

TOWARDS A NON-UNIFORM EPISTEMOLOGY OF MODALITY

Moritz Viktor Jakob Baron

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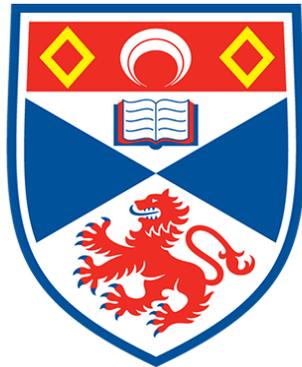
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Towards a Non-Uniform Epistemology of Modality

Moritz Viktor Jakob Baron



University of
St Andrews

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ABSTRACT

While most theories of a modal epistemology implicitly assume, or sometimes explicitly state, a uniform picture of the epistemology of modality, in this thesis I challenge this basic assumption. I argue that there is not one single epistemology of modality for all ‘domains of discourse’. That is, there is no one single way of coming to know modal propositions with such different content as those of mathematics, logic, physics, or the empirical world. I am not attempting to show that all epistemologies of modality should be non-uniform, but instead I am arguing that three influential modal epistemologies each fail to paint a uniform picture of our epistemic access of the modal realm on their own, but taken together form a coherent *non-uniform* epistemology of modality.

The counterfactual theory fails to provide an adequate answer to how we attain modal knowledge of necessary mathematical and empirical propositions. These necessary truths, I argue, do not possess the relevant independence from each other to be analysable in terms of counterfactuals. I argue that Williamson is forced to accept a *non-uniform* epistemology of modality as a result with respect to our knowledge of constitutive truths. Next, I outline Vetter’s possibility-based epistemology of modality and pose three challenges: the access problem, the problem of scope and the generalization problem. The resulting picture is a firmly non-uniform epistemology of modality on at least the level of an epistemology of circumstantial modality and, similar to the counterfactual-based account, the level of essential truths. In the last chapter of this thesis, I discuss Bob Hale’s essentialist modal epistemology. I take on board the essentialist epistemology of necessity, and focus instead on knowledge of possibility on this account. I argue that, on its own, it fails to paint a psychologically plausible picture of how we come to know obvious modal possibility knowledge but instead may plausibly be complemented by other epistemologies of modality.

DECLARATION

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Chapter 1

Introduction

In this thesis I am arguing for the non-uniformity of epistemologies of modality. This is therefore an exercise in the *meta-epistemology* of modality. While most theories of a modal epistemology implicitly state, or sometimes explicitly assume, a *uniform* picture of the epistemology of modality, in this thesis I challenge this basic assumption. I argue that there is not one single epistemology of modality for all ‘domains of discourse’. That is, there is no one single way of coming to know modal propositions with such different content as of mathematics, logic, physics or the empirical world. The *non-uniformity* of our ways of knowing spans across these domains. And I would like to make a case that there is no guarantee that our access to the modal realm maps neatly onto these divisions.

The conflict between uniformism and non-uniformism in modal epistemology is one over domain restriction—whether the domain of modal propositions, with respect to our capacity of knowing any particular proposition in it, is one that allows for a completely general account. The non-uniformist denies this: Methods of coming to know modal propositions need not be the same (uniform) across domains of propositions. *Weak* non-uniformism is the claim that our best current epistemologies of modal-

ity are such that a non-uniform explanation of our modal knowledge arises. *Strong* non-uniformism, on the other hand, is the normative claim that we *should* construct non-uniform modal epistemologies.

I am not attempting a defence of strong non-uniformism in this thesis, even though it might be the more interesting claim. Instead, I am arguing that three influential modal epistemologies fail to paint a uniform picture of our epistemic access of the modal realm, and that the case for weak non-uniformism is a strong one.

I begin in chapter [2](#) with introducing the notion ‘modality’ and continue to set the stage in chapter [3](#) where I introduce the notion ‘epistemology of modality’ and ‘non-uniformism’ together with outlining a number of assumptions, both terminological and more substantial, that I will use during the course of this thesis.

In the main parts of the thesis, I discuss three epistemologies of modality each situated in one of the three classical ‘camps’—rationalism, empiricism and counterfactual accounts—in an attempt to cover as much theoretical ground as possible. A strong case for weak non-uniformism, thus, may provide a case for strong non-uniformism.

In chapter [4](#) I am discussing Williamson’s influential counterfactual-based epistemology of modality. After an overview of the theory and a survey of the most important criticisms, I will outline Williamson’s account as it applies to our knowledge of possibility and necessity. Knowledge of modality, on this account, can be explained as a special case of the epistemology of counterfactuals. After taking cues from the analysis of ordinary empirical counterfactuals and the strategies to assess them, I argue that this counterfactual development works well with respect to knowledge of possibility, but fails to deliver correct results in the case of knowledge of necessity for both empirical as well as mathematical propositions. The upshot of this discussion is that Williamson’s counterfactual epistemology of modality fails to account for our

knowledge of the modality of necessity unless we accept a *non-uniform* epistemology of modality with respect to our knowledge of constitutive truths as a result.

In chapter [5](#) I am evaluating Barbara Vetter's recent *possibility-based* epistemology of modality. This modal epistemology has received less attention in the literature, and this thesis is thus also a contribution to the literature on possibility-based accounts. The possibility-based account describes a three-step model of the epistemology of metaphysical modality, which relies on our intuitive grasp of the modality inherent in 'can statements'. I formulate three problems for the possibility-based modal epistemology: First, the *access problem* is a problem of properly addressing what it means to gain 'access' to modal knowledge without presupposing some modal knowledge of the same kind. Second, the *problem of scope* is due to the fact that the possibility-based account relies heavily on other epistemologies of modality in explaining the *epistemology of can statements*, and thus inherits all restrictions of scope from them. Third, the *generalization problem* targets the account's explanation of our grasp of the concept of metaphysical modality from an understanding of the modality inherent in can statements.

This problem points to a remarkable difficulty, similar to the discussion of Williamson, of dealing with the concept of metaphysical modality. Non-uniformity is already built into the possibility-based account in the case of accounting for how we gain modal knowledge of can statements, and a non-uniform epistemology of modality is furthermore necessitated by the specific process through which we grasp the concept of metaphysical modality on this view.

In chapter [6](#) I am discussing the Bob Hale's *essentialist* theory about modality. Bob Hale sketches an account according to which 'metaphysical necessities have their source in the nature of things, and metaphysical possibilities are those left open by the natures of things' (Hale [2013](#), 250). The epistemology of modality is, for Hale,

mirroring this metaphysical picture. This chapter is therefore also a contribution to a missing spot in the literature on the essentialist account of possibility.

I argue that Hale's epistemology of possibility, taken by itself, is implausible for a wide range of possibility and impossibility claims. Hale's essentialist epistemology of modality paints a psychologically unrealistic way of knowing possibilities in the extreme cases—cases of obvious knowledge of metaphysical impossibility and possibility—even though the account does provide a satisfying *rational reconstruction* of our modal knowledge in general.

The essentialist epistemology of modality describes a robust way of coming to know essentialist propositions—a crucially missing piece, we discovered, in both previously discussed epistemologies of modality. Putting the pieces together, this paints a non-uniform picture of the modal epistemic realm.

Chapter 2

Modality

Necessarily, two plus two equals four. Gold could not have had the atomic number 80 (Mercury has that atomic number). This table in front of me is breakable. The gardener couldn't have been the murderer (the evidence speaks against it). You cannot simply do this (it is wrong). All these statements have, apart from the subject matter they are about (numbers, tables, ethical or natural laws), modal content. They talk about what can or could not be, what is possible or necessary.

However, we might say that these statements are necessary or possible in different ways. Intuitively, what *makes* the propositions expressed by these statements true seems to be different in each case. The fact that gold could not have a different atomic number is likely to be independent of any human being but instead has to do with the fundamental make-up of the world. Likewise, that two plus two necessarily equals four is independent of any empirical objects, and a fact about numbers, or abstract objects; whereas whether that table in front of me is breakable has to do with the physical properties of that table. Other sentences are true in virtue of what morality requires. Before going over these different modal notions, let me briefly introduce the *dual* notion of modality.

It is common to define the two modal notions *possibility* and *necessity* as *duals* of each other: Something is possible if it is not the case that its negation is necessary. And conversely, what is necessary is that whose negation is impossible. In more formal terms, using modal operators \Box for ‘it is necessary that’ ... and \Diamond for ‘it is possible that ...’ we can define this relationship as follows:

Definition 1 (Duality of Modal Operators). ¹

$$\Diamond p =_{def} \neg \Box \neg p$$

$$\Box p =_{def} \neg \Diamond \neg p$$

To elucidate this relationship, take the proposition ‘It is necessary that two and two equals four’. Compare this to the two possibility-propositions ‘Possibly two and two equals four’ and ‘Possibly two and two does not equal four’. The proposition that *it is necessary* that two and two equals four is equal to negating that there indeed could have been the possibility that it was not so, *viz.* that two and two did *not* equal four. Note the difference to ‘It is not the case that two and two could equals four’ (the negated ‘Possibly two and two equals four’). This stands in direct contradiction to the necessity-claim we wanted to analyse in terms of possibility, and rightly so: If something could not be the case, then it should not, at the same time, be necessarily the case. ²

Classically, three notions of modality are distinguished: *epistemic* modality (the modes of knowing a proposition), *alethic* modality (the modes of truth) and *deontic* modality (modes of obligation). (cf Von Wright [1951a](#), 1) Unfortunately, this distinction is less clear than one might wish, and the literature furthermore does not seem to have reached a precise definition. (cf. Hale [2013](#), 103) Let me note some thoughts

¹These definitions mirrors the equivalence relation of universal and existential quantification in predicate logic: $\forall x A \equiv \neg \exists x \neg A$. In this respect, the modal operators \Box and \Diamond are defined like the classical quantifiers and indeed more parallels can be drawn.

²In formal terms, this relationship is encapsulated in Axiom (D) $\Box p \rightarrow p$ in Modal Logic.

on this classification:

First, while this tripartite distinction has been the common classification since its introduction by Von Wright, the restriction advocated there of the terms ‘necessity’, ‘possibility’ and ‘contingency’ to *alethic* modality has not prevailed. Von Wright distinguishes between (i) the *mode* a proposition can be *true* (in the case of alethic modality), (ii) whether a proposition is *known* (in case of epistemic modality) and (iii) whether a proposition is *obligatory*³ (in case of deontic modality).⁴ ‘Possibility’, ‘necessity’ and ‘contingency’ are in this picture restricted to the alethic modalities — a proposition is necessarily, possibly or contingently *true*, while, on the other hand, a proposition is verified (known to be true) or falsified (known to be false) in case of epistemic modality.⁵ (cf. Von Wright [1951a, 1-2]) Nevertheless, as Von Wright is aware, the (alethic) modes ‘necessity’ and ‘possibility’ are equally used to denote epistemic modality, as we often speak of something being epistemically possible or necessary. ([ibid., 32]) This terminology seems to have become standard since, and one usually speaks of alethic, epistemic or deontic *possibility* and *necessity* to denote their respective modalities, blurring somewhat the distinctions.⁶

Second, there is no precise distinction between epistemic and alethic modality. (cf. Hale [2013, 103]) Hale suggests that ‘[p]erhaps the clearest explanation [of alethic modality]

³The characterisation of deontic modality in terms of what is ‘obligatory’ or ‘permitted’ (Von Wright [1951a, 36]) is less clearly defined than its alethic and epistemic counterparts, in that ‘permission’ and ‘obligation’ are the deontic *modes* themselves. It would go beyond the scope of this introduction to attempt a critique of Von Wright’s characterisation here.

⁴Von Wright in fact adds a fourth category: ‘As a fourth main group of modal categories one might add the existential modes or modes of existence. These are concepts such as universality, existence, and emptiness (of properties or classes).’ (Von Wright [1951b, 1])

⁵Here is the full list of modes characterized by Von Wright: alethic (‘necessary’, ‘possible’, ‘contingent’ and ‘impossible’), epistemic (‘verified’, ‘undecided’, and ‘falsified’), deontic (‘obligatory’, ‘permitted’, ‘indifferent’ and ‘forbidden’) and existential (‘universal’, ‘existing’, and ‘empty’). (cf. Von Wright [1951a, 2])

⁶Not everyone does this, however, and Borghini (cf. [2016, 10]) for example seems to retain the restricted use of those terms. Since I am mainly concerned with alethic modality here, I will gloss over this detail.

is in terms of factivity — a sense of “necessary” is alethic if whatever is necessary in that sense is true.’ (Hale 2013, 103) On this view, however, classic epistemic modality becomes a sub-category of alethic modality, since knowledge itself is factive. Deontic modality, quite obviously, fails to be alethic on this account, since what is obligatory for someone can precisely not be that case, and retains its separate position. To keep the tripartite distinction, one might go with Hale and a slightly *ad-hoc* solution: ‘Perhaps the simplest course is to adopt this definition of alethic modality and simply exclude epistemic modalities by an additional stipulation.’ (ibid., 103) What could this additional stipulation be? Following Roca-Royes (2015), one might take the factivity principle $\Box p \rightarrow p$ to be *valid* for both alethic and epistemic modality (but not for deontic modality), but not *characteristic* of it. On this picture, epistemic modality is modality relative to the set of pieces of *knowledge* an actor or a group of actors possesses, while alethic modality is relative to a set of *truths*.

Let me, then, go over these three categories in turn.

2.1 Epistemic Modalities

There is a class of epistemic modal notions that we can notice when we look at the token propositions expressed above. Take the proposition ‘The gardener couldn’t have been the murderer’, without the epistemological explanation in parentheses. There are at least two readings of this, one epistemic, and one non-epistemic. On the one hand, the sentence could state the fact that the gardener simply couldn’t have been the murderer, irrespective of anyone inquiring into it or of an evaluator’s evidence for or against it. The gardener might have simply not been there at the time of the murder — she might have, at the same time, been at a different location and had in general no causal connection to the murder at all. This is a non-epistemic reading.

Note that there is also more than one non-epistemic reading of this sentence. As understood above, we take what is expressed in this sentence to mean that it was not, perhaps, *humanly* possible for the gardener to commit the murder. Humanly impossible since she could not, say, have moved from point A to point B in less than a certain time. Perhaps she was on a different continent and no means of transport would be fast enough to make the trip. Additionally, it might have been *physically* impossible for the gardener to commit the murder - she would have to travel with a speed greater than the speed of light, or simply would have to be at two distinct locations at the same time. This is another non-epistemic reading of the modality expressed in the proposition. Nevertheless, all this does not change the fact that the gardener *could* - in the most general sense of the term - have indeed been the murderer. She could not have been in two places at the same time, or moved faster than the speed of light, but *things could have simply turned out to be different*. It is false, then, that — on this *metaphysical*, non-epistemic reading — that the gardener could not have been the murderer.

On the other hand, there is the epistemic reading, often hinted at by means of an added *the evidence speaks against it*, like in the example above. On this reading, the sentence does not talk about what is or what is not the case independent from our state of knowledge with regard to the content - rather it is a claim about what is known or what is not known.⁷ In general, there is much that we *do not* know – or, modally speaking, there is much that is left open by the knowledge available to us. To someone, who is not in possession of certain pieces of knowledge, the gardener *for all they know* could have been the murderer . This is a scenario that we cannot rule out on basis of our available knowledge. On the other hand, there is much we

⁷Although epistemic modality is usually defined in terms of the knowledge an agent possesses (cf. Von Wright [1951a](#), 5), some authors define this notion in terms of different epistemic states. (cf. Kment [2017](#))

do know, and to arrive at the relevant notion for epistemic possibility, we may start with a simple positive proposal:

Definition 2 (Epistemic Possibility, Positive). *A proposition p is epistemically possible for an agent A if and only if p is compatible with all that A knows. (cf. Roca-Royes [2015](#), 157)*

It is, for example, epistemically impossible for me that the gardener could have been the murderer, since that proposition is not compatible with the knowledge I possess. It is thus, according to the positive proposal, *epistemically impossible for me* — it is incompatible with what I know. The standard negative construal of epistemic possibility expresses the speaker’s failing to know that something is not the case.⁸ (cf. Moore [1962](#), 184) On this account, something is epistemically possible for me if I cannot rule it out.

Definition 3 (Epistemic Possibility, Negative). *It is possible that p if and only if what A knows does not entail $\neg p$. (cf. Stanley [2005](#), 128)*

Since the two modal operators are dual to each other, we may define *epistemic necessity* simply from our definition of epistemic possibility.

Definition 4 (Epistemic Necessity, Dual). *A proposition p is epistemically necessary for an agent A if and only if $\neg p$ is not epistemically possible for A .*

Without a characterisation of what it is for a proposition to be epistemically possible this definition is not particularly enlightening. Filling in this schema with the explanations of epistemic possibility given above, we come to the following definitions for epistemic necessity:

⁸The positive and the negative definition of epistemic possibility are logically equivalent, as we can see from the following equivalence of the material conditional and the conjunction: $(A \rightarrow B) \equiv \neg(A \wedge \neg B)$.

Definition 5 (Epistemic Necessity). *A proposition p is epistemically necessary for an agent A if and only if p follows from all that A knows.*⁹

Epistemic modality on this definition is agent-relative, it relativizes the necessity of the proposition to an agent ('the knowledge A possesses'). This makes sense and should be so, since bodies of evidence or knowledge are indeed relative to agents. A proposition can be epistemically necessary for one person, but need not be necessary for a different person with, say, less knowledge.

Nevertheless, we can obtain an *agent-independent* notion from the agent-relative one by abstraction: 'A proposition P is epistemically necessary for ... an agent [with no empirical evidence] just in case ideal reasoning alone, unaided by empirical evidence, is sufficient to rule out $\sim P$.' (Kment [2017](#)) This notion is no longer agent-relative in the sense that it makes the necessity of the proposition P relative to the agent's body of evidence. Note that epistemic necessity so conceived is still necessity *for* the possible agent with no empirical evidence agent — however, we may, in this sense, *speak* of a proposition being epistemically necessary, without relativization to an agent.

We can also generalize the agent-relative notion — away from singular agents and towards communal bodies of knowledge. On this more general conception, epistemic modality is not a matter of one agent's knowledge, but that of a community. There are two options to deal with a set of agents and their knowledge (cf. Roca-Royes [2015](#), 158), We can, first, take the intersection of propositions known by the members of a given community:

⁹We can easily see that this definition is equivalent to the equivalent dual positive definition of epistemic possibility "it is not the case that $\neg p$ is compatible with all that A knows": 1. $\Box p \equiv \Delta \rightarrow p$, where Δ is A 's all that A knows. Applying the dual equivalence of possibility and necessity yields: 2. $\Diamond p \equiv \neg(\Delta \rightarrow \neg p)$. In classical logic, we can apply the equivalence of the material conditional and the corresponding conjunction: 3. $\neg\neg(\Delta \wedge \neg\neg p)$. Double Negation elimination yields 4. $\Delta \wedge p$, which reads "p is compatible with all that A knows".

