce a few assumptions about explanation and IBE. First, IBE deals with explanation *why*; the explanations that are considered and inferred in applications of IBE are explanations *why* a certain thing is the case and not, e.g., explanations *how* something is done or *what* something is.²³⁵ Accordingly, we will only be concerned with explanation *why* in what follows. Second, recall from chapter 1 the tripartite account of explanation according to which explanations involve claims, propositions, or facts in the roles of explanatory sources (comprising the explanation's base), link, and result. The tripartite account raises the question of how the traditional (and Biggs') explication of IBE as an inference from an explanandum to its best candidate explanans should be recast in terms of base, link, and result. While 'result' can simply replace 'explanandum' in the characterization, matters are less clear with 'base' and 'link' on the one hand and 'explanans' on the other. The salient questions are whether IBE is an inference from an explanatory result to

- . . . the base of the best candidate explanation,
- . . . the link of the best candidate explanation,
- . . . the base and the link of the best candidate explanation,

²³⁵ It is an interesting question whether this assumption is indeed correct (i.e. whether there could for example be something like inference to the best explanation *what* something is), but this is a question for a different occasion. In any case, the standard examples of IBE deal with explanation *why*.

- . . . sometimes the base, sometimes the link of the best candidate explanation, and sometimes both.

Examples of the first type come to mind most readily. For example, Lipton introduces IBE using the following examples:

Faced with tracks in the snow of a certain peculiar shape, I infer that a person on snowshoes has recently passed this way. There are other possibilities, but I make this inference because it provides the best explanation of what I see. Watching me pull my hand away from the stove, you infer that I am in pain, because this is the best explanation of my excited behavior. Having observed the motion of Uranus, the scientist infers that there is another hitherto unobserved planet with a particular mass and orbit, since that is the best explanation of Uranus's path. (Lipton 2004, 1)

But it seems plausible that IBE can also be used to infer the link of the best relevant explanation: Since explanations consist of both a base and a link, inferences to the best explanation should accordingly be able to license an inference to both a base and a link. And indeed it seems that, for instance, from the fact that the window is broken, Sherlock may not only abductively infer that Moriarty threw a ball at it, but also that the window is broken *because* Moriarty threw a ball at it and that Moriarty's throwing the ball caused the window to break.

Moreover, consider the toy-case of a wooden box to which a switch and a lightbulb are attached; the latter lights up when the former is pressed. Given suitable background assumptions, IBE seems to license to infer from this description of the situation that pressing the switch causes the lightbulb to light up. This already supports the assumption that IBE can establish the link of an explanation (here the causal link between the pressing of the switch and the lighting of the bulb) from a description of the result (the lighting of the bulb) and a base (consisting in the pressing of the button) of an explanation. Note that (again given suitable background assumptions) IBE appears to license inferring certain explanatory links over others in the described situation: Inference of a simple causal mechanism (perhaps the presence of a simple electric circuit that is closed by the push of a button) seems licensed over inference of more complex causal mechanisms (such as a miniature Rube Goldberg machine hidden in the wooden box).²³⁶

In addition to these cases, there are examples from the literature on IBE that support the point:

But if we try instead to explain why Jones rather than Smith contracted paresis, we will be led [. . .] to look for some possibly relevant difference in the medical histories of the two

²³⁶ The example of the box with the lightbulb is not mine originally, but I cannot recall where I first encountered it.

men. Thus we may infer that Jones's syphilis *was a cause of* his paresis, since this is an explanatory difference. (Lipton 2004, 73, my italics)

So I will assume that IBE can establish base alone, link alone or both together, depending on the case at hand. With respect to my case against Biggs' proposal this is fair since it provides a further option to understand the proposal. Additionally, we will see in the following sections that the assumption is theoretically fruitful when it comes to the epistemology of grounding.

With respect to Biggs' proposal now the question arises whether metaphysical necessities (more specifically: strict conditionals, possibly universally quantified) play the role of sources (constituting the base) or links in the abductive arguments suggested in his account. In what follows I argue that this question raises a dilemma for Biggs' account. According to the first horn, it is not sufficiently plausible that the relevant metaphysical necessities can figure in the bases of explanations like those suggested by Biggs: As I have argued in chapter 3, possibly ignoring some irrelevant exceptions, an instance of ' $\Box \forall x(Fx \rightarrow Gx)$ ' is not a reason for the corresponding instance of ' $\forall x(Fx \rightarrow Gx)$ '.²³⁷ According to the second horn, strict conditionals cannot be the links of any explanation at all and hence cannot occur in that capacity in abductive arguments.

First horn of the dilemma: instances of ' $\Box \forall x(Fx \rightarrow Gx)$ ' do not normally occur as sources of explanations of the corresponding instances of ' $\forall x(Fx \rightarrow Gx)$ '.