Definition 6 (Epistemic Necessity for Community, Intersection). *A proposition p is epistemically necessary for a group of agents C if and only if p follows from what all members of C know.*

Second, we can take the union of the bodies of the propositions members of a given community know and define the following, less strict, notion of epistemic necessity for a community:

Definition 7 (Epistemic Necessity for Community, Union). *A proposition p is epistemically necessary for a group of agents C if and only if p follows from what some members of C know.*

2.2 Alethic Modalities

Recall the distinction drawn in the previous section between epistemic and non-epistemic readings of ‘could’. One characteristic of epistemic necessity and possibility is its relativization to the knowledge of agents. Alethic modalities can be seen as relative to a set of *truths*, independent of any agent’s knowledge of these truths.(cf. Roca-Royes [2015](#), 160)

Depending on how we relativize an alethic modal notion, we can define different notions of alethic modality. Apart from the classical categories, such as logical, metaphysical or nomic modality, such relative alethic modal notions include practical, mathematical, biological or medical necessity and possibility. We have already seen above that, apart from an epistemic reading of the proposition that ‘the gardener couldn’t have been the murderer’, we readily have multiple non-epistemic readings of ‘could’ here: The gardener could not have done it, because she was right before the time of the murder in another country — it was *humanly* (‘practically’) impossible for her to travel the required distance. In fact, let us assume it was impossible for the

gardener to be the murderer because *at the time of the murder* she was in a different location altogether. No object can be at two places at the same time, so it was even physically (*nominally*) impossible for the proposition to be true.

These are just two examples of the variety of alethic propositions there are. Clearly, other (alethic or otherwise) readings of the modality present in the example may have a different truth-value: As we have already seen, it is not *logically* or *metaphysically* impossible for the gardener to have committed the murder in the example case. It is not logically impossible because no contradiction in logic arises had the gardener been the murderer. Equally it is not the case that it is metaphysically impossible since it might well have turned out that way — things could have simply been different than they are.

While there is substantive disagreement about the logical or explanatory order of the various modal notions *within* the category of alethic modality (cf. Kment [2017](#)), it is common to characterize the different kinds of alethic modalities, such as normative, mathematical, biological or medical modalities by construing them as *relative*, or *restricted* modalities. Fine ([2005](#)) distinguishes these two ways (relativization and restriction) for defining the various kinds of (alethic) modalities from a single, underlying modal notion. (cf. [ibid.](#), 236)

2.2.1 Relativization

On the one hand, there is the ‘classical way’ of relativizing the broader modal notions to one, narrow, source. According to this picture, biological necessity and possibility is relative to a body of biological laws, legal necessity is relative to a body of legal laws¹⁰, what is physically necessary is so relative to the laws of physics; and so forth.

¹⁰Note that legal necessity is *not* a form of alethic modality, as defined above: legal modality is not factive. Nevertheless, it is natural to define legal (and perhaps moral modality) by relativization the same way as other modalities relative to a set of laws. (See also below)

It can easily be seen that such an account requires one source of non-relative, or ‘absolute’ necessity: ‘In broadest terms, it seems that the most promising approach will involve taking some kind of non-relative, or absolute, modality as one’s starting point, and explaining other, relative kinds as in some way relativizations of that basic kind.’ (Hale and Leech 2016, 2)

The classical approach is to have *logical* necessity take this role of absolute necessity - so that something is, say, biologically necessary just in case it follows, on this account, *logically* from a body of biological laws. Smiley describes this now orthodox way as follows.

If we define $\mathbf{O}A$ as $\mathbf{L}(T \supset A)$ then to assert $\mathbf{O}A$ is to assert that T strictly implies A or that A is necessary relative to T . Since the pattern of the definition is independent of the particular interpretation that may be put on T we can say that to the extent that the standard alethic modal systems embody the idea of absolute or logical necessity, the corresponding \mathbf{O} -systems embody the idea of relative necessity — necessity relative to an arbitrary proposition or body of propositions. They should therefore be appropriate for the formalisation of any modal notion that can be analysed in terms of relative necessity.¹¹ (Smiley 1963, 113)

2.2.2 Restriction

As opposed to relativization, which allows to define a broader notion (say, biological modality) from a narrower one (say, logical modality), *restriction* allows for the opposite: ‘To say that property N can be defined from kind of necessity N^* by restriction is to say that a proposition’s having N can be defined as the combination of two things: (i) the proposition’s having N^* , and (ii) its meeting certain additional conditions.’ (Kment 2017) We may, thus, define various kinds of modality as ‘species’ (Fine 2005, 237) of one, broad, form of modality. The most plausible candidate for this kind of broad, absolute modality is — at least for proponents of what Fine calls

¹¹Smiley uses \mathbf{L} , instead of the now more common \Box , as necessity operator.

the ‘new school’ (Fine 2005, 236) — metaphysical modality¹².

Not every restriction, or relativization to an arbitrary body of propositions should perhaps be properly called a kind of modality. We might want to define by restriction what is mathematically necessary by what is (i) metaphysically necessary and (ii) a mathematical truth. (cf. *ibid.*, 237) Likewise, we might find it plausible to define (by relativization) what is biologically necessary by what (logically) follows from the laws of biology. On the other hand, it seems perhaps unnatural to count as a kind of modality ‘the class of truths stated in a certain book ... [or] those necessary propositions that deal with cheddar’ (Kment 2017). I do not see a principled reason to discount any particular modal notion arrived by restriction or relativization — and indeed it is a good question what we count as a form of modality. (*ibid.*)

Some paradigmatic examples of alethic modalities include the following: *Nomic Modality* is the kind of necessity and possibility associated with the natural laws.¹³ *Metaphysical Modality* is perhaps the most difficult and most disputed notion to characterize¹⁴, but Kripke (1972) offers an understanding of the relevant notion, in opposition to epistemic modality, in the following passage:

We ask whether something might have been true, or might have been false. ... If it is true, might it have been otherwise? Is it possible that, in this respect, the world should have been different from the way it is? If the answer is ‘no’, then this fact about the world is a necessary one. If the answer is ‘yes’, then this fact about the world is a contingent one. This

¹²Fine’s characterisation of metaphysical modality as the ‘broad sense ... of necessity that obtains in virtue of the identity of things (broadly conceived)’ (Fine 2005, 236) and of logical necessity as narrow is not undisputed. Indeed it is a good and interesting question whether metaphysical necessity entails logical. For a characterisation of the dilemma and subsequent discussion see Hale (1996, 99)

¹³While it is not generally disputed that there is a form of modality associated with the natural laws, it is controversial whether nomic modality is not *simply* metaphysical modality. *Necessitarians* believe that the laws of nature are metaphysically necessary, while *Contingentists* deny this claim. (cf. Kment 2017)

¹⁴For an overview of some proposals see Kment (*ibid.*). Fine proposes a view according to which metaphysical necessity is the most general kind of modality, and which is rooted in the natures of things. (cf. Fine 1994, 9)

in and of itself has nothing to do with anyone's knowledge of anything.
(Kripke [1972](#), 36)

Conceptual Modality is the form of necessity and possibility relative to the set of conceptual truths, where a proposition is conceptually true just in case it is true solely in virtue of the concepts employed in them. (cf. Roca-Royes [2015](#), 164)

2.3 Deontic Modalities

Deontic modality is the necessity and possibility associated with what is obligatory and what is permitted. Modal terms¹⁵ such as 'might', 'must' or 'may' feature — not only, as we have seen above in propositions about what is or is not true — but also in normative claims. We often speak deontically about what must be the case and invoke a *duty*: 'All Maori children must learn the names of their ancestors.' (Kratzer [2012](#), 5)

Among the deontic modalities are first and foremost the *moral* and *legal* necessities and possibilities. It is easy to see that deontic modals do not adhere to the principle of factivity discussed above. What is morally required does not have to be the case. For example, *that* murder is, in most instances, legally and morally prohibited is exactly because murders are in fact being committed. Likewise, what is legally necessary is not therefore the case. If you violated a law and it is required of you to pay the court a fine, it is so exactly because you have not done so already — and it ceases to be required of you as soon as you have fulfilled your obligation.

¹⁵For the classical and most comprehensive survey of modal terms and expressions see the Kratzer ([2012](#)) and the reprints therein.

Chapter 3

Current State of the Debate

3.1 Epistemology of Modality

We possess quite a lot of modal knowledge: We know that two and two could never equal five, or that gold has the atomic number 79 and could not have a different one. How do we acquire knowledge of modal propositions as expressed in these sentences above? That is the question of modal epistemology, or more rightly, the epistemology of modality. Modal epistemology is not a new area *per se* and, historically, these questions have been answered as part of the larger theory of knowledge or metaphysics. In recent years however, the literature on modal epistemology has grown considerably and several *epistemologies of modality* have been put forward.

Until recently, the different theories of modal epistemologies have been divided in two camps: *rationalist* theories and *empiricist* theories. Rationalist accounts subscribe to the idea that there is knowledge of modality to be had by *a priori* means, *i.e.* by means that are independent from experience. Empiricist accounts, on the other hand, explain our way of coming to acquire modal knowledge by means other than *a priori* reasoning.

A. Vaidya (2016) introduces a third category, *counterfactual* accounts, as separate from the two mentioned above. Counterfactually-based epistemologies explain our knowledge of modality via recourse to our knowledge of counterfactuals. Technically, an exhaustive distinction between rationalist and non-rationalist accounts like the one above has no room for a third category. Counterfactual knowledge if it is not purely *a priori* simply falls under *a posteriori* knowledge for the same reason as any non-purely *a priori* source of knowledge falls under the heading *a posteriori* knowledge. Similarly, ‘mixed’ accounts in the epistemology of modality just ‘are’ empiricist accounts.

There is however, for similar reasons as outlined above, a good reason to introduce a third category – and arguably that might be A. Vaidya’s reason for doing so: The very intelligibility of the ‘a priori’/‘a posteriori’ distinction has come under attack by Williamson (2013).¹

We may further distinguish epistemologies of modality, following Hale (2003), along at least two lines. First, we can distinguish between *symmetric* and *asymmetric* accounts. Symmetric views take knowledge of necessity and knowledge of possibility as equally obtainable and, in general, take the acquisition of one kind of modal knowledge as (generally) independent from knowledge of the other. Asymmetric accounts are those that are not symmetric, *i.e.* they ‘accord priority to one of these questions over the other—treating knowledge of necessity, say, as more fundamental than knowledge of possibility, or vice versa’ (ibid., 5). In other words, knowledge of one or the other of the modal properties is prior to the respective other — and in general, acquisition of modal knowledge will be fundamentally of just one kind.

¹Whether or not arguments to this effect are ultimately successful, it gives a reason to explicitly classify epistemologies that do not adhere to the classical distinction in a separate category. Note that the label ‘Counterfactual accounts’ is in this case poorly chosen, since the category of accounts that do not fit nicely into the *a priori*/*a posteriori* distinction is plausibly wider than the category of counterfactual-based accounts. Additionally, it will depend on the epistemology and nature of our counterfactual knowledge whether such an epistemology is ultimately classified as rationalist or as non-rationalist account.

The latter route, asymmetric accounts, leaves the obvious question as to which of the two modal properties is the more fundamental. We can therefore, second, distinguish between two asymmetric approaches in the epistemology of modality. (Hale 2003, 5, 2013, 252) Given that necessity and possibility are inter-definable and their operators are dual, we arrive at, first, *necessity-first accounts* that take knowledge of necessity to be the more basic epistemological state. And second, *possibility-first accounts* take knowledge of possibility to be prior to knowledge of necessity. These two positions may come in varying degrees of strength: (i) an extreme approach would prioritize knowledge of one kind of modality over any knowledge of the respectively other kind, (ii) whereas a moderate approach ‘allows that there may be interdependence of the dominant and recessive modalities, in the sense that some knowledge of dominant modal truths may depend upon some knowledge of recessive truths’ (Hale 2003, 253).

‘Mind-Independence and Modal Empiricism’ distinguishes furthermore between *top-down* and *bottom-up* accounts in the epistemology of modality. Borrowing from the literature in the philosophy of science, bottom-up accounts are the standard empiricist way of explaining the relation — and indeed our methods of acquiring knowledge about the world and its regularities — between facts and laws. Just like facts are determinables, whose regularities are explained by laws, in the epistemology of modality, our knowledge of these facts starts with knowledge of possibility and from there we abduct to knowledge of necessities, determining the determinables.

Top-down accounts, on the other hand, intuitively capture the more ‘Rationalist’ ideal of science. We start from knowledge of principles, and from there go to knowledge of regularities and facts. Similarly, our epistemology of modality starts with a grasp of necessities, the more fundamental notion on this picture, and knowledge of possibilities is derivative from that. This distinction is an asymmetric one and maps

onto the above distinction between necessity- vs possibility-first accounts.

In the following, I will briefly sketch the most influential rationalist theories in the literature which relate to the topic of this thesis. I shall come back to Hale's essentialist epistemology in more detail in chapter [6](#). Conceivability theories of the epistemology of modality have been among the earliest accounts in the modal epistemology literature. Conceivability will also be an important notion in counterfactual theories, of which I will discuss Williamson's counterfactual-based modal epistemology in chapter [4](#).

3.1.1 Rationalist Accounts

Traditionally, the epistemology of modality has been closely associated with theories about *a priori* knowledge. It is perhaps not surprising that modal epistemology as a field has only been established comparatively recently and that serious thought about and methods and capabilities of acquiring modal knowledge was historically being developed only within other disciplines. (cf. Fischer and Leon [2017](#), 2)

Nevertheless, questions of the status and possibility of knowledge of modal matters have been at the centre of metaphysical theorizing — exactly in identifying the methods of knowing the (metaphysically) necessary as being *a priori*. By the mid 20th century it became an orthodoxy to identify the classes of modal status (necessity, possibility, contingency) with their respective means of knowledge acquisition (the *a priori* and the *a posteriori*) in a rigid manner:(cf. A. Vaidya [2016](#))

1. A statement S is a priori if and only if S is necessary.
2. A statement S is a posteriori if and only if S is contingent.

Interestingly, part of the reason that these statements were thought to be true in their symmetry has to do with the empiricist tradition that found fault with Kant's

acceptance of the possibility of *a priori* knowledge of both analytic and synthetic matters. Analytic truths are thought to be non-informative, in that what could (theoretically) be learnt from such a statement, is already included in the subject of the sentence. Synthetic statements are informative in that they are not analytic. In other words, ‘Kant’s rationalism ... is driven by his desire to explain how we can know necessary truths that aren’t merely logical or conceptual truths’ (Fischer and Leon [2017](#), 2).

Where Kant opened the possibility of both *a priori* and *a posteriori* knowledge of the necessary, the later empiricists argued against the claim that there could be some such informative knowledge. Regardless, *a posteriori* knowledge of necessities thought to be theoretically impossible. (cf. A. Vaidya [2016](#)) And Kant’s famous dictum that ‘experience teaches us that a thing is so and so, but not that it cannot be otherwise’, testifies this conviction.

A dictum that will be upheld until Kripke’s *Naming and Necessity*, where a structural way is outlined to arrive at exactly this: *a posteriori* knowledge of necessity: An *a posteriori* necessity $\Box p$ can be known by inference from a major premise $p \rightarrow \Box p$ together with its antecedent p , where the major premise is known *a priori* and the minor premise is known *a posteriori*. The resulting knowledge of the necessitation will be known in this case. The often-discussed example of *a posteriori* knowledge of the modal fact that ‘Necessarily, water is H_2O ’ begins with a the major premise that true identity claims are necessary. Followed by the minor premise that ‘Water is H_2O ’, we arrive (via *modus ponens*) at the necessitated claim.(cf. Kripke [1972](#)) Much hangs on our knowledge of the major premise, which in Kripke’s example is supposed to be known purely by *a priori* means.

We have a substantive result: We arrived, based on both *a priori* and *a posteriori* considerations (the two premises), at a piece of modal knowledge. It is uncontroversial

that the minor premise ('Water is H_2O ') is known via recourse to experience, by *a posteriori* means. Even if the major premise is indeed known independent from experience, the method by which we acquired the modal conclusion is indeed known not purely by *a priori* means — and this is enough to validate *prima facie* the observation that this piece of reasoning in principle outlines a more general way of arriving at necessary, *i.e.* modal, conclusions by *a posteriori* means.

Traditional rationalist epistemologies include *e.g.* modal intuitionism², Peacocke's understanding-based view³ and conceivability theories⁴. Modal rationalism takes the way we acquire modal knowledge to be an essentially *a priori* matter, *i.e.* independent from experience in a relevantly qualified way.

Influential *essentialist* accounts include the ones developed by E.J. Lowe⁵ and Bob Hale⁶, who have independently put forward their versions of a rationalist modal epistemology. Metaphysical Essentialism can be seen as consisting of two core theses: First, that entities have essential properties (essences) that are not merely dependent on language. Second, that not all necessary truths are essential truths. (cf. A. Vaidya ²⁰¹⁵, 34)

Lowe summarizes his own account as follows:

Metaphysical modalities are grounded in essence. That is, all truths about what is metaphysically necessary or possible are either straightforwardly essential truths or else obtain in virtue of the essences of things. An essence is what is expressed by a real definition. And it is part of our essence as rational, thinking beings that we can at least sometimes understand a real definition – which is just a special kind of proposition – and thereby grasp the essences of at least some things. Hence, we can know at least sometimes that something is metaphysically necessary or possible: we can

²Bealer ²⁰⁰².

³Peacocke ¹⁹⁹⁹.

⁴Chalmers ²⁰⁰²; Yablo ¹⁹⁹³.

⁵Lowe ²⁰⁰⁸.

⁶Hale ²⁰¹³.

have some knowledge of metaphysical modality. (Lowe [2012](#), 947)

Both Lowe's and Hale's accounts are *symmetric essentialist* accounts. Symmetric essentialism is the view that essences are both the metaphysical ground and epistemological way of arriving at modal knowledge.(cf. A. Vaidya [2015](#), 34) *Asymmetric* essentialism is the negation of the epistemological claim: It is not the case that knowledge of essence is prior to knowledge of modality. Symmetric essentialism is a *Finean*⁷ view on the relation between essence and modality, *viz.* that metaphysical modalities are grounded in the essences of things.