The first horn of the dilemma consists in the fact argued for in chapter 3 that (with the possible exception of some extraordinary cases) for no $[P]$, $[\Box P]$ explains $[P]$ in the sense of being a source in an explanation of $[P]$; or, in the idiom of reasons, (ignoring some extraordinary cases) for no $[P]$, $[\Box P]$ is a reason why $[P]$. Consequently, facts of the form ' $\Box \forall x(Fx \rightarrow Gx)$ ' are not (ignoring the extraordinary cases again) reasons why/sources in explanations of the corresponding instances of ' $\forall x(Fx \rightarrow Gx)$ '. The relation that obtains between the sources and the result of an explanation can be expressed by a because-sentence. Thus, Biggs' account requires that because-statements like the following are true:

(BECAUSE-RED) $\forall x(x \text{ is scarlet} \rightarrow x \text{ is red})$ because $\Box \forall x(x \text{ is scarlet} \rightarrow x \text{ is red})$.

²³⁷ To be clear, there are of course explanations with metaphysical necessities as sources (such as the partial explanation of my knowing that $\Box P$ by it being that case that $\Box P$), the claim is merely that the explanations required by Biggs' account do not have metaphysical necessities as bases. On the other hand, as I have already argued in chapter 3, metaphysical necessities are never explanatory *links* due to their and explanation's nature.

In general, the account requires that there are true instances of the following schema:

(BECAUSE- $\Box$) P because $\Box P$.

But in chapter 3 I have argued against the relevant instances of BECAUSE- $\Box$, and suggested how to alternatively accommodate the intuitions in favor of those instances of BECAUSE- $\Box$. Moreover, if Biggs wanted to maintain the relevant instances of BECAUSE- $\Box$ he would have needed to provide an account of the explanatory link connecting $[\Box P]$ and $[P]$ (it cannot be grounding, as discussed in chapter 3) and, second, the resulting epistemological account (if combined with the thesis that we in fact sometimes come to know necessities as it describes), as well as the theories that are established along its lines carry commitment to the relevant explanatory links, avoiding which would be preferable.²³⁸

Second horn of the dilemma: strict conditionals cannot be explanatory links.

The second horn of the dilemma states that strict conditionals cannot be explanatory links. Before I argue for this, note that even if a strict conditional such as $[\Box \forall x(x \text{ is scarlet} \rightarrow x \text{ is red})]$ could in principle figure as the explanatory link of an explanation, it is unclear how that explanation could have the form suggested by Biggs. This is because explanatory links are ordinarily thought of as in some way connecting the base and result of an explanation, and there does not appear to be a candidate explanatory base that $[\Box \forall x(x \text{ is scarlet} \rightarrow x \text{ is red})]$ connects like this with $[\forall x(x \text{ is scarlet} \rightarrow x \text{ is red})]$. This problem can be solved by assuming that IBE can take the following form:

1. Instead of starting with a candidate explanandum (or explanatory result) of form ' $\forall x(Fx \rightarrow Gx)$ ', we start with a true instance of ' Gx ', i.e. a true instance of ' x is red' such as $[a \text{ is red}]$.
2. We come up with candidate explanations of this explanandum, with an explanatory source that may well be antecedently known, for example: $[a \text{ is scarlet}]$.²³⁹

²³⁸ Note that even if the proposal from appendix B of chapter 3 could be made to work, it is unclear how this could help Biggs' cause: A way would have to be found that allows to weigh instances of ' $\Box P$ ' against instances of ' P ' in abductive arguments. Biggs offers nothing in this regard, he does not even consider instances of ' P ' as explanatory candidates. Without such an account though, it remains unclear whether IBE could ever establish an instance of ' $\Box P$ ' over an instance of ' P '.

²³⁹ There may be other candidate sources such as $[a \text{ is crimson}]$, but at least this option is excluded by our knowledge of $[a \text{ is scarlet}]$.

. . . and an explanatory link such as

(METAPHYSICAL) $\Box_M \forall x (x \text{ is scarlet} \rightarrow x \text{ is red})$.

3. The candidate explanations are ranked and if everything goes well, METAPHYSICAL might be inferred as the explanatory link of the best explanation for [*a* is red].

The wooden box example from above supports the point that IBE can indeed proceed in this fashion from a candidate explanandum to an explanation whose base is already known, thus only providing additional knowledge of an explanatory link. Biggs' proposal thus conceived would have two advantages over the version discussed before: First, it would carry no problematic commitment to additional explanatory relations. Second, one might have suspected from the beginning that the explanatory proposals that philosophers of mind such as Block and Stalnaker had in mind when discussing IBE to establish necessities concerned explaining why certain mental states obtain in terms of physical states. If the relevant explanatory proposals are indeed of this form, then it is somewhat natural to suspect that the strict conditionals that connect physical states with mental states are explanatory links for the relevant explanatory proposals.

Alas, the point that constitutes the second horn of the dilemma is that there are well-known reasons against the thesis that metaphysical necessity is an explanatory notion and thus against the thesis that strict conditionals can be explanatory links (this is often put in relational terms: The relation expressed by a strict conditional is not an explanatory one).²⁴⁰ Two such reasons are these: First, explanatory links are asymmetric, but modal dependence (as captured by strict conditionals) is not. Note that while some authors accept that there are instances of symmetric explanation, modal dependence has many symmetric instances where intuitively there is either no explanatory connection to be found, or it does not run in both directions.²⁴¹ For example, modal dependence is reflexive, but explanation is not (even if we allow for some exceptional facts to be self-explanatory). Also consider the following two cases: It is plausible that [snow is white] is true because snow is white and not vice versa. But [snow is white] and [[snow is white] is true] are modally equivalent. Furthermore, any two necessary truths are modally equivalent, but neither need explain nor be a reason for the other.

²⁴⁰ I recap here my discussion from section 3.5.

²⁴¹ For discussion of symmetric instances of dependence and grounding, see for example Jenkins (2011), Barnes (2012), and Thompson (2016).

This last case gets us to the second point against strict conditionals as explanatory links: Explanatory links only connect explanatorily relevant relata, but strict conditionals also connect explanatorily irrelevant relata: Each proposition necessitates *any* necessary proposition, even if the former does not explain the latter. Also, if $[P]$ and $[Q]$ are necessary and $[R]$ is contingent, then $[P \wedge R]$ and $[Q \wedge R]$ are contingent, but necessarily equivalent and no explanatory connection seems to hold between them, at least if $[P]$ and $[Q]$ are explanatorily unconnected.

Biggs might propose a two-component view according to which what should be taken as the explanatory link is a strict conditional together with a further element that ensures that the two conditions above are satisfied. Here are some remarks on this view: First, I do not know of any such account in the literature, so the onus would be on the friend of strict conditionals as explanatory links to develop such a view. Second, taking a clue from Kim (1994), we may believe that explanatory links should somehow account for features of explanation such as irreflexivity, asymmetry, and relevance. *Prima facie*, the proposed two-component view does a worse because less unifying job at this than views that propose explanatory relations like causation or grounding that natively satisfy conditions such as asymmetry and relevance. Third, we might allow for such proposed sub-par explanatory links in the candidate explanations considered in an application for IBE, but it becomes unclear why they should ever be preferred to more unified candidate explanations using notions such as ground.

This completes the dilemma against Biggs' account: In chapter 3 and above I argued first that it is not sufficiently plausible that instances of ' $\Box\forall x(Fx \rightarrow Gx)$ ' are explanatory sources or reasons for the corresponding instances of ' $\forall x(Fx \rightarrow Gx)$ ' and then I argued that instances of ' $\Box\forall x(Fx \rightarrow Gx)$ ' are never explanatory links. But since, as argued above, Biggs' proposal is committed to them either being links or explanatory sources of the right sort, we should discard his proposal.

7.2 Towards an abductive epistemology for grounding

Strict conditionals cannot be the links of any explanation and thus cannot be established by IBE in the way sketched in section 7.1, but truths involving explanatory metaphysical notions that can be explanatory links may well be established in this way. One such notion is grounding, as discussed for example in Fine (2012).²⁴² Adopting the form of argument proposed at the end of the last section, an application of IBE that establishes a grounding claim could look like this:

²⁴² Incidentally, some authors have suggested (but not developed that suggestion) that grounding might be abductively established, e.g. Fine (2001) and Schaffer (2017).

1. Instead of a candidate explanandum (or explanatory result) of form ' $\forall x(Fx \rightarrow Gx)$ ' we start with a true instance of ' Gx ', i.e. a true instance of ' x is red' such as [a is red].
2. We come up with candidate explanations of this explanandum, with an explanatory source such as [a is scarlet].

... and the following explanatory link:

(GROUNDING) [a is scarlet] grounds [a is red].

Note that there might be further candidate explanatory links, such as:

(NOMEX) [a is scarlet] nomologically explains [a is red].

3. The candidate explanations are ranked and if everything goes well, GROUNDING might be inferred as the explanatory link of the best explanation for [a is red].

Note that the sketched proposal does not rely on the use of grounding specifically – instances of any notion that can provide links of metaphysical explanations may in principle be established by an argument like this: Two examples that come to mind are metaphysical laws and perhaps some sort of essential dependence. Note as a possible further avenue of investigation that abduction might also take a somewhat different form: First, a form of abduction could be considered that starts with an explanatory base and a result, and just compares possible links.²⁴³ In contrast, the abduction above compares bases and links together. Second, a form of abduction could be considered that takes several instances of, i.e. ' x is red' and ' x is scarlet' as its starting points from which a metaphysical law or a plurality of grounding statements is then inferred. Third, one could consider understanding abduction as theory choice guided by explanatory principles (amongst other principles, possibly). I will say a bit more about this option in what follows.

At this point there are good news and bad news for an abductive epistemology of metaphysical necessity. The good news is that an abductive epistemology of explanatory notions such as grounding may form the basis for an epistemology of metaphysical necessity: While not everyone in the literature agrees, grounding truths are commonly taken to entail corresponding metaphysical necessities. In order to arrive at an at least partially abductive epistemology of metaphysical necessity, the abductive argument in favor of the relevant grounding or essence claims might then be supplemented by a method that can establish the link between grounding claims and the corresponding metaphysical necessities.

²⁴³ Recall the wooden box example from above.