Conceivability accounts in the epistemology of modality hold that conceivability provides justification for believing that something is possible. How exactly we are to understand the notion of conceivability and what role it plays in our acquisition of modal knowledge varies from account to account. A. J. Vaidya and Wallner (cf. [2018](#), 5) note three important connections between conceivability and modal knowledge:

- (1) It is necessary in sense x that P iff it is not possible in sense x that P is false.
- (2) We are epistemically led from the conceivability of P to the belief that P is possible in sense x.
- (3) We are epistemically led from the inconceivability of P to the belief that P is impossible in sense x. ([ibid.](#), 5)

3.1.2 Non-rationalist Accounts

Rationalist accounts were, for a long time, the only candidates for an epistemology of modality.(cf. Wirling [2019a](#), 68) Rationalist theories have come under mounting criticism — most notably from an anti-exceptionalist point of view⁸ and to meet

⁷Fine [1994](#)

⁸Anti-exceptionalism is the view that the methods which philosophers employ should not be exceptionally different from the methods employed in other disciplines, notably the natural sciences: 'Here as elsewhere, we can do philosophy on the basis of general cognitive capacities that are in no deep way peculiarly philosophical.' (Williamson [2007](#), 178)

the so-called *integration-challenge* for the epistemology of modality. (cf. Peacocke 1999) This challenge, coined by Peacocke (ibid.), has been quite influential in framing central aspects and problems in the still recent field of the epistemology of modality. He writes:

In a number of diverse areas of philosophy, we face a common problem. The problem is one of reconciliation. We have to reconcile a plausible account of what is involved in the truth of statements of a given kind with a credible account of how we can know those statements, when we do know them. (ibid., 1)

Part of a broader family of ‘challenges’, the *integration challenge* is a generalization of Benacerraf’s dilemma for mathematics to an arbitrary subject matter. Benacerraf (1973) identified, what he called, two concerns any theory of mathematical knowledge attempts to meet: first, the concern of having a homogenous semantic theory across mathematical and other propositions, and second, the concern that mathematical *truth* be compatible with a ‘reasonable’ epistemology. (cf. ibid., 661)

Benacerraf’s dilemma was always meant to be a general one, and not only reserved to the realm of mathematics. The more general, descriptive, thesis is that most accounts of mathematical truth only lived up to answering *one* of the two concerns, but never both. Although Benacerraf clearly had a much larger picture in mind, Peacocke, in formulating his integration challenge as a generalization of Benacerraf’s dilemma, for the most part picked up on the second concern, *viz.* the desideratum for a plausible theory of mathematical truth, that the *theory of truth* (broadly speaking the *metaphysics*) ‘mesh with a reasonable epistemology’ (ibid., 661).

Benacerraf writes about his more general aim:

Suffice it to say here that, although it will often be convenient to present my discussion in terms of theories of mathematical truth, we should always bear in mind that what is really at issue is our over-all philosophical view. I will argue that, as an overall view, it is unsatisfactory—not so

much because we lack a seemingly satisfactory account of mathematical truth or because we lack a seemingly satisfactory account of mathematical knowledge— as because we lack any account that satisfactorily brings the two together. (Benacerraf [1973](#), 663)

This formulation of what Peacocke will call the integration challenge, points to the question of ‘reconciling’ (cf. Peacocke [1997](#)) the metaphysics and the epistemology of any domain of knowledge. One can frame the discussion between modal epistemologists, and between modal rationalism and modal empiricism — and indeed the very questions that led to the recent proliferation of modal empiricist views — in terms of Benacerraf’s dilemma. This framing has been a common way to motivate the question modal epistemologists are trying to answer.⁹ If we assume modal mind-independence, *i.e.* the view that what is necessary or possible is so independently of human minds, the natural question then becomes how to *access* those mind-independent truths. (cf. Roca-Royes [2010](#), 335)

If we further remember Kant’s dictum that experience can never tell us what *might* be the case (only what *is* the case), the epistemology of modality soon appears to become a somewhat mysterious matter. We arrived at Benacerraf’s dilemma — and the chasm between modal truth (and the commitments for it that arise from a claim to mind-independence) and modal knowledge:

This challenge has traditionally been presented in the literature as involving the need for a necessity-sensitive faculty that would enable us to recognize modal facts, followed by the claim that we cannot make sense of such a faculty. The idea behind the alleged need for this faculty is the so-called ‘causal account of knowledge’, which would require all knowledge to be fundamentally grounded in causal affection. ([ibid.](#), 335)

A common thread in empiricist accounts is that they take the motivation for a non-rationalist story in the epistemology of modality from a the perceived failure of a

⁹c.f Roca-Royes ([2010](#)) and Wirling ([2019b](#))

rationalist answer to the integration challenge. Non-rationalist accounts, on the other hand have a much more ready answer to this challenge. They can simply defer to an easy-to-integrate domain of knowledge that is used to justify our knowledge of modal propositions: ‘According to modal empiricism, justified modal belief is just a matter of empirically justified categorical beliefs about certain sorts of actually obtaining facts...’ (Wirling [2019a](#), 70) The link between ‘what is involved in the truth’ of modal propositions and ‘how we can know those statements’ is no longer mysterious as it was with (prototypical) rationalist accounts.

Non-rationalist epistemologies of modality, or empiricist accounts¹⁰, are accounts that explain our knowledge of modal propositions by means other than *a priori* reasoning. Experience, in this picture, does not merely play an *enabling* role in our knowledge of modal facts, but has an *evidential*, *i.e.* justification-relevant, part to play¹¹. That is to say, our justification for knowing modal claims is *a posteriori*, or at least not purely *a priori*. The view thus is that ‘it isn’t simply that experience explains how, say, we acquire the relevant concepts. Rather, the view is that modal claims answer to the tribunal of experience in roughly the way that claims about quarks and quails answer to it.’ (Fischer and Leon [2017](#), 263)

Most non-rationalist theories do not hold the stronger claim that we *directly* arrive at modal knowledge through experience. Rather, modal knowledge is acquired on the basis of experiential knowledge together with some *ampliative principle* like abduction, induction or deduction. An ampliative principle ‘is a principle of reasoning

¹⁰All empiricist epistemologies of modality are non-rationalist accounts, but the reverse is not true: there are non-rationalist modal epistemologies that are not empiricist - at least according to their own assessment. One example, as mentioned above, being Williamson’s counterfactual account, which clearly stands in the tradition of modal empiricism, denies that there is a meaningful separation between the *a priori* and the *a posteriori*.

¹¹This distinction is precisely what Williamson disputes: ‘In such cases, the question “A priori or a posteriori?” is too crude to be of much epistemological use. The point is not that we cannot draw a line somewhere with traditional paradigms of the a priori on one side and the a posteriori on the other. Surely we can; the point is that doing so yields little insight.’ (Williamson [2007](#), 169)

which allows the epistemic subject who possesses the right empirically justified, non-modal beliefs, to transcend actuality and draw a modal conclusion.’ (Wirling [2019a](#), 21)

Sonia Roca-Royes provides such a *similarity-based* epistemology for *de re* possibility claims about concrete objects. The starting point for the account is the following:

I know that the wooden table in my office, Messy, is not broken. How do I know that? I see it. Although not broken, Messy can break. How do I know that? Because the table I had before Messy, which we may call “Twin-Messy”, was a twin-sister of Messy, and it broke; and I know that Twin-Messy broke because I saw it. (Roca-Royes [2017](#), 226)

In other words, we know about what’s possible, *i.e.* we gain modal knowledge, by generalizing from what we know about similar things. The challenge is to explain the relevant kind of similarity that matters here, ‘some antecedent knowledge of which non-modal properties ground the modal properties of the one entity, thereby allowing us to look for the same properties in the latter.’ (Fischer and Leon [2017](#), 6)

Another possible stance in the epistemology of modality is to take the notion of modality to be primitive. Such a philosophical view is Modalism (cf. Bueno and Scott A. Shalkowski [2015](#), 671, [2009](#), 306).

3.2 Non-Uniform Epistemology of Modality

Uniformity of the modal realm is a sometimes explicit, more often implicit, assumption by proponents of different epistemologies of modality that there is only one fundamental ‘route’ by which one is to acquire modal knowledge. It is the idea that our epistemic access to all modal propositions is essentially the same, no matter what the modal knowledge is about. *Non-uniformism* is the denial of uniformism: There is, fundamentally, more than one route to modal knowledge. The idea that our access

to modal knowledge is non-uniform in this sense is a very recent one, and has not gained much traction in the literature. We can note, however, that there has been an increased (and overall positive) interest towards non-uniformism, while at the same time no explicit case for it has been made. ¹² (cf. Wirling 2019b, 1)

Two understandings of a ‘route to modal knowledge’ can be distinguished: a genetic and a justificatory understanding. First, there is the genetic understanding according to which speaking of the ‘route’ to a specific piece of modal knowledge we mean the causal origins of that piece of knowledge. A causal story might involve recounting how someone attained knowledge of a particular modal proposition. *e.g.* how it is that I come to know that I can jump across this stream or that ant.

For example, assume that I know that (it is possible that) I can jump across this stream near my house. How do I know this? An explanation of my modal knowledge here may involve the fact that I did indeed jump this stream numerous times in the past, or it may involve testimony: someone I trust told me about a place where I can easily jump across the stream. This is the *genetic* understanding of my modal access, my ‘route’ to this particular piece of modal knowledge. It provides an explanation of how one, in fact, achieved a certain piece of modal knowledge. This does not need to be how one *usually* arrives at modal knowledge, or how one *could* arrive at modal knowledge - the genetic understanding of our ‘route’ simply tells a specific story of how an actor achieved modal knowledge *in this instance*.

On the contrary, there is a second, justificatory, understanding of the ‘epistemic route to modal knowledge’ which is not about an actual, genetic explanation of the formation of a piece of modal knowledge. Rather, we can think of an explanation

¹²The only detailed case for it in print to date, as far as I am aware, is due to Sonia Roca-Royes in a series of papers (2007, 2017, 2018), although Fischer (2017) also explicitly endorses (but argues rather briefly for) non-uniformism. Finally, some overviews mention the distinction (Tahko2015; Vaidya 2015)’ (Wirling 2019b, 1)

of an acquisition of modal knowledge in terms of a *rational reconstruction* of the justification of said knowledge.

If I know a certain modal proposition by testimony, this might be my actual route to this piece of modal knowledge, but *testimony* can not be my ultimate justification for the knowledge. On a rational reconstruction of my knowledge, we may find a wholly other explanation: Depending on the epistemology of modality, we might say that the justification of me knowing that it is possible for me to jump across that stream is that this possibility-knowledge is left open by the necessities I know.¹³ On another epistemology of modality, a rational reconstruction of my knowledge of an impossibility may include knowledge of a certain counterfactual: ‘If gold had an atomic number of 5 then a contradiction would follow’.¹⁴ Again, this does not mean that I do, in fact, know this counterfactual, or go through a deduction from my known pieces of necessity-knowledge.

A rational reconstruction may but need not coincide with the genetic explanation: I may know that it is impossible that gold has an atomic number of 5 by testimony (I read it in a good textbook on physics), but on a rational reconstruction, my justification ultimately may derive from the fact that it is an essential fact of gold to have a certain atomic number and no other. Here, the genetic explanation of my route to modal knowledge (testimony) is different from the rational reconstruction understanding. On the other hand, the genetic understanding and the justificatory understanding may coincide in cases where one, say, comes to know a piece of modal knowledge by direct deduction.

In the remainder, I will understand uniformity and ‘epistemic access’ according to the second, justificatory, way, but I will qualify this understanding in one important way:

¹³cf. Hale and Wright 2001.

¹⁴cf. Williamson 2007.

An epistemology of modality ought to give a plausible rational reconstruction of the knowledge we have of modal propositions, *i.e.* tell a plausible *justificatory* story of our route to modal knowledge, of how we come to know that something is necessary or possible. However, such a reconstruction ought not be out of the reach of ordinary human subjects.

This qualification which will become important in chapter 6 when discussing knowledge of possibility on Bob Hale’s essentialist modal Epistemology and where I formulate a *desideratum* for any epistemology of modality: there are certain modal propositions such that any epistemology of modality (a) must classify propositions in this set as *knowable* and (b) must explain *how* we know these propositions in a psychologically realistic way.

In other words, while I am - just like the authors I am discussing - understanding the aim of the epistemologies of modality as giving a rational reconstruction of our route to modal knowledge, such reconstruction should not be wildly different from the ways we standardly come to know possibilities and necessities. This is furthermore firmly in the spirit of an *anti-exceptionalist* epistemology of modality, where our knowledge of metaphysical modality should be continuous with other, more mundane, kinds of knowledge - and in particular that there is no special, *exceptional*, way of knowing modal truths.

3.2.1 Different Senses of Non-uniformism

The term ‘uniformity’ is used in different senses within the literature. The most standard definition, I take it, is the one I have given above, which also appears in A. Vaidya (2015)¹⁵: ‘The uniformity view holds that there is only one single route

¹⁵This definition is also used in Wirling (2019b)’s overview and first pass at categorising the recent non-uniformity literature. Tahko (2017) speaks of uniform accounts of modal epistemology just in case when such accounts posit one singular ‘basis of all our modal knowledge’ (ibid., 29) (for

to modal knowledge at the most fundamental level of explanation.’ (A. Vaidya [2015](#), 6)

Since the literature is not always consistent in the usage of the uniformism/non-uniformism distinction, it is useful to note the following: First, some authors¹⁶ prefer to speak of modal *justified belief* rather than knowledge. Not much hangs on the difference for my purposes here, although I believe that the interest of modal epistemology lies in modal *knowledge* rather than justified modal belief, and so I shall continue to talk about modal knowledge.

Second, I speak of *fundamental* or ‘non-derivative’ (Wirling [2019b](#), 2) routes to modal knowledge. Derivative routes are *e.g.* knowledge by testimony or remembering. I take it that this qualification is uncontroversially needed — the interesting sense in which the epistemology of modality can be non-uniform is with respect to the *sources* of our modal knowledge.

Third, I reserve the uniform/non-uniform distinction to an approach taken with respect to the epistemology of modality more generally: ‘This allows us the following quite natural way of speaking: uniformists hold that we need only one modal epistemology to account for all modal justification, non-uniformists hold that we need more than one.’ ([ibid.](#), 3) This is in contrast to some authors labelling individual epistemologies of modality ‘uniform’ or ‘non-uniform’.¹⁷ I thus prefer to classify individual epistemologies of modality as either *modest* or *ambitious*. (cf. [ibid.](#), 3) A *modest* epistemology is one that purports to explain our knowledge of only a sub-domain of all modal propositions, whereas an *ambitious* modal epistemology purports to explain all of our modal knowledge.

example essence). I take it that talk of ‘bases’ is essentially the same as talk of ‘routes’ to modal knowledge.

¹⁶cf. Wirling [2019b](#).

¹⁷cf. Tahko [2017](#), 31.

Fourth, it is compatible with the uniformist's view that we have multiple ways, each capable of explaining knowledge of *all* modal truths. For example, we might come to know the same modal propositions in two different ways: Once, by going through an imaginative exercise and — on that basis — concluding that a certain proposition is possible. Or, on the other hand, by abducting from previous experience. I have come to know, say, that *that glass over there* is fragile (it is possible to break it easily) by imagining the glass falling and upon impact with the floor shattering in multiple pieces. But I might also have come to know that fact by experience: I have handled many of similar glasses before, and have indeed dropped one at some point; and now I have come to know such glasses are, and indeed *that one over there* is, fragile.

It is a good practice to keep these two issues separate: On the one hand, there is the uniformist claim that there is one way through which we come to know all kinds of modal truths. On the other hand, this claim does not preclude there being multiple such ways. I shall reserve the term *pluralism* to a claim to such an effect, *i.e.* there being a multitude of routes to arrive at a class (or all classes) of propositions. We can thus speak about a 'pluralism of uniform epistemologies of modality'.

It is furthermore compatible with the uniformity-claim that the propositions which we are capable of knowing via *one* route, are in no non-trivial and interesting way different from propositions not knowable by that route. There might be no other classification of propositions other than *that they are exactly known in virtue of that basis*. Talk of different classes, on this picture, is uninformative and not a defining feature of non-uniformity.

3.2.2 Two Construals of Non-uniformism

Wirling identifies two construals of the debate between uniformism and non-uniformism: First, one can identify the conflict as one over 'proper domain restriction'

(Wirling 2019b, 5). On this construal, the uniformist and the non-uniformist are in disagreement over whether the domain of modal propositions (with respect to our capacity of knowing any particular proposition in it) is one that allows for a completely general account — and specifically one that postulates one source of modal knowledge. The non-uniformist denies this: ‘An intuitive thought is that the sub-fields of epistemology ... appear drawn up with reference to *the subject matter of the knowledge* in question—that is what it is knowledge *about*.’ (ibid., 5) The intuitive idea here is that there are multiple suitably different subject matters within the domain of modal propositions, and knowledge of any proposition within a sub-domain is explained by one method — and these methods need not be the same (uniform) across sub-domains. The uniformist simply denies this picture: There can be one single method that is capable of explaining our knowledge of modal propositions irrespective of what subject matter the knowledge is about.

The second construal of the conflict between uniformism and non-uniformism is one according to which what is at stake in the debate is a difference in opinion about the explanatory value of competing theories. (ibid., 6) One virtue that a typical epistemology of modality should have, might be explanatory scope: Between competing theories, the one with the wider scope — the theory that can explain more phenomena (or, perhaps in our case, the one that can explain knowledge of more modal propositions) — is, other things being equal, preferable to the one with lesser scope. One way to construe the difference between uniformism and non-uniformism, then, is a debate about the existing epistemologies of modality: scope, it can be said, in relation to other theoretical virtues, might be of more or lesser importance. Non-uniformism, on this view, might be one outcome of this debate — it might turn out that a *modest* theory is overall better in an abductive sense than a competing ambitious epistemology of modality.

Correspondingly, we can distinguish between two versions of non-uniformism: (Wirling 2019b, 8) *Weak* non-uniformism is just the claim — corresponding to the second, abductive, construal above — that our best current epistemologies of modality are such that a non-uniform explanation of our modal knowledge arises. *Strong* non-uniformism, on the other hand, ‘is the claim that we *should* prefer and go on to construct modest rather than ambitious modal epistemologies, [i.e.] the proper explanatory scope of a modal epistemology is not all of modal knowledge.’ (ibid., 9) Strong non-uniformism is based on considerations outside of the epistemology of modality and is independent of any first-order theory.

There is, however, a problem of categories with this classification: The first claim (weak non-uniformism) is a purely descriptive claim, while the second claim (strong non-uniformism) is a normative claim. This is clearly not an oversight but intended.

There have been no defences of strong non-uniformism (in its normative version) in the literature so far — with the exception of Wirling (ibid.), who argues that, since the *metaphysics* of modality is heterogeneous (non-uniform), and taking seriously the integration challenge for modality (see above), we should not expect the epistemology of it to be unified either. I will also not attempt a defence of strong non-uniformism, even though it might be the more interesting theory of the two. In the following chapters, I will instead defend a weak non-uniformism and show that three classical examples of modal epistemologies all fail to paint a uniform picture of our epistemic access of the modal realm.

Chapter 4

Counterfactual Modal Epistemology

4.1 Introduction

Williamson's¹ counterfactual-based epistemology of modality has been both influential and attracted considerable criticism in the literature. Hill (2006), Kroedel (2012) and Kment (2014) all have since proposed counterfactual accounts of how we arrive at modal knowledge that are similar to Williamson's original proposal. Here, I focus on Williamson's account for two reasons. First, it is certainly the most influential counterfactual based account and has thus created the most responses. Second, the criticism leveled against Williamson's account will also apply *mutatis mutandis* to other counterfactual modal epistemologies.

I begin with an overview of Williamson's account and continue in the next section with a survey of the existing literature and a classification of the most important

¹Williamson (2005, 2007).

criticisms. Following the overview of Williamson's position, I outline Williamson's epistemology of counterfactuals and distinguish two ways of coming to know that a counterfactual is true: First, there is a fast route that 'shortcuts substantive inquiry' (Williamson 2000, 91) on part of the evaluating subject. I argue that this approach is circular. Second, I discuss Williamson's proposed route of analysing our knowledge of counterfactual conditionals.

I argue that this counterfactual development works well with respect to knowledge of possibility, but fails to deliver correct results in the case of knowledge of necessity for both empirical as well as mathematical propositions.