The bad news is that even if this link is a case of grounding, i.e. if the strict conditional is grounded in the grounding claim, it is of a form that the method sketched above cannot establish, because the method establishes an explanatory link based on the knowledge of an explanatory result (and potentially an explanatory base that also is known already). In this case, though, the explanatory result (the strict conditional) is not yet known and thus cannot serve as a premise of an abductive argument (at least not if abductive arguments are understood as I have done above). Even if we grant that IBE is able to establish grounding claims as suggested above, the method remains limited in a notable way with respect to metaphysical necessities. In metaphysics, interest in notions such as grounding is at least partially due to the idea that merely modal notions cannot capture certain explanatory features of the metaphysical phenomena. In our context, this feature of notions such as grounding in principle allows for IBE to provide epistemic access to these notions. Somewhat ironically, the stronger, explanatory notions may in principle be accessed by IBE, while metaphysical necessity requires different or at least supplementary methods.

Let me give an idea what these could be: Aside from a *sui generis* capability of assessing modal propositions (or related propositions such as counterfactuals), some live options are conceptual analysis, Carnapian explication, and abductive methodology understood more broadly as a kind of theory choice: If these methods deliver accounts of modal propositions in terms of explanatory ones, IBE as understood above could establish the latter, from which modal truths could then be derived using the aforementioned accounts.

Finally, turning to the epistemology of empty-base explanation, note that the above outline of how IBE might establish grounding statements is flexible enough to show how IBE might establish zero-grounding explanations: One of the explanatory candidates might be a zero-grounding explanation. IBE may then establish that candidate, if it turns out to be the best explanatory candidate that is available.

7.3 The case of identity

In the following sections I will try to refine and put some flesh on the bare bones of the proposal offered in the previous section. In this section let us consider whether the proposal can accommodate the idea that IBE is also able to establish identity statements: As in the case of metaphysical necessity, if an identity statement can be the conclusion of an instance of IBE, it has to either be the link of the corresponding explanation, or it has to figure in its base. More specifically, Biggs proposes that identity propositions such as [being a quantity of H₂O is identical with being a quantity of water] can sometimes be abductively inferred from

universally quantified biconditionals such as $[\forall x(x \text{ is a quantity of H}_2\text{O} \leftrightarrow x \text{ is a quantity of water})]$. For this to be true, [being a quantity of H₂O is identical with being a quantity of water] has to figure in the base or be the link of an explanation of $[\forall x(x \text{ is a quantity of H}_2\text{O} \leftrightarrow x \text{ is a quantity of water})]$.

So, might [being a quantity of H₂O is identical with being a quantity of water] figure in the base of an explanation of $[\forall x(x \text{ is a quantity of H}_2\text{O} \leftrightarrow x \text{ is a quantity of water})]$? Or, in the idiom of reasons, might [being a quantity of H₂O is identical with being a quantity of water] be a reason $[\forall x(x \text{ is a quantity of H}_2\text{O} \leftrightarrow x \text{ is a quantity of water})]$? Although I am not completely unsympathetic, one reason to be skeptical here is that to understand the relevant explanations as grounding explanations would commit us to non-standard instances of grounding, while understanding it differently commits us to novel explanatory relations (recall here my discussion of the explanation of logical theorems from chapter 4).

To the thesis that identity statements can be the links of explanations one might object that they relate entities (broadly construed, including individuals, properties, facts, and propositions), while explanatory links are properly expressed using sentential operators.²⁴⁴ But this objection would be insufficient for two reasons: First, while the operator view may well be correct for the case of grounding, this in itself does not suffice to show that all explanatory links are to be expressed using sentential operators – for example, perhaps causation is best understood as a relation between events. Second, as has been argued in the literature (e.g. by Rayo 2013), the notion of identity can be generalized to yield identity operators that apply to predicates and sentences, instead of merely to singular terms. Such a notion of generalized identity could then be used. But then it seems like the asymmetry-considerations from above apply here again: Explanatory links must be asymmetric, but identity statements are not, therefore identity statements cannot be explanatory links.²⁴⁵

Alternatively, we can try to invoke theoretical virtues such as ideological parsimony to argue in favor of generalized identity statements: A theory according to which being *F* just is being *G* is in this respect more ideologically parsimonious than a theory that does not identify them. While ‘abduction’ is sometimes used to refer to a general practice of theory choice on the basis of theoretical virtues such as parsimony, let us try to see whether we can understand the idea that identities can be established by abduction while understanding the latter as properly involving explanatory considerations as before.

²⁴⁴ As for example Fine (2012) proposes for the case of grounding.

²⁴⁵ Perhaps an asymmetric notion can be developed on the basis of generalized identity, but this is an idea that I will not pursue here.

So instead of going down either of the routes suggested above, I want to take a look at a method suggested by Rayo (2013) and developed by Greco (2015), that is related to IBE but somewhat more general, which may help to make sense of the idea of using something like IBE to establish identities. Rayo and Greco are concerned with the epistemology of ‘just is’-statements, a kind of generalized identity statement. Instead of using IBE as understood above, they suggest an explanatory principle of theory choice which sometimes favors theories containing certain identity statements over other theories.²⁴⁶ I will now quickly present the principle and offer some comments on it:

(Methodological Maxim)

In choosing between rival sets of ‘just is’-statements, the more why-questions you can pose and answer, the better. The more why-questions you can pose but can’t answer, the worse.