4.2 Overview

Williamson notes a logical equivalence between, on the one hand, the modal operators for necessity and possibility, and on the other hand, the following corresponding counterfactuals.

$$(1n) \quad \Box A \equiv (\neg A \Box \rightarrow \perp) \qquad (1p) \quad \Diamond A \equiv \neg(A \Box \rightarrow \perp) \qquad (4.1)$$

In other words: (1n) says that the 'necessary is that whose negation counterfactually implies a contradiction' (Williamson 2007, 157). Likewise, for (1p): 'The impossible is that which counterfactually implies a contradiction; the possible is that which does not.' (ibid., 157)

Williamson does not explicitly talk about his preferred relevant notion of contradiction, or what amounts to a contradiction in a specific domain of discourse; though he notes that 'contradictions can be formed in any language with conjunction and negation' (ibid., 178). In the case of "everyday" propositions or propositions about empirical things, Williamson notes that if we develop the (counterfactual) supposition

that Gold had a different atomic number than it actually has, we would run into a contradiction eventually - though, as will be discussed later in this chapter, it is not a simple contradiction between the proposition that "Gold has the atomic number 79" and the fact that "Gold does not have the atomic number 79".

In the case of propositions with mathematical content, Williamson notes that in 'deductive inference, our reasoning to contradictions (as in proof by *reductio ad absurdum*) is not strikingly more or less reliable than the rest of our deductive reasoning.' (Williamson [2007](#), 178) If we take Williamson's example of *reductio ad absurdum*, or proof by 'contradiction', arguably the relevant notion of contradiction is one where a mathematical statement can not be both true and false at the same time. A proof by contradiction may begin with the negation of the assumption we wish to be proved, and ends when a contradiction has been derived from the assumption. Such a contradiction may be the logical negation of the assumption or an obvious mathematical falsehood like $1 = 0$.

Williamson's definitions of necessity and possibility above tell us little about the overall goal of an epistemology of modality, if we do not

1. further assume that the logical equivalence goes hand in hand with, at least, an epistemological 'correspondence' and
2. tell a plausible story about the epistemology of counterfactuals.

Williamson is confident: Given the principles above, 'we should expect the epistemology of metaphysical modality to be a special case of the epistemology of counterfactuals.' ([ibid.](#), 162) We are thus owed an epistemology of counterfactuals, which Williamson also delivers.

According to Williamson, imagination plays a central role in the epistemology of counterfactuals — in our everyday dealings with, and coming to know the truth

of, counterfactual conditionals.² Imagination as a route to modal knowledge has traditionally been held by proponents of rationalist theories of modality, and is a concept which has drawn considerable criticism. Williamson aims to reverse this — not in giving imagination *direct* role in our knowing of modal truths — but instead in highlighting the role of imagination in our every-day knowledge of counterfactual matters. This strategy is part and parcel of Williamson’s larger anti-exceptionalist approach:

[S]corn is easily poured on imagination as a test of possibility: it is imaginable but not possible that water does not contain oxygen, except in artificial senses of “imaginable” that come apart from possibility in other ways, and so on. [...] Once we recall its fallible but vital role in evaluating counterfactual conditionals, we should be more open to the idea that it plays such a role in evaluating claims of possibility and necessity. (Williamson 2007, 163)

Imagining counterfactual scenarios is indeed something we often, and quite reliably, do. To use Williamson’s example: I imagine myself jumping across a narrow stream in assessing whether I could have, if I jumped, landed on the other side. I imagine myself falling into the water if the stream is quite broad — thus either failing to assent to the truth of the counterfactual, or coming to realize the truth of a different counterfactual. The claim is that the imagination used in these examples of evaluating every-day counterfactuals is of the same kind as the one we use in verifying the more *outlandish* counterfactuals used in the modal equivalences above. Recall that modal propositions like ‘It is impossible that it rains tomorrow’ are equivalent to counterfactuals of the form ‘if x were the case, a contradiction would follow’ (or, in our example: if it would rain tomorrow, a contradiction would follow). In Williamson’s words: ‘There is nothing peculiarly philosophical about the way in which the

²Williamson has, on more than one occasion, worked on imaginability. Apart from his work on the epistemology of modality (cf. Williamson 2007), there is a related study on imaginability and the *a priori* - *a posteriori* distinction found in Williamson (2013).

counterfactual is assessed.’ (Williamson [2007](#), 188)

An immediate problem arises: Imagination is characteristically unconstrained. We can imagine all sorts of things — I can imagine myself flying, jumping the English Channel, I can imagine rocks floating upwards in the air or things spontaneously disappearing. How are we to choose the *correct* imagination in our counterfactual development?

Williamson is very well aware of this problem: ‘You can imagine the rock rising vertically into the air, or looping the loop, or sticking like a limpet to the slope. What constrains imagining it one way rather than another?’ ([ibid.](#), 143) The problem is furthermore not new. In fact, Williamson’s account in more than one way resembles and takes cues from Goodman ([1947](#)) theory of counterfactuals and, as we shall see, inherits its problems too. Let me briefly introduce the so-called *problem of cotenability* raised by Goodman:

4.2.1 The Problem of Cotenability

Goodman ([ibid.](#)) formulates the *metalinguistic* theory of counterfactuals — a theory that has been developed next to David Lewis’s possible world account, but is somewhat overshadowed by the possible world account’s popularity. According to Lewis, ‘if A were the case then B would be the case’ is true if there are possible worlds in which A and B are true which are more similar to the actual world than any possible world in which A is true and B is false.(cf. Loewer [1979](#), 99)

Goodman’s metalinguistic approach, on the other hand, counts a counterfactual as true if its antecedent (A) plus relevant conditions (S) and the laws of nature imply its consequent. The problem with this approach, which Goodman elaborates at the same as describing his account, is that, as it turns out, there is considerable difficulty in fleshing out exactly what the relevant conditions are: It cannot be the set of ‘all’ true

sentences, because the very nature of a counterfactual statement is that its antecedent is false.

The only way to save the criterion is to exclude from S any true statement which, though compatible with A, would not be true if A were.(cf. Goodman [1947](#), 120) Goodman calls this restriction *co-tenability* with respect to A and defines: ‘A is cotenable with S, and the conjunction A.S is self-cotenable, if it is not the case that S would not be true if A were’ ([ibid.](#), 120).

However such account now faces a serious difficulty, since in order to determine whether a counterfactual is true, one must be able to determine whether or not statements are cotenable with the antecedents. And this involves being able to determine whether or not a ‘further’ counterfactual is true. As Goodman remarks: ‘to establish any counterfactual, it seems that we first have to determine the truth of another. If so, we can never explain a counterfactual except in terms of others, so that the problem of counterfactuals must remain unsolved.’ ([ibid.](#), 121)

Although ‘[t]here is no uniform epistemology of counterfactual conditionals’ (Williamson [2007](#), 152), as Williamson acknowledges, we can nevertheless put the cognitive process it takes to evaluate a counterfactual into a schema: ‘one supposes the antecedent and develops the supposition, adding further judgments within the supposition by reasoning, offline predictive mechanisms, and other offline judgments.’ ([ibid.](#), 153) We develop the situation in imagination, we conceive and simulate the counterfactual situation at hand. Such imagining must be somehow constrained, in order to produce reliable results: ‘Some but not all of one’s background knowledge and beliefs are also available within the scope of the supposition as a description of the counterfactual circumstances, according to complex criteria (the problem of cotenability).’ ([ibid.](#), 153) How exactly our background beliefs are constrained and what that amounts to will concern us in the following sections. In any case, we assent to the counterfac-

tual when our imagining the antecedent leads to us supposing the consequent, and we dissent from the counterfactual if it does not. We can put this into a schema: (Williamson 2007, 151-4)

1. Suppose the antecedent.
2. Develop the supposition. (ibid., 152)
3. Imagination can in principle exploit all our background knowledge. (ibid., 143,153)
4. However, some parts are imagined away, some are held fixed (not all of one's background knowledge is available as a description of the counterfactual circumstances). (ibid., 153)
5. Imagination proceeds as "realistically" as it can. (ibid., 143,151)
6. Assert the counterfactual if and only if the development leads you to add the consequent. (ibid., 153)

The counterfactual-based epistemology of modality which Williamson envisages is firmly rooted in his *anti-exceptionalist* stance. Philosophical anti-exceptionalism is the view that, simply put, philosophy (and its methods and subject-matter) is no exception to other disciplines, notably the natural sciences.³ In Williamson's words: 'Although there are real methodological differences between philosophy and the other sciences, as actually practiced, they are less deep than is often supposed.' (ibid., 3)

Applied to the epistemology of modality, Williamson holds that our knowledge of metaphysical modality is continuous with other, more mundane, kinds of knowledge.

³This commitment, however, should not be understood as a flat-footed reduction of the philosophical method to the one of the natural sciences: 'The present opposition to philosophical exceptionalism is far from involving the idea that philosophers should model themselves on physicists or biologists.' (Williamson 2007, 6)

In particular, Williamson is firmly against any epistemology of metaphysical modality that posits intuition as a special, an ‘exceptional’, way of knowing modal truths. Contrasting this picture, the counterfactual-based account holds that the kind of knowledge and methods used in evaluating counterfactuals is fundamentally the same kind as employed in our dealings with every-day pieces of knowledge. ‘In particular, a plausible non-skeptical epistemology of metaphysical modality should subsume our capacity to discriminate metaphysical possibilities from metaphysical impossibilities under more general cognitive capacities used in ordinary life.’ (Williamson [2007](#), 136)

Williamson’s counterfactual-based epistemology of modality described above, and *in extensio*, counterfactual accounts in general have in the last fifteen years since Williamson’s first formulation received considerable attention in the literature and attracted a number of criticisms. In the following section, I will attempt a rough classification of the different kind of critiques against the counterfactual-based account.

4.2.2 Criticism

In this section, I will go over the most important criticisms of Williamson’s counterfactual-based modal epistemology. We can classify criticisms against counterfactual-based epistemologies broadly along the following lines: First, concerns about the *logical form* of the theory, *e.g.* about the connection between the epistemology of modality and the epistemology of counterfactuals. Second, concerns about the *content* of the theory, *i.e.* about the methods applied in the proposed epistemology of counterfactuals or the (non-logical) relations between modal and counterfactual thinking. Third, concerns about the *scope* of the account.

Concerns about Williamson’s claim that ‘the epistemology of metaphysical modality

[is] a special case of the epistemology of counterfactuals' (Williamson 2007, 162), and the postulated connection between the two epistemologies, *viz.* the explanation of the former in terms of the latter, have been raised by Jenkins (2008). This concern is about the logical form of the theory in general: The equivalences between the modal operators \Box and \Diamond have been known before Williamson, but what is novel about Williamson's account — and indeed what makes the account into an epistemology of modality in the first place — is the claim about the particularly epistemological connection over and above the logical connection between a certain modal operator (and in extension all modal propositions) and a certain counterfactual (and the corresponding class of counterfactual propositions).

Jenkin's criticism of this connection is straightforward and strictly denies Williamson's claim: 'I contend that it definitely does not follow from the fact that modal claims are logically equivalent to certain counterfactual claims [...] that modal epistemology is tantamount to a special case of counterfactual epistemology.' (ibid., 695)

That logical equivalence does not imply epistemological equivalence becomes apparent from some more examples: 'It does not follow from the fact that disjunctive propositions $A \vee B$ are logically equivalent to negated conjunctive propositions $\neg(\neg A \wedge \neg B)$ that the epistemology of disjunctive propositions is a special case of the epistemology of negated propositions.' (ibid., 695) There is no guarantee that the way we come to know a certain class of statements may reduce to a qualitatively/phenomenologically quite different way simply because there is a logical equivalence between the two classes of statements. Consequently, Jenkins concludes by stating that 'without supplementation, flagging the logical equivalences does not give many clues as to how the envisaged way of knowing about modality is supposed to be working.' (ibid., 696) I think this is correct, without further argument, because the claim that the

epistemology of modality is a special case of the epistemology of counterfactuals has not been made plausible by Williamson.

Taking a closer look at Williamson's elaborations on his theory about the epistemological relation between modal and counterfactual thinking, we notice a variety of formulations. A possible reply on behalf of Williamson to Jenkins' challenge here could take a cue from a remark that he makes about implicit recognition of that relation. Williamson makes the further qualification that we need to have (or already have) *implicit recognition* of the logical equivalences between modal statements and counterfactual statements in order to broadly subsume modal thinking under counterfactual thinking: '[M]odulo the implicit recognition of this equivalence, the epistemology of metaphysically modal thinking is tantamount to a special case of the epistemology of counterfactual thinking.' (Williamson 2007, 158)

Ultimately, however, this reply fails to be convincing. It will only amount to a shift in the locus of Jenkins' challenge. For it is an equally important part to make good on the claim that we have (or should have) an implicit recognition of the equivalence. A counterfactual-based epistemology of modality along Williamson's lines needs to tell a convincing story about 'whether it is plausible that the abilities in virtue of which we know counterfactuals are also the abilities in virtue of which we have modal knowledge.' (Jenkins 2008, 698) Williamson's claim that there is no plausible story to be told in the first place remains unsatisfying:

'The idea that nevertheless we evaluate them by some quite different means is highly fanciful, since it indicates a bizarre lack of cognitive economy and has no plausible explanation of where the alternative cognitive resources might come from.' (Williamson 2007, 162) It is not plausible that there could not even be an interesting alternative story to be told about our knowledge of modal truths other than by referring to our capacity to evaluate counterfactuals.

A more promising approach is given by Kroedel (2017), who admits that the above cited equivalences are rather unintuitive and that a straight-forward derivation of modal statements from the corresponding counterfactual statements is implausible. (cf. [ibid.](#), 187) Ultimately, Kroedel concludes that a satisfying answer cannot be decided by philosophy alone, but points to results in developmental empirical psychology about the cognitive mechanisms potentially underlying both modal and counterfactual reasoning. Kroedel's outlook on the merits of a counterfactual-based epistemology of modality is much more cautious than Williamson's: 'Since we do not yet understand the mechanisms very well, what an account of the epistemology of modality will ultimately look like still is very much an open question.' (Kroedel 2012, 12) This verdict, to my lights, takes seriously the sort of criticism Jenkins raises against a counterfactual epistemology of modality.

There is a variety of criticisms of Williamson's counterfactual-based epistemology that have to do with the content, rather than the logical form, of the proposal. A. Vaidya (2015) raises several questions for the counterfactual account, two of which are helpful in contextualizing a number of criticisms. First, the *question of dependence*: 'Does the counterfactual account of our knowledge of metaphysical modality depend on any kind of modal knowledge? If so, is that dependence problematic?' ([ibid.](#), 12) Second, the *question of imaginative engagement*: The counterfactual account of our modal epistemology, as we have seen above, relies heavily on *imagination* to assess counterfactuals. So how does this process work exactly? What guides our counterfactual development here? (cf. [ibid.](#), 12)

Tahko (2012) criticizes that it is not clear how our imagination is constrained when assessing a counterfactual. 'The method can produce reliable results only if we know which facts to hold fixed. The only way out is that we must have some modal knowledge of metaphysical necessities that precedes the counterfactual assessment.'

(Tahko [2012](#), 106) Metaphysically impossible variations need to be ruled out, so he claims, except where metaphysical necessities are in question.

Roca-Royes ([2011](#)) notes a similar challenge:

Furthermore, for our counterfactual judgements to amount to counterfactual knowledge, it is not enough that we merely happen to hold fixed the right things - our counterfactual judgements would be (extensionally) correct in this case, but hardly knowledge. We need to hold them fixed knowledgeably. ([ibid.](#), 548)

I will come back to this criticism in more detail in section 4.3

Concerns about the scope of Williamson's counterfactual-based theory have also been raised. A. Vaidya ([2015](#)) raises the following problem: 'Given that the counterfactual account of our knowledge of metaphysical modality aims to capture metaphysical modality, does it really do so for the wide range of metaphysically modal claims that are known?' ([ibid.](#))

The truth of ordinary modal claims, such as that a bush is located at a specific location could be located at a different location, seem to be correctly assessed by Williamsons's account. However, so Vaidya continues, more *extraordinary* modal claims, are not as easily solved. Examples include whether it is possible for there to be a physical duplicate of a human that is not conscious. ([ibid.](#)) In chapter [4.3](#) I shall argue that the counterfactual account of modal epistemology fails to account for our knowledge of the necessity of mathematical propositions.

4.3 Assessing Counterfactuals

In this section I will be focusing on Williamson's counterfactual-based account. This account proposes that 'metaphysically modal thinking is logically equivalent to a special case of counterfactual thinking.' (cf. Williamson [2007](#), 158) And, furthermore,

that the epistemology of modality is therefore reducible (‘tantamount’ (cf. Williamson 2007, 158)) to the epistemology of counterfactual thinking.

Williamson’s account aspires to explain our knowledge of modality in a uniform manner, via an epistemology of counterfactuals. I believe this uniform approach fails in its generality. In fact, I believe that any such attempt fails and that it necessitates a non-uniform modal epistemology. However, I will not argue for this general claim here, but will merely advance the argument that Williamson’s counterfactual-based account will not work satisfactorily across all classes of propositions.

We may start from the common assumption that mathematical propositions are, if true, necessarily true (and if they are false, necessarily false). How do we know of a specific mathematical proposition that it is necessary? I shall argue that it is not through Williamson’s counterfactual based account that we can gain knowledge of the fact that any mathematical proposition is necessary. There is a vague sense in which we all know that a mathematical propositions are necessarily true, at least when it comes to ‘every-day’ mathematical propositions. We all have the intuitive sense that ‘two plus two equals four’ is true, and necessarily so. *How could it be otherwise?* This, to my lights, is Williamson’s insight — or at least the starting thought from which an initial confidence in reducing modal epistemology to the epistemology of counterfactuals stems.

Two doubts begin to arise nevertheless. First, even though we can all come to appreciate this claim in the case of those mathematical propositions that come ‘somewhere in the middle’, intuition soon fails us approaching either end of the spectrum: axioms or outlandish theorems. It is not evident how to pinpoint what it is exactly that makes a mathematical proposition to be of an ‘everyday’ kind. Mathematical propositions seem to be quite dependent on each other, quite ‘tightly knit’ together.

Second, and this will be the main point I shall argue for here, the fact that we cannot

imagine otherwise, on this account, is not *explaining* the necessity of mathematical propositions, since this fact is not epistemically prior to the very claim we are trying to explain, *viz.* the necessity of a specific mathematical proposition.

Take any true mathematical proposition p . How do we know that p is necessary — recall that the counterfactual-based modal epistemology purports to explain metaphysical modality in general in terms of counterfactuals. Williamson claims, as we have seen, that there is an epistemic reduction in place: We can explain our epistemic access to modality in general by an appeal to our epistemic access to *counterfactuals*.

I distinguish two ways in which we can assent to the counterfactual. These two ways are not in any strict sense opposed to each other, or fundamentally different ways of evaluating counterfactuals. Rather, I think of the first as a shortcut to arrive at the conclusion, normally arrived at via the second route:

First, we can simply *look* at the antecedent. If we know it to be impossible, we thereby know the whole ‘counterpossible’ to hold vacuously, regardless of what the consequent is. Second, we follow the longer schema described in the counterfactual based account and go through an imaginative development of the counterfactual supposition. We imaginatively develop the antecedent and, after some time, under certain constraints and in a fallible way, ultimately assent (if we arrive at the consequent) or dissent (if we do not arrive) to the counterfactual’s truth.

4.3.1 Short-cutting Inquiry

Let us start with principle (1n)⁴ above: $\Box p \equiv \neg p \Box \rightarrow \perp$ To know whether p is necessary, we have to know the counterfactual on the right-hand side of the equivalence —

⁴*c.f.* section [4](#)

it has epistemic priority. Let me start with a simple example: Since any mathematical statement (if true) is necessarily true, the antecedent of $(\neg p \Box \rightarrow \perp)$ is going to be something impossible. On Williamson's picture, such counterpossibles — counterfactuals with impossible antecedents — hold vacuously, *i.e.* they are true regardless of the consequent or the precise content of the antecedent. Let us further suppose that you know that $(\neg p \Box \rightarrow \perp)$ is a counterpossible. Since any analysis of mathematical necessity on the counterfactual-based account will involve counterpossibles on the right-hand side of the equivalences (1n) and (1p) above, and since we assumed that counterpossibles hold vacuously; and we know that we have a counterpossible in front of us, one might arrive at the conclusion that, for any mathematical statements p we can know that $\Box p$ holds. This reasoning can be paralleled for all mathematical statements.

Clearly, this can't be right. To evaluate the right-hand side of (1n), we have just assumed that $(\neg p \Box \rightarrow \perp)$ is a counterpossible — and thus assumed knowledge of the necessity of all mathematical statements. This was exactly what we were trying to attain in the first place. Indeed, circularity threatens already in the equivalences (1n,1p). We simply cannot use the very notion we are seeking to explain (*i.e.* knowledge of modality) on the left-hand side of the equivalence in our evaluation of what stands on the right-hand side (knowledge of counterfactuals). But exactly this happened in the example above, where our explanatory direction went something like this:

1. We know that p is necessary if, and only if, we know that $(\neg p \Box \rightarrow \perp)$.
2. We know that $(\neg p \Box \rightarrow \perp)$ holds (vacuously), because we know that $\neg p$ is impossible.

This gets us nowhere; the story is too quick — but maybe we can flesh it out more and remove the circularity? Let us take a look at the second step in this explanatory

chain.

We can evaluate a counterfactual claim without going through most of the imaginative exercise and regardless of the consequent, if we know any of the following: First, if we know the antecedent to be impossible and, as we did, accept that counterpossibles hold vacuously, then we need not develop the counterfactual more. Once established that we evaluate a counterpossible, we need not look at the consequent to know the truth-value of the whole counterfactual. Second, as a subclass of the first, if the antecedent is a logical contradiction (and an *ex-falso* rule is accepted) then anything follows for the consequent. Third, some easy to know logical equivalences of the antecedent should hold counterfactually without needing to go through a counterfactual development.

Here we are only interested in counterfactuals of the form $(\neg p \Box \rightarrow \perp)$, where p is a mathematical statement. How are we to evaluate this counterfactual? I argue that we cannot explain our knowledge of this fact only via the equivalence principle that Williamson gives us. To get to $\Box p$, we cannot appeal to the fact that $(\neg p \Box \rightarrow \perp)$ is a counterpossible via this very same route. We cannot shortcut evaluation of the counterpossible above by appealing to the fact that it is a counterpossible, for how did we know that $\neg p$ is impossible in the first place? To summarize, we cannot come to know this via any of the equivalences of the counterfactual-based account on pains of circularity.

4.3.2 Assessing Ordinary Counterfactuals

In the previous section I discussed the idea that the nature of the antecedent of a counterfactual is such that, to use a Williamsonian phrase, it ‘shortcuts substantive enquiry on the part of the subject’ (Williamson [2009](#), 366). In other words, there are some counterfactuals that do not require us to go through a *simulation* or

full counterfactual development of the antecedent to assess its truth value. Counterpossibles might just be of that sort if we accept they are vacuously holding, for simply by recognizing the antecedent as impossible we can assent to the truth of the whole counterfactual. To put this into context: When we analyse $\Box p$ in terms of counterfactuals, the ensuing counterpossible ($\neg p \Box \rightarrow \perp$) might just be of that kind. However, we cannot simply appeal to $\neg p$'s *impossibility* to shortcut inquiry, for p 's modal status is precisely what is in question.

Let us now look at how a more complete analysis of counterfactuals must look like in this context. Williamson holds that 'imaginative simulation is (...) the most distinctive cognitive feature of the process of evaluating' (Williamson 2000, 152) counterfactuals. Recall the basic steps involved in this process outlined above. Roca-Royes (2011) formulates this process as involving two constraints upon imagination:

- (EC-i) Imagination proceeds as realistically as it can. We add the antecedent of the counterfactual at hand and, keeping it, minimally amend our background knowledge in order to preserve consistency. (cf. [ibid.](#), 540)
- (EC-ii) Imagination can exploit all our background knowledge (except for what has been imagined away. (cf. [ibid.](#), 540)

This is a 'seemingly' ([ibid.](#), 4) plausible epistemology for counterfactuals in the empirical domain, *i.e.* counterfactuals with empirical *de re* content (for non-abstract objects). Seemingly plausible only, because, while this epistemology works well with everyday counterfactuals (counterfactuals with a metaphysically possible antecedent and a logically consistent consequent (cf. [ibid.](#), 2)), problems arise when this epistemology is used to analyse counterpossibles and combine it with a counterfactual-based account of modality. (cf. [ibid.](#), 8-9).

We can see that this is so by looking at the uncontentious empirical case: If we want to assess a counterfactual with the antecedent 'if the bush had not been there'

(Williamson [2000](#), 142) we must imagine away the fact that there is a bush, otherwise we would never be in a situation to counterfactually develop the situation in the first place. This is a minimal requirement and it works well with contingent antecedents. The problems with this epistemology (in connection with a modal epistemology), however, arise precisely because we cannot appeal to a prior distinction between contingency and necessity. It is also not at all clear that we can keep the minimal requirement for metaphysically impossible antecedents.

Recall that, in developing a counterfactual supposition, we cannot strictly retain *all* our background beliefs. We have to at least imagine away one piece of knowledge, *viz.* the very piece of knowledge that forms the (counter-factual) antecedent of the conditional and which is our starting supposition in the counterfactual ‘simulation’. If we were to retain this piece of knowledge, we could never get started with our simulation in the first place.

Is this the only piece of knowledge that has to go? No, quite generally, with respect to any further proposition, we have to ask: Do we keep in our simulation or do we imagine it away? To foreshadow the conclusion of this section: In the case of mathematics, and in the case of necessary propositions in general, the answer is not straightforward, since a large number of pieces of mathematical and empirical necessary truths are connected to each other — either by the laws of nature or the theorems of mathematics in general. In assessing a counterfactual mathematical simulation, we face the same choice with respect to each proposition in the whole domain of mathematics.

Let me make the general strategy in assessing counterfactuals more explicit:

Consider the following example. We want to know whether Williamson’s account gives us the right answer to the question whether $7 + 5 = 13$ is possible. We will thus have to look at the epistemology of counterfactuals and assess the truth of $7 + 5 = 13 \rightarrow \perp$,

i.e. whether, in our counterfactual development of the supposition that $7 + 5 = 13$ a contradiction arises. A contradiction would arise, *e.g.* when we compared it with the truth that $7 + 5 = 12$. Are we done? Not quite, since it is unclear whether this piece of knowledge is available to us within the simulation. We are faced with a choice: Either, (1) imagine away this piece of knowledge and look somewhere else for a contradiction. Or yet, (2) flag up a contradiction and stop the counterfactual development.

In general, we always have to choose between these two options:

1. In a counterfactual development of a supposition s , when faced with a piece of knowledge contradicting the supposition, imagine away pieces of knowledge so as to make the supposed set of propositions coherent.
2. In a counterfactual development of a supposition s , when faced with a piece of knowledge contradicting the supposition, stop the counterfactual development and assent to a counterfactual of the form $s \Box \rightarrow \perp$.

At this point, one might be inclined to stop and ask whether I have not, in opening up this choice, already rigged the very description of the situation in my favour. Why is there even a choice between, as it were, *bracketing* certain pieces of mathematical knowledge and flagging up a contradiction? Surely, the very fact that 7 and 5 equals 12 is enough to stop our imaginative exercise. Why should we even open up the possibility that we have not encountered a contradiction here — and with it, proven our desired result, *viz.* that it is not possible that $7 + 5 = 13$?

The fact that there even is a choice in this matter is already a step in the direction of showing that there are problems with both of the outlined options and it will pave the ground for an argument to the effect that in the case of mathematics specifically, and knowledge of necessity in general, (i) option (1) is unsatisfying and (ii) that we ought not simply to rest content with option (2).

4.4 Knowledge of Possibility

How do we gain knowledge of possibility on Williamson's account? Consider the following situation: Take the proposition 'X could have lost the last American Election' and consequently did not become president of the United States. This is certainly true, it is not *necessary* that X is the President today — and we would consider a conclusion to the contrary a *reductio* of any good account of our epistemology of modality.

According to the counterfactual-based modal epistemology, this proposition is identical to the following counterfactual: 'It is not the case that, were X not the President of the United States, a contradiction would follow'. This seems right — we would not encounter a contradiction in developing this counterfactual simulation. We would not want to encounter a contradiction either, for otherwise we would end up with false possibility statement on this epistemology of modality. Let me develop this thought.

Let us assume that, in developing the counterfactual situation, we come across the piece of knowledge that X, in fact, is the current president. We have already seen that we must bracket this piece of knowledge — we ought not, so to say, 'admit it to court' in our simulation, for two reasons: First, practically, we would never get started with our simulation in the first place. We would never be in a position to simulate anything this way. Second, more importantly, we would end up with a straight contradictory situation and would have to assent to the counterfactual above; and with it to the metaphysical impossibility of X losing the election. So, we have to imagine at least this fact away.

Admittedly, pondering over what to do with our knowledge of the Presidency of X is somewhat artificial since imagining a counterfactual, or otherwise, situation simply

brings with it a certain ‘imaginative freedom’ that does not constantly bump against the facts. We are, after all, imagining a *counter-factual* situation.

Other items in our background knowledge, however, are not that easily discarded. What, for example, are we to do with the following piece of background knowledge: That, in fact, X is (also) commander-in-chief of the United States Armed Forces? If we are knowledgeable of the further fact that whoever is President of the United States is also commander-in-chief of the armed forces, we can straightforwardly derive another contradiction in our counterfactual simulation here.

We are now, again, faced with the same choice: stop the counterfactual development here, or discard this further piece of knowledge and continue.

The latter approach just is option (1) outlined above: We declared the piece of knowledge, as it were, ‘inadmissible’ to our simulation and continued to imagine as if this further piece were not the case, too. Thus, one could treat this situation on par with the earlier case and insist that, even though the initial description of the counterfactual situation was incomplete and perhaps ambiguous, it was nevertheless clear from the beginning that it implicitly encompassed situations like the one encountered. It just was part of the counterfactual assumption that we were not only to assume that X was not President but also that they were not the commander-in-chief of the armed forces either.

There is, however, no compelling reason to accept this. There is no *necessary, logical* connection between the fact that person X is or is not president of the United States and the, further, fact that person X is or is not commander-in-chief of the United States Armed Forces. Yes, currently, whoever *is* the president is also the commander-in-chief, and whoever is commander-in-chief is also the president. But this does not need to be the case in all possible worlds. We can easily imagine a world where these two positions do not always have to be inhabited by the same person — and in fact,

there are other countries besides the United States where this is not the case.

Unlike the first example we discussed above, the bracketing of the knowledge of the truth of the negation of the supposition, here we do not *have* to go with option (1): stopping the counterfactual development is a perfectly coherent and reasonable strategy. Note that we do not have to stop either: we may choose to bracket this piece of knowledge and explore the counterfactual situation further - but we are not forced to do this as in the first case.

To summarize, there is a certain *independence* of empirical propositions that allows for a bounded counterfactual development in imagination: We have to imagine away at least one piece of background knowledge, *viz.* the very negation of the counterfactual supposition, in order to even have a chance of developing the counterfactual situation in the first place. There are also certain other pieces of knowledge that, as we have seen in the discussion on cotenability above, also have to be bracketed: all propositions that are logically connected to the supposition by necessity.

However, crucially, there are also pieces of knowledge that are not necessarily connected to the supposition but nevertheless may lead to a contradiction when entertained within the counterfactual development — and these pieces of knowledge, as the knowledge that X is commander-in-chief of the United States Armed Forces in the example above, do not *have* to be discarded *tout court*. There is a real choice whether to admit them into the counterfactual development or not. The fact that there is a choice, makes counterfactual development feasible in the first place.

4.5 Knowledge of Necessity

The foregoing discussion was intended to explain why there is so much as a choice involved, when in our counterfactual supposition we are confronted with certain pieces

of knowledge whose negations are implied by the very supposition we are interested in imaginatively developing. There is a choice, not between how to incorporate the incompatible factual information, but in whether there is a point in continuing our imaginative exercise, or starting it in the first place.

In the previous section we found that empirical propositions enjoy a certain independence from each other: when assessing the possibility of a certain proposition and going through the counterfactual development of the form ‘It is not the case that, were p the case, then a contradiction would follow’, there are two classes of pieces of background knowledge we may encounter in the counterfactual development.

Recall the options from above:

1. In a counterfactual development of a supposition s , when faced with a piece of knowledge contradicting the supposition, imagine away some piece of knowledge so as to make the supposed set of propositions coherent.
2. In a counterfactual development of a supposition s , when faced with a piece of knowledge contradicting the supposition, stop the counterfactual development and assent to a counterfactual of the form $s \square \rightarrow \perp$.

First, there are *dependent* pieces of knowledge. Falling under this category is the very first piece of knowledge (the fact whose negation we might suppose) and all propositions we can deductively infer from it. Here, option (1) is the only workable one: we bracket these pieces of knowledge or incorporate them into our counterfactual development. Second, there are the *independent* pieces of knowledge. Again, we may choose between options (1) and (2) — between bracketing and continuing or stopping the counterfactual development. In the empirical case, always going for option (1) does not seem to be a workable position, not least owing this to the ready availability of the unproblematic option (2).

What about knowledge of necessity? Here, the options are different. Let me begin with knowledge of necessity in mathematics before discussing the empirical case.

4.5.1 Knowledge of Necessity in Mathematics

Where the problem in the empirical case was that our imagination is threatened to be prematurely curtailed by the facts, the issue with mathematical propositions is that, once we let our imaginative exercise get off the ground, we will be unable to stop it at all. In mathematics, as opposed to the empirical domain, this is not so, for the very reason why we needed an alternative to option (2) — *viz.* stomping our feet at the contradiction and insisting to stop the counterfactual development — was that we wanted to let the imaginary exercise to get off the ground in the first place. And this reasoning is precisely not a viable option in the mathematical case. Let me expand this thought for the remainder of this section.

Quite generally, we can note that option (1) has a merely ‘suspensory’ character. It merely postpones evaluating the counterfactual in the hope that *at some point* there will be no more contentious cases left. This is a valid strategy in the empirical case — at some point we will have exhausted all the relevant logical ties that surround the supposition — for example X’s presidency in the example above — and will end with having either imagined away or incorporated into our fiction all the facts; at which point we will have not ended up with a contradiction within the simulation (that is not traceable back to mistake), so to rule it possible that X did not win the election.

With mathematics we just do not have this kind of security. There simply is no end to a counterfactual deduction where we can genuinely say we have exhausted all the logical, or otherwise, implications of a single mathematical proposition. Once we supposed as true a mathematical falsehood, we have committed to also accept as true

a wide-ranging number of propositions.

Let me continue the example from above: Suppose, we want to know whether, on Williamson's account, the proposition $7 + 5 = 13$ is possible. We do not want this proposition to come out as true, so we look at the counterfactual $7 + 5 = 13 \rightarrow \perp$ and whether we could come to know it, *i.e.* whether a contradiction-in-imagination follows from a counterfactual deduction. In order to assess this counterfactual, we go through an imaginative exercise of the following form: Suppose that $7+5$ really equals 13 and let us develop this supposition.

First, we will have to get rid of the fact that $7+5$ indeed equals 12. As in the ordinary, empirical, case outlined in the previous section, this would immediately generate a contradiction, but we cannot stop just yet. We have to imagine away this piece of knowledge; but we already knew this: after all, we are interested in a *counterfactual* development, so it is only correct that we did not take our knowledge of the facts to be the criteria for our assessment of the counter-facts. But matters do not end here: We still look for contradictions in our simulation — or, rather, we ‘develop’ the supposition in our imagination — and if we encounter a contradiction, we pass on to judgement about the counterfactual.⁵

We are thus faced with a choice each time we consider whether a certain item of mathematical background knowledge is to be admitted into our simulation: Take, for example, the case of $7 + 6 = 13$: From our counterfactual assumption it follows that $7 + 6 = 14$ (for example by addition of 1 on both sides and the subsequent identities

⁵This last sentence depicts rather nicely the two strategies with which we handle further pieces of our imaginative simulation: First, we can ‘go hunt for contradictions’, *i.e.* we take pieces of knowledge and compare it with our supposition. That we cannot halt at the first contradictory piece of evidence has become clear, we have to further judge whether it is fit, so to speak, to play this role — whether it has a certain logical ‘distance’ to the supposition. The second strategy begins with this idea of independence and examines each item of knowledge first on its dependence on the counterfactual assumption. That we cannot neatly separate these two strategies in mathematics further proves my point.

of $5 + 1 = 6$ and $13 + 1 = 14$). We can now (1) imagine away that 7 and 6 really equal 13 or build it into our supposition, by imagining away other parts of our background knowledge (*e.g.* by imagining away how addition works). It is, furthermore, not clear why we can appeal to anything like the earlier arithmetic operations from within our supposition at all. Neither of the two additions $5 + 1$ and $13 + 1$ would survive an arithmetic in which $7 + 5$ equals 13.

And so we continue: any mathematical proposition we like to examine for aptitude to admission into our imaginative simulation and subsequent comparison with the supposition, will — if it passes this test — generate a contradiction with the supposition. But that very fact is at the same time the reason why it can never be so allowed to enter.

No mathematical proposition possesses the relevant independence from any other proposition. Conversely, any proposition that does flag up a contradiction will never be able to do so from within the simulation, for it will, again, display the same features that *commander-in-chief* has in relation to *President of the United States*. In other words, no mathematical proposition or operation survives in a mathematically counterfactual simulation.

If we have reached an end, there will be nothing left of mathematics. We will always encounter yet another piece of mathematical knowledge that we will have to assess with respect to its aptitude of standing a chance of being retained in the light of the counterfactual simulation. What we have here is not quite a regress, but the picture of counterfactual analysis of mathematical propositions as a potentially infinite cognitive process — one that will only stop once there are no pieces of mathematical background knowledge left to assess. And what we end up with at the end of this process, if we followed route (1), is nothing at all.

When I say *there will be nothing left of mathematics* I speak from within the counter-

factual development. Of course, mathematics as a discipline, or the infinite number of mathematical propositions, is left wholly untouched by our imaginative exercise. What is more, I am also not talking about different, independently coherent, axiomatisations simultaneously. I am assuming that we employ one axiomatisation consistently throughout the counterfactual development – and within one axiomatisation, no theorem enjoys sufficient interdependence from each other.