Note first that it might be possible to use this as a basis to develop a unified abductive account of the epistemology of ‘just is’-statements and properly explanatory notions such as grounding. Of course, as with Biggs’ proposal, more would have to be said about how the candidate answers to the relevant why-questions are to be ranked. Note also Greco’s explanation of how the Methodological Maxim allows to decide between rival sets of ‘just is’-statements:

This double contrastivity of explanation – both in why questions, and in because answers – suggests a natural way of saying more about what sorts of costs and benefits are associated with accepting or rejecting a ‘just is’-statement. In general, accepting a ‘just is’-statement amounts to rejecting a distinction. On the doubly contrastive approach to explanation, distinctions (contrasts) are central to both questions, and answers. This will shed light on the sense in which rejecting or accepting a distinction has both costs and benefits. When we accept a new ‘just is’-statement and thereby reject a distinction, we eliminate potential explanantia. We cannot explain anything by appeal to something’s being *F* rather than *G*, once we accept that what it is to be *F* just is to be *G*. This is the cost side of the equation, and the sense in which accepting a ‘just is’-statement involves a “decrease in the range of theoretical resources of one’s disposal”. But for essentially the same reason, rejecting a distinction also eliminates potentially pesky explananda. This is the benefit side of the equation – one cannot be under a burden to explain why something is *F* rather than *G* if what it is to be *F* just is to be *G*. (Greco 2015, 7)

But this account seems unsatisfactory because it cannot explain why the benefit of not being under a burden to explain why something is *F* rather than *G* counts in favor of the corresponding ‘just is’-statement, rather than only in favor of the

²⁴⁶ In fact, Rayo and Greco are skeptical that their method ultimately succeeds, but this shall not concern us here.

ideologically cheaper corresponding universal biconditional $[\forall x(Fx \leftrightarrow Gx)]$. Let me explain: Once we accept that '*F*' and '*G*' are co-extensional, we have already removed the burden of explaining why something is *F* rather than *G*, because this question has as a presupposition that something is *F* and not *G*, but this presupposition is inconsistent with the assumption that everything is *F* iff it is *G*. Analogously, once we accept that everything is *F* iff it is *G*, we are already unable to explain anything by appeal to something's being *F* rather than *G*, because explaining thusly would require that we believe that there is something that is *F* and not *G*. Again, the consideration does not only apply to 'just is'-statements, but already to universally quantified biconditionals.

Therefore, let me propose a better account of the Methodological Maxim that does not rely on any considerations about contrastivity. We need to show how accepting 'just is'-statements affects how many why-questions we can pose and answer, even under the assumption that being *F* and being *G* are co-extensional. To do this, consider the following why-questions and because-answers:

1. Why is *F*?
2. Why is *G*?
3. *P* because *x* is *F*.
4. *P* because *x* is *G*.

If it is not the case that being *F* just is being *G*, then we deal with two distinct why-questions and two distinct because-answers here. But if being *F* just is being *G*, then a case can be made that in the relevant sense, 1. and 2. are the same why-question, and 3. and 4. are the same because-answer. After all, being *F* just is being *G*. Therefore there are prospects of an abductive epistemology of identity statements via the move to theory choice and explanatory maxims such as Greco's Methodological Maxim: 'Just is'-statements reduce the number of why-questions as well as the number of possible answers to why-questions.

It may be worth pointing out that a move like this does not without further ado provide an abductive epistemology for metaphysical necessities: Since why- and because-contexts are hyperintensional, the acceptance of mere co-intensionality – that metaphysical necessities can deliver – does not allow for a reduction in the number of why-questions and because-answers that one can offer: The notion of identity that is required for such a reduction needs to be strong enough that why-questions such as 1. and 2. are conflated if being *F* and being *G* are identical in the relevant sense.

Note that if this proposal works, the Methodological Maxim may provide the material to formulate an account of the theoretical virtue of ideological parsimony in explanatory terms: It may provide an answer to the question why a theory according to which being *F* and being *G* are identified and which is hence (in this respect)

more ideologically parsimonious than a similar theory according to which being *F* and being *G* are not identified, is to be preferred over the latter theory: Namely because the Methodological Maxim advises us to prefer the theory that gives rise to fewer unanswered why-questions.²⁴⁷

7.4 Fleshing out the account

Let us take a step back now and consider in what directions the above should be developed next. Note at the outset that there are at least two ways a proposal like the above can be understood: First, it can be understood as delivering an account of our judgments, intuitions, how they are justified, and what their underlying mechanisms are. A proposal with such an aim is for example given by Lipton (2004), who proposes IBE as an account of our scientific but also our ordinary, everyday life inferential practices. With respect to the present proposal, the idea would be that our intuitive judgments concerning grounding statements are due to and justified by an underlying application of IBE.²⁴⁸

Second, the present proposal can be understood as offering a method that can be reflectively applied to arrive at grounding statements. In order to offer such a method, the proposal needs to include specific enough instructions as to how to generate explanatory proposals, how to weigh competing explanatory proposals against each other and as to when we are in fact allowed to infer the best explanatory candidate. If we want to offer an account of the first kind, a similar account of how competing explanatory proposals are generated, weighted against each other, and finally inferred must be offered: Otherwise, it seems to me, we cannot be confident that our intuitions are indeed the result of a weighing of explanatory proposals. So, there are some open questions that an account of IBE that is able to establish grounding claims – whether the account proposes IBE as a method that can be reflectively applied or as an account for our intuitive judgments – needs to answer. Such questions include:

²⁴⁷ Let me mention one problem that further development of these ideas would have to address: There is some intuitive support for the idea that (assuming the identity of water and H₂O) we should accept that *x* is water because *x* is H₂O and still reject that *x* is water (or H₂O for that matter) because *x* is water (for discussion see Schnieder 2010). The approach either has to either reject this, or develop a notion of generalized identity and a criterion of identity of why-questions and because-answers that avoids the problem.