What we end up with is a blank imaginative situation where any background mathematical knowledge (and all knowledge we might come to gain) is ‘bracketed’. It is an imaginary situation in which there is, not only nothing left to contradict or even compare to the supposition, but also nothing *further* that is apt to be advanced as candidate for a contradiction. And if something *is* advanced, it will be no different from all the propositions before it that were imagined away.

It is the epistemology of counterfactuals, in conjunction with Williamson’s reductive analysis of modality that generated a problem with the scope of this account. In a discipline like mathematics, where there are very tight logical relations between, plausibly, all relevant propositions (at least within a commensurable subset), the attempt to imagine a counterfactual situation inevitably results in affecting the whole domain.

The simulation, as it were, ‘sprawls’ indefinitely with no hope of it ever stopping, unlike in the domain of possibility. Option (1) is off the table at least in this case. This was an option whose standing was derived from its applicability in, and success of, evaluation of certain empirical counterfactuals — such as the proposition that it is possible that X did not win the last American Presidential Election. Where option (2) was a non-starter in the case of the analysis of this ordinary proposition, option (1) offers no help with respect to mathematical propositions.

4.5.2 Knowledge of Necessity of Empirical Propositions

The analogy with which we ended the previous section is incomplete; for we are comparing a contingent empirical with a necessary mathematical proposition — and there simply *are* no contingent mathematical propositions against which we are in a position to test the merit of option (1).

Furthermore, there is reasonable doubt that a strategy broadly along the lines of option (1) would work across the board of necessary empirical propositions either. The dividing line of the capacity of the counterfactual analysis of modality seems not to be drawn between the mathematical and the empirical, but between the necessary and the contingent.

Consider Williamson's example: 'It is necessary that gold has atomic number 79'.(cf. Williamson [2007](#), 164f) How are we to assess the truth or falsity of this modal statement? According to the counterfactual epistemology of modality, we go through a counterfactual development where we assume the negation of the statement we are interested in. We thus suppose 'Gold has the atomic number 78'⁶ How would we go about assessing this counterfactual? The strategy stays the same as in the mathematical case above: We start with the supposition that gold has the atomic number 78 and develop this supposition. We discard the obvious background knowledge that gold does in fact have atomic number 79 and continue.

A plausible next proposition is that if gold had atomic number 78 then it would have a silverish-white colour. Elements have different chemical and physical properties depending on their atomic number, among other things. But we also know that gold is a bright, slightly orange-yellow metal. This is a good candidate as any other to flag a

⁶Note that we may also be interested in an *impossibility* statement of the form 'It is impossible that gold has the atomic number 78'. Necessity and possibility are dual to each other, however, so practically, we assess the same counterfactuals in each case.

contradiction in our supposition, and now we are, just as before in a situation where we need to assess whether this piece of background knowledge should be imagined away according to option (1) or if we are allowed to stop the counterfactual development according to option (2).

I believe that this case is similar to the mathematical case and we are *not* allowed to stop the counterfactual development. The proposition that gold has a slightly orange-yellow color is *not* of relevant independence to our supposition (that gold has atomic number 78) — and thus we must bracket this piece of knowledge in our imagination. We must bracket it, because it follows from the laws of physics, together with our supposition that gold has atomic number 78, that *that element with atomic number 78* has, necessarily, certain chemical and physical properties. Having a certain atomic number simply brings about certain macroscopic properties.

This same behaviour repeats itself, just like in the mathematical case, for all *relevant* propositions we might consider as candidates for a contradiction-in-imagination. Let's consider some more examples. Supposedly all chemical and physical properties gold has will need to be imagined away. Macroscopic properties of gold, chemical synthesis or molecular bindings, ionisation or other atomic transformations can also not be considered independent of the supposition that gold had a different atomic number (and thus structure).

We thus end up with a similar result: At the end of our counterfactual development, there are no propositions left that have, at the same time, a certain independence to the supposition such that they need not be imagined away, but are relevant enough such that they may act as candidate for a contradiction to the supposition. Remember that the preferred outcome of the counterfactual supposition *is* a contradiction — otherwise the proposition that gold has, necessarily, atomic number 79 will come out as false.

There is, however, an important difference to mathematics: Our counterfactual development does not sprawl indefinitely as was the case with mathematical propositions. It wouldn't dissolve all of the empirical propositions, for some are genuinely independent. For example, the fact that it rained on that date at that place is independent of the atomic number of gold. The fact that Mount Everest has such-and-such height is, presumably, also independent of our supposition. The acceleration of an apple falling to the ground, for example, is an independent proposition. This applies to an infinite number of contingent and necessary independent propositions.

4.6 Knowledge of Constitutive Facts

While empirical propositions do possess relative independence from each other on a global level, there are nevertheless independent sets of propositions present in a counterfactual development. This explains an important difference between empirical and mathematical propositions and is perhaps not surprising. There simply are no contingent mathematical propositions. Every mathematical proposition, if true, is necessarily true — and thus it is not surprising that, if we suppose a falsehood *as true* we end up with no useful mathematical system at all. We should not expect a different outcome.

However, this result has important consequences for the counterfactual-based epistemology of modality: Since, in both the mathematical as well as the necessary empirical scenario, we will never end up with a contradiction — there simply will be no independent proposition left to generate a contradiction with the supposition — we *overgenerate* possibility claims: propositions like ‘It is possible that $7+5=13$ ’ or ‘It is possible that gold has the atomic number 78’ come out as true and known: we will never encounter a contradiction and thus never assent to the corresponding counterfactuals $7 + 5 = 13 \Box \rightarrow \perp$ and ‘Gold has atomic number 78’ $\Box \rightarrow \perp$.

In order to even so much as to allow for the possibility of a choice between options (1) and (2), *i.e.* whether we allow the simulation to get off the ground in the first place and continue thereafter, we looked for clues in the empirical, possibility case. We noted that option (2) is in no shape to provide us with a satisfying strategy of counterfactual development. Additionally, option (1) seemed plausible enough in this case.

The latter strategy offer no help in the case of mathematics and certain necessary empirical propositions; and what is more, it leads to straightforwardly undesirable results. More generally, there is no hope, it seems, for strategy (1) in the analysis of counterfactuals with necessary (empirical or mathematical) suppositions. We appear to be at an impasse.

One option would be to re-think strategy (2) and its purview with respect to necessary propositions. Since there are no contingent mathematical truths, a possible way out of the impasse consists in making good the idea that there is something salvageable in option (2), something that could not only provide us with a plausible epistemology of modality in mathematics, but also stands a chance of being generalizable to the epistemology of necessity in general. The question is why are we allowed to resort to option (2) in the counterfactual development of mathematical propositions, *i.e.* why are we allowed to terminate the counterfactual development either in the beginning or at seemingly arbitrary moments?

Why is it, then, we might object, that Williamson cannot simply ‘bite the bullet’ in the mathematical case as well, with regards to option (2) outlined above? Take the proposition ‘It is possible that $7 + 5$ equals 13’. We develop counterfactually the suppositions that $7 + 5$ does in fact equal 13, but immediately encounter a contradiction: We also know that $7 + 5$ equals 12, and derive $0 = 1$. This is an obvious falsehood we stop the development, and may not assent to the knowledge

that it is possible that 7 and 5 equal 13.

Likewise in the case of necessity: It is necessary that $7 + 5$ equals 12. We begin with the supposition that $7 + 5$ does not equal 12, and immediately encounter a contradiction: If 7 and 5 do not equal 12, then by subtracting 7, 5 does not equal 5 and we may conclude that 0 does not equal 0. This delivers the correct result for both necessities and possibilities.

More generally, for the epistemology of counterfactuals to be sufficiently general, this further constraint now may be added to it: ‘never imagin[e] away constitutive facts.’ (Roca-Royes [2011](#), 544) We end up with a recipe of assessing counterfactuals (with empirical antecedents) of the following form:

1. Suppose the antecedent.
2. Develop the supposition.
3. Imagination can in principle exploit all our background knowledge. However, some parts are imagined away, some are held fixed.
4. Imagination may be to proceed as “realistically” as it can.
5. Hold constitutive facts fixed.
6. Assert the counterfactual if, and only if, the development leads you to add the consequent.

Consider the earlier example again: We want to know whether the proposition $7 + 5 = 13$ is possible. According to the proposed epistemology, we must now assess the following counterfactual $7 + 5 = 13 \rightarrow \perp$ for its truth. In order to counterfactually develop this supposition, we will have to at least imagine away the fact that $7 + 5$ does equal 12. However, it is not clear whether we have to admit even this, for it seems mere evasion. Presumably, the fact that 7 and 5 equal 12 is as good as any other

mathematical truth a candidate to flag up a contradiction with the counterfactual supposition.

Let me unpack this thought: There seem to be a number of candidates apt to play this particular role. First, there is the straight-forward fact, whose negation constitutes exactly the ‘counter-fact’ we are to imaginatively suppose. Second, there are the vast number of axioms and theorems, such as e.g. $7+6 = 13$ or that $47*13 = 611$. Of all candidates, the first is the most natural to imagine away, were we faithfully interested in imagining that $7 + 5 = 13$. The further removed from the initial supposition the mathematical truth is, the less we find it plausible to be candidate for ‘bracketing’.

However we should not trust this feeling: I can think of no way of making good the idea that any mathematical proposition, including the axioms, enjoys sufficient ‘distance’ from any other mathematical truth. In the end, the fact that $7+5$ in reality just equals 12 is as good a place to stop the counterfactual development as any other.

This, of course, delivers the right result; but why are we justified in such a move? Where does the justification to hold fixed this particular truth come from? Why are we allowed to hold this particular piece of knowledge fixed? Recall that it cannot be *because* $7 + 5 = 12$ *is true*. Truth cannot be the criterion, for it is precisely *facts* that we must imagine away in counterfactually developing a supposition. The fact that $7 + 5 = 13$ is *impossible* will not make a good criterion either, for its modal status is exactly what we are interested in.

If Williamson were to bite this bullet, however, the strategy must appeal exactly to the special character of the counterfactual development we discussed in the mathematical and the necessary-empirical case: Williamson, so the objection goes, must hold that it is *exactly* the ‘everything must go’ characteristic of a counterfactual development

with an impossible supposition that accounts for the necessity of all mathematical propositions (if true).

The very fact that the counterfactual development does not get off the ground in the first place, or, if we force it nevertheless to get off the ground, then there is in principle no reason to let it ever stop, *is*, in a sense, a contradiction. Williamson must hold that the ‘absurdity’ of the contradiction manifests itself, not in a direct logical contradiction between otherwise logically independent propositions, but in the complete breakdown of any sense of mathematics itself.⁷

We may take cues from the actual use of proof by contradiction in mathematics: In a proof by contradiction we assume the negation of the proposition we want to prove, and then try to reach some kind of contradiction or falsehood. This proves the negation of the negation, thereby validating the original proposition. If we want to prove $B \vdash Q$, we *suppose* ‘Not Q’ and B. In practice, we set B to be our background mathematical knowledge and hold it fixed. A contradiction may result then either from a direct contradiction with our supposition ‘Not Q’, or some other blatant falsehood like $0 = 1$ (which in the simple case just means a contradiction with the supposed background knowledge B).

Take for example the proof by contradiction for the proposition that the diophantine equation $x^2 - y^2 = 1$ has no positive integer solutions.

1. We suppose (counter-factually) that there is a solution (x, y) and that x and y are positive integers.
2. We can then, from this supposition, refactor $x^2 - y^2 = 1$ into $(x - y)(x + y) = 1$
3. Supposing further, this equation has two solution pairs: (1) $x - y = 1$ and

⁷The same applies, *mutatis mutandis* for the empirical domain: The only difference is that there are still independent empirical propositions possible within the counterfactual development.

$x + y = 1$ and (2) $x - y = -1$ and $x + y = -1$.

4. Evaluating the first pair we get as solution $x = 1$ and $y = 0$.
5. Evaluating the second pair we get as solution $x = -1$ and $y = 0$.
6. Both pairs contradict the supposition that x and y are positive.

This is a neat proof, but a *contradictio ad absurdum* does not automatically lead to a definite result. In fact, it never leads to a definite result, since from a contradiction between Not Q and the background knowledge B, we may derive only that *either* Not Q *or* B is false. Pragmatic considerations lead, in practice, always to negating the first disjunct, but this must not necessarily be always true.⁸

The same considerations also apply to Williamson's modified counterfactual development scenario: In order for the counterfactual development to stop, we need to assume that *something* is fixed in order to derive a contradiction — and this *something* might as well be the very proposition whose negation we supposed. Williamson seems to hint at such a strategy when he discusses the importance of 'constitutive truths' in counterfactual development. (cf. Williamson 2007, 170)

The reason is not simply that we know that gold is the element with atomic number 79, for we can and must vary some items of our knowledge under counterfactual suppositions. Rather, part of the general way we develop counterfactual suppositions is to hold such constitutive facts fixed. (...) For example, we need not judge that it is metaphysically necessary that gold is the element with atomic number 79 before invoking the proposition that gold is the element with atomic number 79 in the development of a counterfactual supposition. Rather, projecting constitutive matters such as atomic numbers into counterfactual suppositions is part of our general way of assessing counterfactuals. The judgment of metaphysical necessity originates as the output of a procedure of that kind; it is not an independently generated input. (ibid., 164-70)

⁸In fact, there is hidden third disjunct present as well: the rules of inference. (Wright 1980, cf.) It would go beyond the scope of this thesis to discuss this option however.

An objection along these lines would have consequences for the counterfactual-based modal epistemology in general. First, ‘for our counterfactual judgements to amount to counterfactual knowledge, it is not enough that we merely happen to hold fixed the right things ... [It] seems to require knowledge of what the constitutive facts are.’ (Roca-Royes [2011](#), 11) This is in fact a limitation of the counterfactual account with respect to its *uniformity*.

Second, if a further modal notion is to be accepted and our epistemology of modality now encompasses both notions, we end up with a proliferation of modal notions and possibly epistemologies. What we end up with is not simply a non-uniform epistemology of counterfactuals but also a non-uniform epistemology of *modality*, for we cannot — on pains of falling into a regress — assume the same epistemology (here: of counterfactuals) to be applicable in both cases. In effect, we have thereby also extended, or subdivided, our metaphysics of modality to include, say, the *constitutive*; and thereby accepted a *non-uniform* epistemology of modality.

4.7 Conclusion

Let me take stock of the dialectic options presented so far: I introduced two approaches to analysing the class of counterfactuals Williamson claims are pertinent to assessing the modal status of propositions. First, there is a ‘fast-track’ way which shortcuts any substantive counterfactual development (simulation) on behalf of the subject. I have argued that there is not much hope to this method when it comes to establishing the necessity or possibility of mathematical propositions — save we accept a non-uniform epistemology of modality.

Second, there is the ‘normal’ route of assessing counterfactuals: We suppose the antecedent, retain some background beliefs and imagine away others, and come to either affirm the consequent (and with it the counterfactual) or refrain from doing so

(and thus dissent from the whole counterfactual). However, some items of background knowledge cannot be, as it were, ‘brought into’ the counterfactual simulation. This imaginative exercise, as commanded by a certain background epistemology, has to strike a careful balance between finding items of our background knowledge that have to be imagined away and still retaining others so as to generate a contradiction as demanded by the counterfactual-based epistemology.

This counterfactual development works well with respect to knowledge of possibility, but fails to deliver correct results in the case of knowledge of the necessity of mathematical propositions and certain empirical propositions. The necessary truths of mathematics and physics, as we have seen, simply do not possess the relevant *independence* from each other as to generate a contradiction with a counterfactual development. It emerged an issue that lies more with the analysis of *necessity* on the counterfactual account than with the domain to which the propositions belong to.

An objection to this argument is to maintain that it is exactly the described problematic never-ending, all-encompassing counterfactual development that *is* a manifestation of the relevant contradiction. Why should we expect an imaginary development of an impossible supposition to lead to a, as it were, ‘coherent’ logical contradiction? The necessity (or impossibility) of a proposition just *lies in* the fact that it cannot coherently be entertained in conjunction with a constitutive truths. Williamson may maintain that certain constitutive truths need to be fixed, and as soon as there is a contradiction between constitutive truths and a supposition, we stop the counterfactual development.

The outcome of an objection along these lines, however, leaves me in a position to bite the bullet on this objection: A counterfactual-based epistemology of modality that holds constitutive truths fixed in the evaluation of a counterfactual development, is, in

essence, a *non-uniform* epistemology of modality. With this insight in mind, the two dialectic concessions constitute an argument against a *uniform* counterfactual-based epistemology of modality and, in turn, an argument for a *non-uniform* epistemology of modality in general.

Chapter 5

Possibility-Based Modal Epistemology

5.1 Introduction

In her article ‘Williamsonian modal epistemology, possibility-based’, Barbara Vetter proposes, what she calls, a *possibility-based* epistemology of modality. In this chapter, I first outline Vetter’s epistemology of modality. The possibility-based account contains a three-step model of an epistemology of *metaphysical* modality: First, our ‘entry point’ into modal thought is our familiarity with can statements such as *e.g.* ‘I can jump this gap’. Second, to grasp the *concept* of metaphysical modality, and not just the restricted kind of modality that is inherent in can statements, Vetter describes a cognitive process of generalization. Third, to finally reach *knowledge* of metaphysical modality, a closure principle is formulated. I go over these steps in the first section of this chapter.

Following a classification of Vetter’s account in terms of *access* and *navigation* questions, I formulate three problems for the possibility-based modal epistemology. First,

the access problem is a problem of properly addressing what it means to gain ‘access’ to modal knowledge in the first place without already presupposing some modal knowledge of the same kind. Second, the problem of scope is due to the fact that the possibility-based account relies heavily on other epistemologies of modality in explaining the *epistemology of can statements*, and thus inherits restrictions of scope from them. Third, the generalization problem is one that targets the possibility-based account’s explanation of our grasping the concept of metaphysical modality from our understanding of the modality inherent in can statements. This problem is similar to the problem outlined in the previous chapter for a counterfactual-based epistemology of modality, in that it points to a difficulty in dealing with the concept of metaphysical modality.

5.2 Overview

Vetter explicitly wishes to retain at least two commitments of a Williamson-style modal epistemology in, what she calls, a ‘firmly Williamsonian’ (Vetter 2016, 769) account of modal knowledge: *realism* and *anti-exceptionalism*. First, a *realist*, or mind-independent, epistemology of modality does not assume any truth makers for modal statements that are mind-dependent, *i.e.* what makes modal claims true or false is not dependent on what any human thinks, but a matter of the content of the modal statement itself. (cf. [ibid.](#)) Second, *anti-exceptionalism* is the claim that ‘our knowledge of metaphysical modality is continuous with our everyday knowledge about the world’ ([ibid.](#), 766).¹

Note that whereas the first commitment is a metaphysical claim about the truth con-

¹As Williamson says about his anti-exceptionalist approach: ‘Here as elsewhere, we can do philosophy on the basis of general cognitive capacities that are in no deep way peculiarly philosophical.’ (Williamson 2007, 178)

ditions of modal propositions, the second commitment is an epistemological one: it concerns the knowability of modal propositions. In Vetter's words, the *possibility-based* epistemology of modality is modeled after a picture of 'realism about metaphysical modality, along with anti-exceptionalism about our ways of knowing about it.' (Vetter 2016, 789)

Vetter sets up this account in three steps, which I shall discuss in order: First, I will go over what Vetter calls an epistemological 'entry point' into modal thinking; more precisely, thinking about metaphysical modality. This entry point functions as a kind of *everyday* epistemic access to the more extraordinary concepts such as objective modality and—as Vetter describes in the next step—eventually the concept of metaphysical modality.