²⁴⁸ In this case, one may wonder whether the account would be phenomenologically adequate.

1. How can the explanatory candidates be determined and how can we know what the explanatory candidates are?
2. How can the *best* explanatory candidate be determined and how can we know what the *best* explanatory candidate is?
3. What constrains the application of IBE such that sometimes none of the explanatory candidates can be inferred?

These are also questions that a general account of IBE should address, but they nevertheless generate additional pressure for an abductive epistemology of grounding: We can be decently confident of applications of IBE in ordinary, everyday and scientific contexts, but here we want to argue that IBE can be used in a metaphysical context and, more specifically, to establish grounding claims. In order to do this, we need to argue that at least in principle, the above questions can be answered for applications of IBE that aim to establish grounding claims.

We should be able to show how IBE is constrained, not least because if it were unconstrained, it appears that an all too simple argument for a principle of sufficient reason could be attempted along the following lines: Suppose we wonder whether a fact $[P]$ has a reason why it obtains. Then if the application of IBE is unconstrained and if explanatory candidates such as candidate grounds are easily stipulated (as they appear to be), then IBE can establish the best available explanatory candidate.²⁴⁹ Since $[P]$ was arbitrarily chosen, it is unclear what should stop IBE from providing each fact with a reason why it obtains. It appears that if we let it come this far, the only option to stop this overgeneration is to claim that sometimes there must be several maximally good explanatory candidates and that then none of them – but also not their disjunction – can be inferred.

Luckily, there are several options for how the application of IBE to infer instances of grounding is constrained are available:

- We cannot always infer that something is grounded because sometimes a theory according to which something is ungrounded is explanatorily more valuable. This option is to a certain extent discussed in the following subsection.
- The explanatory candidates may not be as plenitudinous.
- There may be no unique best explanatory candidate and as a consequence IBE may not be applicable.
- There may be a threshold on the quality of explanations that can be inferred by IBE: If the quality of even the best explanatory candidate is below the threshold, it cannot be inferred, according to such a proposal.

²⁴⁹ Let us ignore empty-base explanation for the sake of convenience for now.

- IBE might only be applicable once it has been established that an explanation exists.²⁵⁰

A complete account of IBE as a method to establish grounding claims would have to choose and defend at least one of these options. In the remainder of this section, I will first look at how Biggs' account fares with respect to the questions raised above, and then I will offer some thoughts on how IBE might establish whether a given proposition is grounded in something, zero-grounded, or ungrounded.

7.4.1 Can Biggs' account deal with these questions?

Returning to Biggs' proposal briefly, we can observe that he does not sufficiently account for how explanatory candidates are determined, how the best amongst the candidates is determined, and how IBE is constrained such that sometimes we cannot infer a corresponding modal claim from a universally generalized conditional. While he (2011, 312, fn. 26) gestures at Lewis (1986b) for an idea to answer the two questions above, he does not properly formulate or defend an account here.

The existence of this lacuna in Biggs' account also means that he does not succeed in his secondary aim, namely to provide an abductive argument against dualist theories in the philosophy of mind and in favor of physicalism concerning the mental. At least, his case remains incomplete at this critical juncture, because he provides no criterion that tells us (nor method to determine) when the abductive inference is warranted and when it is not. Since it cannot be always warranted, lest IBE objectionably overgenerate necessities (or, in our case, grounding claims), the question remains whether it is warranted in the case of the mind-body problem. A related problem arises from the existence of dualist intuitions that conflict with the (physicalist) explanatory candidates that Biggs would like to establish: Biggs does not tell us why IBE should be able to trump such intuitions. Yet, he probably cannot completely abandon *all* use of intuition, for presumably some sort of intuitive judgment about what counts as an explanatory candidate and about relative explanatory strength is required to identify the explanatory candidates, rank them, and constrain the application of IBE. It may turn out that the dualist intuition that the physicalist candidate is not an explanatory candidate

²⁵⁰ But note that this may seem to conflict with our everyday practice, where we regularly use IBE arguably without knowing that an explanation does exist.

or not a sufficiently good explanatory candidate is the very kind of intuition that has to be considered in metaphysical applications of IBE.

Staying with the topic of intuition for a while: Inference to the best explanation as a method for metaphysics has partially been motivated by various broadly ‘empiricist’ skeptical concerns about intuition- and conceivability-based rationalist views.²⁵¹ In fact, it is sometimes explicitly suggested that abductive methods can address the empiricist worries, see for example Biggs (2011) and Roca-Royes (2017, 242). But IBE as a method for metaphysics can only respect the motivation to avoid these empiricist worries if the required methods for determining what the explanatory candidates are and how they are weighted to determine the best explanatory candidate are not similarly suspect. For if they are, it becomes unclear how the empiricist could accept the use of IBE in metaphysics (e.g. to establish grounding claims) although it involves the very kind of methods the empiricist finds objectionable.

Note that the point is not intended to be about labels, e.g. that IBE should count as a rationalist method rather than an empiricist method (for example Bonjour (1998) seems to see it that way). Rather, if IBE is offered as a method for metaphysics that is able to resist broadly empiricist concerns leveled against applications of intuition and conceivability in modal metaphysics and elsewhere, it should be established that how we determine and weigh explanatory candidates does not rely on methods (such as certain forms of intuition) that are equally suspect by empiricist lights as proposals that directly invoke such methods (such as an intuitive faculty that allows us to determine the essential truths or what grounds what) for metaphysics. As far as I can see, this has not yet been established; for example, no such account is to be found in Biggs (2011). In fact, it seems quite plausible that intuition plays some important role in determining and weighing the explanatory candidates of an application of IBE – yet it is an open question why these intuitions should be more trustworthy than direct intuitions about what is necessary or what grounds what.

Note that even certain dialectical moves do not free the empiricist from this burden: For example, if we start with the assumption that IBE in general is respectable and then find out that its use in metaphysics involves aspects that are problematic for the empiricist, one reaction would be to conclude that the empiricist is mistaken, not only about IBE, but about intuition-based, rationalist methods as well. On the other hand, the empiricist might discard even IBE, at least as a method for metaphysics. Either way, the empiricist does not get from IBE what they wanted. A similar consideration seems to apply to some other broadly

251 For a number of works in this vein concerning modal epistemology see, e.g., the papers in Fischer and Leon (2017) and the papers mentioned in Roca-Royes (2017, 221).

empiricist accounts such as Roca-Royes' (2017) inductive account of knowledge of de re possibility for concrete entities. In this particular case, the open question is whether the similarity-judgments required by applications of induction according to Roca-Royes are admissible by empiricist lights.

7.4.2 Grounded, zero-grounded or ungrounded?

To close the chapter on more of a constructive note, let us think about whether and how explanatory considerations can help to decide whether a fact is ungrounded, grounded in something, or zero-grounded. More precisely, suppose there are three theories M_1 , M_2 , and M_3 which differ with respect to the grounding status of a fact $[P]$: According to M_1 , $[P]$ is ungrounded, according to M_2 , $[P]$ is grounded in something, and according to M_3 , $[P]$ is zero-grounded. Without going into the messy details, the theories are intended to be as similar as possible, but they need not only differ with respect to the proposition that $[P]$ is grounded, for M_2 should also contain the grounds of $[P]$, if there are any.

We can then ask whether explanatory considerations at least sometimes tell us to favor M_2 (according to which $[P]$ is grounded in something) over M_1 (according to which $[P]$ is ungrounded). The previous sections suggest that the answer is yes: M_2 contains the material for a grounding explanation of $[P]$, while M_1 does not. But immediately, two further questions arise: First, what constrains explanatory considerations such that M_2 is not always valued over M_1 ? Second, suppose that explanatory considerations sometimes, but not always, value M_2 over M_1 . Then it is a further question whether explanatory considerations ever value M_1 over M_2 : Can *explanatory* considerations establish that certain facts are ungrounded, and if so, how?²⁵²

I want to focus on the latter question here. One idea as to how explanatory considerations might establish ungroundedness is that the fact that a certain fact $[P]$ is ungrounded itself figures as a ground in a grounding explanation of some fact $[Q]$ and can be established by an inference to the best explanation for $[Q]$. For example, suppose the abductive method sketched above does not establish a ground for a certain fact $[P]$ – perhaps there are no candidate explanations, or perhaps none of the candidate explanations is good enough to be inferred. One might think that the very fact that no ground for $[P]$ has been established so far is itself best explained by the fact that $[P]$ is ungrounded. Formulated like this, it

²⁵² Note that in asking this I do not want to suggest that there are no other possibilities of how ungroundedness can be established. For example, the fact that $[Q]$ does not ground $[P]$ might be derivable from other grounding facts that are incompatible with $[Q]$'s grounding $[P]$.

seems plausible that if there are ungrounded facts, there are explanations like this, but further investigation would be required to clarify exactly how this kind of explanation operates.

A further idea is to apply a variant of the Methodological Maxim from the previous section:

(Methodological Maxim*)

In choosing between M_1 and M_2 , the more why-questions you can pose and answer, the better. The more why-questions you can pose but can't answer, the worse.

But this maxim alone can often not favor a theory M_1 according to which $[P]$ is ungrounded over a theory M_2 according to which $[P]$ is grounded in $[Q]$. Let me explain:

- For M_1 , the question why P arises and is not answered.
- For M_2 , the question why P arises and is answered. Furthermore, the question why Q arises and is – let us stipulate – not answered.