Second, I discuss how the possibility account describes the way of extending our understanding of this 'entry point', this *everyday* kind of modality we are already familiar with, to the more interesting concept of metaphysical modality. On Vetter's account, we reach an understanding of the concept of metaphysical modality by means of the cognitive process of generalizing: We are already familiar in dealing with 'can statements'—statements featuring the circumstantial modality *I can*—and we are able to generalize and make an 'extension beyond that entry point' (ibid., 768) with respect to both time and context.

Third, to guarantee *knowledge* of metaphysical modality, Vetter proposes a closure principle for knowledge of can statements and metaphysical modality. Note that the first two steps describe an anti-exceptionalist way of attaining grasp of the *concept* of metaphysical modality, while the closure principle in the third step *relies* on this grasp and is a guarantee that we achieve *knowledge* of metaphysical modality by inference from knowledge of can statements. Let me go over these three steps in turn.

5.2.1 The Entry Point

Can Statements

Let me begin discussing the first step, *i.e.* the so-called ‘entry point’ into modal thought. What could the ‘entry point’ consist in? And how can we understand this concept? Vetter begins with a reference to Williamson, who identifies counterfactual statements as the ‘entry point into the relevant kind of modal thought and knowledge within our ordinary thought and knowledge about the world’ (Vetter [2016](#), 768). Although Williamson never uses the terminology of ‘entry points’ into modal knowledge, we may recall that in Williamson’s counterfactual-based epistemology of modality, counterfactual statements play an anti-exceptionalist role, *i.e.* knowledge of counterfactual statements entails knowledge of metaphysical modality, and there is nothing mysterious about the kind of knowledge we employ when evaluating counterfactual statements.

On Williamson’s account, ‘the epistemology of metaphysically modal thinking is tantamount to a special case of the epistemology of counterfactual thinking.’ (Williamson [2016b](#), 796) And in ‘Reply to Vetter’ he agrees with what Vetter describes, and notes that his counterfactual-based epistemology of modality—just as Vetter’s—bases knowledge of metaphysical modality in our ordinary ways of knowing. Williamson thus gives ‘the starring role to ordinary ways of knowing about what would have happened if something had been different’ (Williamson [2007](#), 770), whereas Vetter, as mentioned above, bases her epistemology on can statements.

The emphasis is slightly different, however, as Williamson focuses on the logical equivalence between counterfactual statements of a specific form and claims of metaphysically modality. Furthermore, it is important to Williamson that there is no *necessary* epistemic order between knowledge of counterfactuals and knowledge of metaphysical

modality:

Several authors have misinterpreted the account in Williamson (2007) as moving from the logical equivalences between claims of metaphysical modality and claims involving counterfactual conditionals to the idea that we first know the latter and then use the logical equivalence to come to know the former. (Williamson 2007, 801, fn 1)

In other words, what we commonly do is using a similar cognitive process to come to know both counterfactuals and metaphysically modality: ‘The main point is that if one has what it takes to evaluate counterfactual conditionals, one already has what it takes to evaluate claims of metaphysical modality.’ (ibid., 802, fn 1)

Thus, according to Vetter, can statements of the form ‘x can F’ fulfill the role of Williamsonian counterfactuals of the form ‘if it were the case that x, then y would follow’. Both can statements and counterfactual thinking give us epistemic ‘access’ into the modal realm.(cf. Vetter 2016, 768) But what are can statements exactly, and—as epistemological entry-points into modal thought—how do we get to know these statements in the first place?

Let me expand on what form of (non-metaphysical) modality is contained in can statements. Vetter gives us a brief statement of the kind of modality expressed: ‘Can statements are our paradigmatic forms of expression for objective, or in linguistic terms: circumstantial modality.’ (ibid., 771) In other words, when we use can statements in every-day talk, what we express is not metaphysical modality or possibility, but circumstantial possibility. But what is circumstantial, or ‘objective’, modality exactly? What kind of possibility is expressed here? Vetter claims that when we use can statements in ordinary contexts, ‘we talk about relevant possibilities obtaining at the time of the utterance.’ (ibid., 772) Arguably, objective – or circumstantial in linguists’ terms—possibility is contextualized modality.

Circumstantial Modality

The term ‘circumstantial modality’ is due to Angelika Kratzer, who introduced it as part of her tripartite classification of *relative* modality. (cf Kratzer 1991) In contrast to *epistemic* modality (necessity and possibility relative to what someone knows) and *deontic* modality (necessity and possibility relative to what is the ethical or legal law), *circumstantial* modality is modality which is true or false ‘given the relevant circumstances’ (ibid., 640). The distinction between the first two varieties of modality—epistemic and deontic—is a relatively common and uncontroversial one.

Philosophers usually further distinguish a third category: *alethic modality*, that form of modality which is independent of anyone’s state of knowledge or the (ethical or legal) laws: alethic modality is relative to sets of truths. Circumstantial modality, I take it, is best understood as a form of this latter kind and Vetter also often speaks of *objective modality*. Let us look at Kratzer’s examples:

- 7 Jockl must sneeze. (in view of the present state of his nose etc., Jockl must sneeze)
- 8 Jockl can lift the rock. (given the weight of the rock and the condition of Jockl’s muscles etc., Jockl can lift this rock)
- 9 Jockl couldn’t see the train arrive. (given that Jockl is short sighted and the train was far away, Jockl couldn’t see the train arrive) (cf. ibid., 640)

These examples demonstrate the difference in kind of circumstantial modality to epistemic and deontic varieties of modality. As is apparent, the ‘can’ and ‘must’ above are not dependent on anyone’s state of knowledge or the ethical laws. Vetter agrees: ‘Circumstantial modal bases are determined by propositions about how things stand, regardless of our epistemic access.’ (Vetter 2016, 68) The truth of the sentences above is not determined by *all* propositions about how things stand, but by *some relevant*

subset of propositions about how things stand.

That ‘Jockl must sneeze’ is true is very much dependent on some contextually fixed propositions. In fact, the statement ‘Jockl must sneeze’ does not even make sense or is analysable on its own. It is also obvious that, if we want the statement to come out as true (‘in view of the present state of his nose etc., Jockl must sneeze’), the *must* here expresses a form of contextualized, restricted form of modality.

If statements like this, which we use all the time in everyday language, should have any chance of a truth value assignment, the evaluation in terms of *all* possible worlds (‘In all possible worlds, Jockl must sneeze (here and now)’) is certainly wrong. Rather, an analysis must go somehow like this: the relevant circumstances (his bodily condition along with, say, certain environmental conditions) necessitate such-and-such bodily reaction (a sneeze). He could of course have not sneezed (it is metaphysically possible that he didn’t)—simply because it is (metaphysically) possible that the circumstances have changed: it is possible that there was not so much dust in the air, for example, or that Jockl had a different physical constitution etc.

Circumstantial modality is relative. Kratzer takes circumstantial modality to be relative to relevant circumstances, and Vetter speaks of ‘restricted’ modality. Metaphysically speaking, circumstantial modality is not an interesting category on its own. Almost all forms of alethic modality are relative or restricted forms of modality. In fact, as we have seen in chapter [2](#), relativization and restriction are the two most salient ways of defining a modal property in terms of another. Likewise, an answer to the question of how exactly circumstantial modality is different from metaphysical modality along these lines is unhelpful. Metaphysical modality is, like circumstantial modality or nomic modality, a sub-species of alethic modality. Since metaphysical modality is either the, or at least one of the, broadest notion of modality, and since circumstantial modality is per definition one of the narrowest, this is one obvious

difference, albeit not a very illuminating one.

Let me go over these characterizations in turn: First, when we use ‘can’ or ‘must’ circumstantially, we hold the metaphysical laws fixed. When we talk about whether I can jump across that stream of water, we usually do not consider scenarios where the laws of metaphysics or logic are different. Second, we also hold fixed the natural laws: I can jump across the narrow stream, I know it, and I would be irrational to come to the conclusion that I cannot, there are some possible worlds where the gravity on earth is slightly different and my jumps therefore are much smaller. Third, as we have seen above, the hallmark of circumstantial modality is that, per definition, the truth of the sentence is relative to circumstances defined in the context of the situation. I can jump this stream now and in my current physical condition.

I doubt there is a strong case to neatly separate circumstantial from metaphysical modality. Indeed, much depends on what we take metaphysical modality to be: Vetter disagrees with the standard definition of metaphysical modality and I suspect much of the momentum lies here. The standard definition Vetter takes issue with goes as follows:

Williamson [...] proposes that we understand ‘metaphysical modality as the maximal objective modality’ [...] where objective modalities include practical and physical modality, and in general everything that is classified as ‘circumstantial’ modality in linguistics. (Vetter 2016, 770)

Vetter, on the other hand views ‘metaphysical possibility as a gradual extension from a single kind of possibility (or, at any rate, a single kind of expression), the restricted possibility expressed by ordinary uses of the modal auxiliary ‘can.’ (ibid., 770) I do not see how this difference in terminology between ‘maximality’ and ‘limit’ helps us here: It is unclear what exactly the difference is: the restricted possibility expressed by ordinary uses of ‘can’ is exactly circumstantial modality—and circumstantial modality is admittedly a kind of objective modality. The only difference,

then, is in viewing metaphysical modality as either the ‘maximal objective modality’ or else as ‘gradual extension’ from it. Without further information what gradual extension metaphysically speaking amounts to, this is of no great help.

Nevertheless, even if circumstantial modality may not be a useful metaphysical category, it certainly is a useful *epistemic* one – and arguably that is the case in Vetter’s proposal in the first place: ‘When we think about possibility claims in metaphysics (also usually phrased in the present tense), we want to speak timelessly and unrestrictedly.’ (Vetter [2016](#), 770) I am unsure how much this observation is a feature of our language, or our conversational conventions, than a deep property of modality.² Nevertheless, circumstantial modality can be seen as a family of alethic modal properties that we use in everyday discourse when we talk with modal terms such as ‘must’ or ‘can’. Circumstantial modality in this sense is a kind of modality that is restricted in terms of metaphysical laws, natural laws and circumstantial factors given in context.

Vetter is aware that can statements might have *metaphysically modal* content, but argues that they ‘very nearly; but not quite’ ([ibid.](#), 771) have metaphysically modal status. She goes on to explain: ‘Each can statement entails a metaphysical possibility; by knowing that entailment, our knowing about the more mundane objective possibilities expressed by can statements puts us in a position to know about metaphysical possibilities as well.’ ([ibid.](#), 771)³ I will come back to the epistemological implication

²I do not completely agree with the characterization of metaphysical modality above. We may speak timelessly and unrestrictedly in metaphysics, but not all statements that express metaphysical modality are completely timeless and unrestricted in context.

³For our current purposes, this answer is rather unsatisfying for there is no argument given that *knowledge* of a can statement is not a form of *knowledge* about metaphysical possibility—after all, the entailment from can statements to metaphysical possibility might well hold between some form of knowing about metaphysical knowledge and metaphysical knowledge tout court. This is a trivial point: A truth-functional connection like *implication* simply does not bring with it any interesting *epistemological* weight. It might well be that we find there is a logical implication between two concepts, but pending further argument, a connection in truth values gives us no information about any conditions of knowability or even an epistemological connection between the two concepts. Two

below.

5.2.2 Grasping the Concept of Metaphysical Modality

The second step, on Vetter's account, is to acquire the *concept* of metaphysical modality. After having an entry point into modal (not metaphysical) thinking as outlined above, we may gradually extend our grasp of the kind of modality expressed in can statements. We do this by means of a process of *generalization*.

My suggestion will be that this works in much the same way as it does in other cases, such as ontology: we gradually extend the contexts of utterance, we abstract from times, and we then apply any other methods of systematic metaphysical theorizing that we have at our disposal. (Vetter 2016, 770)

Can statements, as Vetter holds, usually express a kind of restricted possibility, and not metaphysical possibility.⁴ We then extend and generalize the grasp and understanding we have of the kind of possibility inherent in can statements—resulting in a grasp of the concept of metaphysical modality.

The 'possibility-based' epistemology of modality is therefore—in contrast to Williamson's counterfactual based epistemology of modality—a *possibility-first* account. Knowledge of metaphysical modality is on this picture dependent on 'a gradual extension from a single kind of possibility (...), the restricted possibility expressed by ordinary uses of the modal auxiliary 'can'.' (ibid., 770) The idea is that ordinary can statements express a restricted kind of modality—when we utter can statements, we talk about possibilities present *at a certain time* and *in a certain context*. In other

propositions may be connected by (truth-functional) implication yet be in principle unknowable.

⁴This is not always the case: We can perfectly well express metaphysical modality when using a can statement. Depending on the context of utterance, the statement *I can jump one metre* may express the metaphysical modality that is possible for me, *simpliciter*, to make such a jump. Indeed, as Vetter notes, we can use terms such as 'simpliciter' or *absolutely* to mark metaphysical modal meaning. (cf. 2016, 773)

words, the modality inherent in ordinary can statements is circumstantial modality, a kind of family of objective, alethic modalities that are restricted by (i) the retaining (invariance) of our metaphysical and nomic laws, but which (ii) varies with context and circumstances.

We then extend our understanding of this kind of modality, which we are already competent in handling, to an understanding of the concept of metaphysical modality. We do so by generalizations: we may abstract from the current *circumstances* of utterance, we may speak *timelessly* or generalize away from a certain *feature* of the situation. When we utter statements of metaphysical modality, Vetter explains, ‘we want to speak timelessly and unrestrictedly. A metaphysics of modality is about all possibilities whatsoever, at any time, whatever our interests.’ (Vetter [2016](#), 772)

Take, for example, the ‘de-relativization’ of my circumstantial knowledge that I can jump this stream: I might know by heart that I can jump across a certain specific stream of water - I know this because I have done it a hundred times as a child. In assessing if I can jump a, perhaps, similar stream on my hike right now I *generalize* my prior knowledge of what I can. I relax the contextual restriction on the can statement and arrive at the more general and less relativized statement ‘It is possible (for a human being) to jump across such-and-such stream’. I thereby come to grasp a less-restricted concept of modality—and I can go on: *de-contextualize* further and away from the object in question to reach the even less restricted modal proposition ‘It is possible to jump such-and-such length’.

By this generalization, which Vetter holds is a thoroughly anti-exceptionalist cognitive process, we forge the concept of an objective modality that is no longer *circumstantial*, *i.e.* it does not depend on the features and circumstances of a given situation. This concept, the *limiting* concept of objective modality is the concept of metaphysical modality.

5.2.3 Knowledge of Metaphysical Modality

In the previous two steps, Vetter describes the anti-exceptionalist process of forging, grasping, and understanding the concept of metaphysical modality. This is however, not a process of coming to acquire metaphysically modal *knowledge per se*, rather, grasp of the proper concept of metaphysical modality is a necessary condition on attaining such knowledge. Furthermore, it must target the correct kind of modality—it is not enough for attaining knowledge of metaphysical modality to simply have an understanding of the concept of *circumstantial* (or another limited kind of objective modality): ‘What we need is some sort of grasp on metaphysical, as opposed to the more restricted forms of, possibility.’ (Vetter 2016, 771)

How do we, then, on Vetter’s account achieve *knowledge* of metaphysical modality?

The answer is a closure principle for knowledge:

Each can statement entails a metaphysical possibility; by knowing that entailment, our knowing about the more mundane objective possibilities expressed by can statements puts us in a position to know about metaphysical possibilities as well. But in order to know about the entailment, we need to have some grasp (implicit or explicit, under this name or any other) of metaphysical possibility. And of course, since the possibilities in question are restricted, our knowledge about the falsity of a can statement does not yield knowledge of metaphysical impossibilities and necessities. (ibid., 771)

Let me unpack this quote: Vetter proposes here a closure principle on knowledge of can statements and knowledge of metaphysical modality: “I can p” entails that it is possible that p’. Knowing a can statement is generally not knowledge of a metaphysical modality, instead what we know is some restricted modality expressed by the can statement—a circumstantial modality which is restricted by the context and the specific circumstances present at the utterance. As discussed above, this does not always have to be the case: Can statements do express metaphysical modality

sometimes: when we do metaphysics, or when we explicitly mark the statement as expressing such unrestricted modality by the use of certain words. The general case, however, is one where can statements express a restricted objective modality. Nevertheless, the modal proposition expressed by a can statement *entails* a metaphysically modal proposition.⁵

5.3 The Access problem

5.3.1 Access and Navigation Questions

This setup corresponds on the surface to what Wallner and Vaidya call the *access* and *navigation* questions for modal epistemology: The access question asks: ‘how is it that we gain access to or acquire epistemic standing for beliefs about modality?’ (A. J. Vaidya and Wallner [2018](#), 1) Whereas the navigation question is about ‘how we can reason with justification from one kind of modality to another, say from logical to metaphysical to physical modality’ ([ibid.](#), 1).

On the face of it, the possibility-based epistemology of modality provides an intuitive story in terms of these two questions: In the first step outlined above, the entry-point, may be identified as an answer to the problem of ‘access’. A description of the ‘entry point’ is an answer to the question of how we come to acquire modal knowledge in the first place. Vetter states this thought as follows: can statements are ‘an entry point into modal thought and knowledge from our ordinary thought and knowledge

⁵Williamson ([2016a](#), 457-8) delivers an argument for this claim: If we assume that the conjunction of any objective necessity operators is itself an objective necessity operator, then there is a *strongest* objective necessity operator, *viz.* that conjunction. From this follows that the strongest necessity (of a proposition) entails any weaker objective necessity (of the proposition). And, inversely, any weaker objective *possibility* entails the strongest possibility (for a given proposition). We can now identify this strongest objective necessity operator with metaphysical modality: ‘Thus metaphysical necessity implies every objective kind of necessity, and dually every objective kind of possibility entails metaphysical possibility.’ ([ibid.](#), 458)

about the world' (Vetter 2016, 770).

The 'limiting case' and the closure principle, on the other hand, taken together would then be an answer to the 'navigation question'. While we gain some knowledge of modality in virtue of our proficiency in handling and knowing can statements, this does not constitute knowledge of *metaphysical* modality.⁶ In fact, moving from one kind of knowledge of modality, say, circumstantial, to another, *e.g.* metaphysical is a classic example of a navigating problem. In any case, metaphysical modality is the most interesting kind of modality for the modal epistemologist and a story of how we *navigate* the modal realm to knowledge of metaphysical modality is an answer to the navigation question.

However, in Vetter's description of this 'entry point' a slightly different target is revealed: On the one hand, we might think that Vetter views this epistemological 'entry point' in terms of the access question. She notes that the aim is to 'identify an entry point into modal thought and knowledge from our ordinary thought and knowledge about the world' (ibid., 768), and it seems that Vetter's is describing *how* we gain 'access to the modal realm *from outside the modal realm*' (A. J. Vaidya and Wallner 2018, 21).