It appears that the maxim is silent on whether to accept M_1 or M_2 : While M_1 does not answer why P , M_2 appears to merely have traded the answer for the cost of a new why-question it does not answer, namely why Q . Note first that it does not make a difference if we consider the relevant (negated) grounding statements as well: For M_1 the question arises why $[P]$ is not grounded and for M_2 the question arises why $[Q]$ grounds $[P]$.²⁵³ It seems the only case in which the maxim favors a theory M_1 according to which $[P]$ is ungrounded over a theory M_2 according to which $[P]$ is grounded (in something) is if, according to the latter theory, $[P]$ is fully grounded only in two or more facts taken together for which why-questions arise that do not arise for M_1 .

So perhaps we have not counted correctly and we have to suppose that M_1 either contains $[Q]$ or its negation. But this would only increase the amount of why-questions that arise for M_1 and are not answered (as we may stipulate in analogy to our stipulation about Q for M_2). Therefore, this change does not show that Methodological Maxim* alone can favor M_1 over M_2 . It appears that a principle like Methodological Maxim* that involves merely counting why-questions and their answers can often not help decide in favor of a theory according to which a given fact $[P]$ is ungrounded, rather than in favor of a similar theory according to which $[P]$ has a ground.

²⁵³ If anything, this spells trouble for using the maxim to establish ungroundedness, because $[P]$'s not being grounded is plausibly grounded in $[P]$'s not being grounded in x , for every x , and this gives rise to a plenitude of why-questions.

Of course, alternatives are available: Perhaps M_2 will involve concepts that M_1 does not involve. If F is such a concept, then globally, M_2 will give rise to many why-questions that M_1 does not. For instance, suppose M_2 stipulates as a ground for $[P]$ that some entity is F . Once the concept F is introduced, questions arise concerning what other things stipulated by M_2 are F and why they are F . Also, suppose that according to M_2 no other things are F . Then why-questions arise with respect to those things not being F . Depending on whether or not M_2 offers satisfactory answers, M_1 might be valued higher with respect to the Methodological Maxim*.

If we look beyond Methodological Maxim*, further options seem available: Perhaps M_2 's being more (for example ideologically) can somehow be weighted against its answering more why-questions, such that it comes out as less attractive than M_1 . A problem with this is that it is not quite clear how this weighting works. Here, an attraction of the Methodological Maxim* was that it suggested a unification of the theoretical value or disvalue of complexity and power to answer why-questions. Another (if perhaps not completely satisfactory) option would be to accept a certain bruteness of explanatory theoretical value – one theory is just explanatorily better than another with nothing more to be said, and we have some epistemic faculty (e.g. intuition) that can tell us which theory that is. But before we go that far, we should remember that we only enter the business of weighing two theories if they are epistemic possibilities: It is presumably at least possible to rule out a grounding proposal like M_2 on intuitive or conceptual grounds before any application of IBE or the Methodological Maxim*.

Now, once zero-grounding enters the field, things change: Let us see whether we can identify explanatory virtues that favor theory M_3 according to which $[P]$ is zero-grounded over the similar theory M_2 according to which $[P]$ is grounded in something, and over a similar theory M_1 according to which $[P]$ is ungrounded. M_3 answers the question why P and apparently only gives rise to the why-question concerning the grounding statement. In this respect it does better than both M_1 which gives rise to both the question why P and why P is not grounded, and it does better than M_2 which answers why P but gives rise to the new questions why the ground(s) of $[P]$ obtain and why the relevant grounding fact obtains.

So, focusing on the first case, it appears that for a given theory according to which certain facts are fundamental by way of being ungrounded, zero-grounding has the potential to generate alternative, explanatorily stronger, proposals. For each theory according to which a fact $[P]$ is ungrounded, there is an alternative theory according to which $[P]$ is zero-grounded. In contrast to ordinary grounding explanations, zero-grounding explanations do not involve any grounds, and hence they do not incur new explanatory burdens with respect to such grounds. *Prima facie*, the latter theory has therefore more explanatory power than the former

theory, since the latter allows for a zero-grounding explanation of $[P]$, whereas according to the former theory, $[P]$ does not have a grounding explanation; other things being equal, this seems to favor the latter over the former theory.

Are there now any other broadly explanatory virtues that rank the zero-grounding involving theory M_3 lower than either of its two rivals? It seems complexity will not do: M_3 does not involve any concepts or entities that are not involved in M_1 and M_2 , and with respect to what facts it involves it seems similarly complex to M_1 . It appears we are again left with three possibilities: First, there are other explanatory virtues; second, explanatory virtue is an at least partially fundamental matter; or third, it is only possible to decide against proposals for zero-grounding before the stage of weighing relative explanatory value is reached – for example by deciding on intuitive or conceptual grounds against the possibility of the relevant zero-grounding theory. Unsurprisingly perhaps, an upshot of this discussion is that a crucial part of an account of an abductive method that is able to establish grounding statements will be an account of how exactly the candidate grounding explanations are determined. One idea to be pursued here may be (as towards the end of chapter 5 to take more seriously the connection between explanation, understanding, and general explanatory principles, or unification more generally): The hope is that if candidates for instances of zero-grounding (and empty-base explanation in general) must be limiting instances of more general explanatory principles, then brute ‘zero-ification’ of the fundamental postulates of some theory will not be possible in general.