On the other hand, it becomes clear that this is not Vetter's intention. Rather than focusing on the *how* question—how we arrive at modal knowledge—the possibility-based account is concerned with the *where*: The entry point is one 'into metaphysical, non-epistemic, modal thought and knowledge' (Vetter 2016, 780), where emphasis is put on 'metaphysical'. On this picture, the aim of the possibility-based epistemology of modality, and of the epistemic 'entry point' in particular, is to describe a *transition* from circumstantial modal knowledge to metaphysical modal knowledge.

⁶Vetter notes: '[S]ince the possibilities in question are restricted, our knowledge about the falsity of a can statement does not yield knowledge of metaphysical impossibilities and necessities.' (Vetter 2016, 771)

It is important to note that can statements have modal content, and that they serve as an entry point not into modal thinking *per se*, but into thinking about *metaphysical modality* specifically. This line of thought is more akin to the navigation question. In other words, the question remains whether Vetter’s epistemological entry point is one of *access* or of *navigation*: on the one hand, it may be an access into *modal thought per se*, on the other hand, it there may be a much more specific target: an entry point into metaphysical modal thought *from knowledge of circumstantial modality*.

5.3.2 The Access Problem

One question we can ask is how the specific claims about navigation and entry points go together. I believe this question is in fact an expression of a bigger challenge for the epistemology of modality that surfaces not only with regard to the access question (as it did here), but also in the context of the Williamsonian anti-exceptionalist project.

Recall that the access question specifically is about the concept of an ‘entry point’ into modal thought *tout court*, *i.e.* some sort of epistemic, cognitive mechanism that describes a move from non-modal, categorical, knowledge to modal knowledge. I believe this is the intended reading of the access question—meant as a question for any epistemology of modality to provide a satisfactory story about *how* knowledge of modality is gained in the first place.

However, this is clearly not the way Vetter thinks about the ‘entry point’ into modal thought, and I believe there is an interesting point to be found here. When Vetter talks about can statements being the entry point into metaphysical modal thought, she takes the epistemologically interesting question to be how we come to know *metaphysical modality*—how we can access the realm of metaphysical modality, as opposed to the realm of modality in general.

These two views are of course compatible, indeed independent of each other: Knowledge of metaphysical modality may be explained through some non-modal knowledge, thus perhaps delivering an answer to the access question directly, or through some piece of modal knowledge (perhaps physical, mathematical or nomic modality), thus staying firmly within the modal realm and not answering the access question at all.

Nevertheless it is an interesting question whether the access question *should* not be more explicitly about *metaphysical* modality—after all, it is *metaphysical* modality in which the epistemology of modality as a field of philosophical inquiry is most interested in.

Before evaluating this question, I want to note the connection to the anti exceptionalist project: Vetter is interested in this approach first and foremost, a project which intends to ‘[root] our knowledge of [metaphysical modality] just as securely in our ordinary ways of knowing’ (Williamson [2016b](#), 796). Anti-exceptionalism, and usually modal epistemology in general, make claims about *metaphysical* modality. It is usually silent on issues relating to access or navigation of the modal realm. Depending on whether ‘our ordinary ways of knowing’, or, more precisely the kind of ordinary knowledge used to ground knowledge of metaphysical modality, is itself modal or not, the anti-exceptionalist explanation will describe an access or a navigation move.

If the ordinary cognitive process which describes how we come to know metaphysical modality is itself grounded in a different kind of modal knowledge, then the anti-exceptionalist explanation is a *navigation* explanation; it is an *access* explanation otherwise. An anti-exceptionalist epistemology therefore may already deliver an answer to the access question in the case of Williamson’s counterfactual based epistemology of modality and deliver *some* answer to the navigation question, *viz.* an answer to the question how we ‘navigate’ from knowledge of some kind of modality

to metaphysical modality as is the case with Vetter's possibility-based account.

There is a more general problem to be found about the architecture of any proposed modal epistemology. It seems there is a trade-off that any modal epistemology has to account for: On the one hand, our every-day knowledge that ought to give us entry into the modal realm has to be different enough from the more robust metaphysical modality we want to achieve—so that the transition from the former kind of knowledge to the latter ('It is necessary that Mercury has the atomic number 38') not become a trivial exercise. The epistemology of modality is interested in the question how we gain modal knowledge in the first place—we would not answer this question if all we could do was point at yet another class of modal statements. Inevitably, the result would either be a hopelessly circular one or not an answer at all.

On the other hand, the modal epistemologist must tell a convincing story of how we manage the transition from non-modal knowledge to modal one *in the first place*, *i.e.* how we get access to modal knowledge. It is, I assume, an uncontroversial fact that we already have a good deal of, and are in position to gain more, modal knowledge.

We may formulate the *access problem* for the possibility-based account as follows. 'How can we reason from one kind of modality to another?' is the navigation question, and Vetter's third step in construing her epistemology was to argue that knowledge of metaphysical modality (the *limiting case* of our modal concepts) may be gained from our knowledge of can statements, via a closure principle and grasp of the concept of metaphysical modality, which is gained by generalization from our grasp of the modality inherent in can statements.

I argue that by construing this step as a navigation step, Vetter blocks an interesting reading of the first step in the possibility-based account as an 'entry point': it is no longer possible to speak of can statements as the 'entry point' into modal thought generally. Additionally, Vetter's claim that our ordinary knowledge of can state-

ments serves as an ‘entry point’ into knowledge of metaphysical modality knowledge is rendered less interesting:

1. Can statements express circumstantial modality.
2. We grasp the concept of metaphysical modality by generalizing from our understanding of the concept of circumstantial modality.
3. Moving from knowledge of circumstantial modality to knowledge of metaphysical modality is *navigating* the modal realm.
4. Since can statements already express modal content, they can not serve as an *entry point* into the modal realm *tout court*.
5. The access question is not answered by an appeal to our knowledge of can statements.
6. Can statements also do not serve as an *entry point* into knowledge of metaphysical modality in an interesting sense.

On Vetter’s account, assuming that we can indeed speak of arriving at the limiting case of modal knowledge in terms of navigation, and that we can make sense of the concept of metaphysical modality as an extension and generalization of some prior grasp of a different kind of modal knowledge, can statements must already have modal content.

5.3.3 An Objection

Let me address an objection: The possibility-based account never meant to provide an answer to the access question in terms of can statements. Can statements on Vetter’s account, express modal content, we have seen that they express circumstantial modality, a form of objective modality, and the term ‘entry point’ merely *sounds* similar to the term ‘epistemic access’. In reality, so the objection goes, the two concepts—

the entry point into knowledge of metaphysical modality and epistemic access to the modal realm—are independent of each other.

This is clearly Vetter’s intention, but matters are complicated by the fact that she introduces two epistemic complexities into the possibility-based account—and ends up satisfying neither. Designating can statements as intermediary epistemic steps between ‘ordinary’ non-modal knowledge and ‘extraordinary’ knowledge of metaphysical modality might satisfy a certain epistemic need to bridge the gap between the kind of unrestricted claims metaphysicians like to make and the more ‘normal’ everyday modal claims we all make very frequently. But I argue that this need is tangential to the core expectation we have of an epistemology of modality.

Both circumstantial modality and metaphysical modality are objective modalities, and both are alethic modalities; it is unclear how the transition between two similar notions of modality explains the arguably more interesting and pressing question of how we come to know the mysterious category of metaphysical modality *in the first place*. Answering this question by an appeal to yet another mysterious category of modality, circumstantial, alethic, objective modality, is not enough.

Of course, it is true as Vetter claims, that ‘it is abundantly clear that we do know, of a great many can statements, whether they are true or false, and that we must have such knowledge prior to philosophical reflection’ (Vetter 2016, 770)—but on the current picture, the possibility-based account does little to address the question *why* we have such knowledge.

On the contrary, I believe that an appeal to the claim that can statements serve as the location of the ‘entry point’ into *metaphysical* modality (and not into the modal realm *tout court*) in fact does the account a disservice: It is unclear what an ‘entry point’ into metaphysical modality *means* when the point itself is so close to the target.

In this context, Vetter discusses the ‘demarcation challenge’ for modal epistemology

in this context: One needs to provide ‘some account of what demarcates the relevant forms of possibility from irrelevant ones, such as epistemic possibility’ (Williamson 2007, 178). Relevant forms of possibility (modality) are, for Williamson, metaphysical modality and, for Vetter, circumstantial modality. If we agree that the demarcation challenge can be met by *can* statements, this would—additionally to an adequate epistemology of *can*—be enough for a plausible answer to the access question. However, I argue this would equally collapse the navigation question in regard to Vetter’s case of metaphysical modality as the ‘limiting case’ of objective modality.

In general, the discussion of how circumstantial modality is related to epistemic modality is at best a tangential one: Epistemic modality is different from circumstantial modality—and is different from metaphysical modality, so the challenge does not quite capture the distinction we are after here, but it will provide some starting point. Even if it is shown that there is a clear distinction between epistemic and circumstantial modality, which I assume is relatively easy to accept, how can we make sure that this argument does not fall on one or the other side of the point we are after, *viz.* how to properly demarcate circumstantial from metaphysical modality?

In other words, a plausible epistemology of modality must walk the line between providing an explanation of how we achieve knowledge of metaphysical modality that is either too cheap or too demanding or mysterious. Too cheap because starting with an ‘entry point’ that already is essentially modal, or already presupposes knowledge of possibility, and does not answer the central question of modal epistemology, *viz.* how we acquire knowledge of possibility and necessity in the first place, at all. The flip-side is an overly demanding explanation that ought not to be mysterious: The modal epistemologist must provide an explanation of how we can arrive at modal knowledge from an anti-exceptionalist basis.

If Vetter is successful in showing, which I believe she does, that circumstantial modal-

ity is sufficiently distinct from epistemic modality, Williamson's challenge is avoided, but no headway has been made with respect to the central question here: How we can be sure that the so-called 'entry point' into modal knowledge (on Vetter's account can statements) not already is a species of proper metaphysical modality—even if the possibility account does not aim at answering the *how* question directly, but rather the *where* question.

Any account of a modal epistemology that is structurally similar, *i.e.* any account that proposes a certain *entry point* to modal knowledge, situated perhaps in our everyday language and knowledge, faces the same problem: to make sure, on pains of circularity, that the *entry point*—or, more generally, any reduction of our knowledge of epistemic modality to a non-epistemic base—does not itself presuppose the kind of modality we are trying to explain.

5.4 The Scope Problem

There is a further problem for the transition from ordinary, non-modal knowledge to knowledge of can statements. If can statements do not play the role of accessing the modal realm in the first place, as we have seen, the *locus* of the access question simply gets deferred back. Epistemically, the action of the access question with regard to our knowledge of modality (in general, not just metaphysical modality), now lies in explaining how we *come to know* can statements.

I believe this is by design, as we have seen above, as Vetter's epistemological 'entry point' into modal thinking is not meant to answer the access question as an epistemic *how* question—rather it is meant to be the *locus* of our introduction to modality in the first place read as an answer to a *where*-question: And on the one hand, Vetter may defer any epistemology of the 'entry point' (can statements) to other epistemologies of modality. On the other hand, the possibility-based account centres on the epistemic

move from knowledge of can statements (and the modality inherent in them) to knowledge of metaphysical modality.

It seems the possibility-based account postpones answering the access question to an analysis of the epistemology of can statements: Since can statements express alethic and objective modality explaining how we come to know *these* propositions is an interesting question we can frame in terms of access and navigation. Vetter gives us an outline of how we can know the truth or falsity of can statements, where right from the start we are cautioned, in Williamson's words⁷ that 'there is presumably no unique way of properly evaluating can statements' (Vetter 2016, 770) Nevertheless, it is certainly correct that we *do* have knowledge of the truth or falsity of many can statements and Vetter provides two ways of justifying this point.

First, Vetter claims, that 'some of our ways of knowing about what objects can do were hard-wired' (ibid., 771). We have some knowledge of the truth or falsity of can statements, because it is crucial for practical deliberation and our survival to have such knowledge. This evolutionary argument leaves some room for explanation about *how exactly* we arrive at this modal knowledge—other than simply pointing to the fact *that* we possess it. It would go beyond the scope of this thesis to discuss this evolutionary argument; but we may nevertheless note that here, as in the following explanation, the epistemology of can statements is accounted for *outside* the possibility-based account of modal knowledge.

Second, Vetter lists some ways of knowing can statements, which make reference to *other epistemologies of modality: modal perception, imagining and induction on actualized possibilities*. I may come to know if I can do something by simply *perceiving* something as possible for me—or, more realistically, I *just know* what I can and cannot

⁷Williamson uses a similar phrase when he claims that '[t]here is no uniform epistemology of counterfactual conditionals.' (Williamson 2007, 152)

do. I perceive the possibility that I can jump this gap or that I can not jump the English Channel *etc.* A further explanation we have already seen in our discussion Williamson may also evaluate the truth or falsity of a can statement by imaging the situation counterfactually. Likewise, I may know that I can not move this desk alone because I have tried to do this before.

All these explanations of how I know whether I can or cannot do something make reference to one modal epistemology or another. Note that all these accounts are indeed full-blown epistemologies of modality in themselves, rather than simple descriptions of ways of coming to know the truth or falsity of statements involving the word ‘can’.

Modal perception, imagining and induction on actualized possibilities are all meant to be ways of achieving knowledge of *metaphysical* possibility: Strohminger and Yli-Vakkuri, for example, argues that ‘it seems to be possible for humans to know modal facts by perception’ (Strohminger and Yli-Vakkuri 2017, 5). Williamson’s examples of imagination are made in conjunction with his counterfactual-based epistemology of modality: ‘Once we recall its fallible but vital role in evaluating counterfactual conditionals, we should be more open to the idea that it plays such a role in evaluating claims of possibility and necessity.’ (Williamson 2007, 163) Likewise, Roca-Royes is very clear that the interest in induction on actualized possibilities is in answering questions like, say, how an object can break – where the modality in ‘can’ is explicitly taken as alethic, indeed metaphysical, modality. (Roca-Royes 2017)

The examples are perhaps not exhaustive, and I do not wish to dispute Vetter’s point that these strategies do explain ways of coming to know can statements in detail here. Nevertheless, it is noteworthy to point out that the epistemologies Vetter cites do not make a distinction between explaining knowledge of modality, indeed metaphysical modality, and knowledge of *can* statements in these examples. Vetter might draw a

distinction here, but it is not immediately obvious that the specific examples respect the distinction:

Indeed, all these methods to explain how we come to know the truth and falsity of can statements which Vetter lists equate the modality inherent in *can* with metaphysical modality. The ways we come to know can statements are thus precisely the same as the ways we come to know metaphysics modality.

Vetter's possibility-based account thus relies heavily on other epistemologies of modality and inherits all restrictions of these epistemologies. I call this the problem of scope for the possibility-based account: As the *locus* of the how question of our epistemic access to modality is distributed to a variety of other epistemologies of modality, the scope of the *possibility*-based account is limited by the limits of the other accounts.

We can furthermore note that this result amounts to a built-in endorsement of the *non-uniformity* of modal epistemology: Vetter would subscribe to the view that there is no one, singular, epistemology that accounts for all our knowledge of metaphysical or indeed circumstantial modality. At the level of *how* we come to know what is possible for us, there may be a variety of different plausible epistemologies.

5.5 The Generalization Problem

5.5.1 Generalizing from Circumstantial Modality

On the possibility-based epistemology of modality, knowledge of the concept of metaphysical modality is explained by having knowledge of a can statement and knowledge of a closure principle. However, as I mentioned above, there is no guarantee that the *epistemic* connection holds: knowing the proposition a can statement expresses does not guarantee knowledge of the entailed *metaphysically* possible proposition. What

we *do* achieve however, according to Vetter, is being in a *position to know* about metaphysical possibilities by, on the one hand, knowing that entailment and, on the other hand, knowing the objective possibilities expressed by can statements.⁸

Furthermore, *that* we can even apply such a closure principle and have knowledge thereof, we need to have a grasp of the concept of metaphysical modality. How we attain such an understanding of the concept is outlined above: by generalization from the concept of circumstantial modality—a concept we are all familiar with due to our intimate familiarity of the use of and kind of modality inherent in can statements.

The concept of metaphysical modality is, according to Vetter, the ‘limiting case’ of our understanding of can statements and the modality expressed by such statements. An explanation of this ‘limiting case’ is indeed to illustrate an epistemology (as opposed to a metaphysics) of metaphysical modality: ‘all this is not intended as a definition or an analysis of metaphysical possibility or our concept of it, but simply as an account of how we come to think about (and consequently to know about) metaphysical possibility.’ (Vetter 2016, 772)

How does this generalization work in detail? Recall that on the possibility based account, the modality expressed in can statements is *circumstantial* modality. For example, when I utter, say, that I can jump across a stream, I express the restricted possibility that I can *now* jump across *this* stream *under these circumstances* (the current level of water, my current bodily condition, and so on). This kind of modality, as we have seen above, is important in so far as circumstantial modality is—exactly as metaphysical modality, a kind of objective, alethic modality.

⁸‘Each can statement entails a metaphysical possibility; by knowing that entailment, our knowing about the more mundane objective possibilities expressed by can statements puts us in a position to know about metaphysical possibilities as well.’ (Vetter 2016, 771)

Vetter sees this closeness as a feature of the possibility-based account: Can statements entail metaphysical possibilities.(cf. Vetter 2015, 771) The possibility-based account thus describes a way of coming to acquire an understanding the concept of metaphysical possibility *from* knowledge of restricted (circumstantial) possibility and the corresponding concept of a restricted objective modality.

In order to achieve this, Vetter claims that we need ‘some sort of grasp’ on metaphysical modality. (cf. Vetter 2016, 771) This grasp on metaphysical modality (possibility) is guaranteed by the act of *generalizing*. Vetter convincingly argues that can statements are predominately used circumstantially(cf. *ibid.*, 771-2): in ordinary contexts, we talk about what we can *at some specific time* or *in a specific context*. In other words, we come to acquire an understanding of metaphysical possibility by generalizing away from at least two restrictions present in the ‘everyday’ concept of modality we are familiar with already: the restricted kind of circumstantial modality expressed by our everyday usage of can statements. Circumstantial modality is restricted at least with respect to time and context. (cf. *ibid.*, 770)

On the other hand, Vetter contrasts the usage of can statements by metaphysicians: when metaphysicians use can statements (when doing metaphysics) they usually want to speak independent of specific times and contexts:

Likewise, when we make or consider possibility claims, in particular can statements (in the present tense) in ordinary contexts, we talk about relevant possibilities obtaining at the time of the utterance. When we think about possibility claims in metaphysics (also usually phrased in the present tense), we want to speak timelessly and unrestrictedly. A metaphysics of modality is about all possibilities whatsoever, at any time, whatever our interests. (*ibid.*, 772)

In order to ‘grasp’ the concept of metaphysical modality, we perform a move from ordinary thought to thought in metaphysics—and by this move, we generalize.(cf. *ibid.*, 772)

This proposal is meant to highlight a cognitive mechanism, by means of which we may generalize away from context and times, and which we may employ to move from an *implicit* understanding of metaphysical modality as it lies in our everyday ordinary use of can statements (and thereby a use of the objective modality inherent in them) towards the more *explicit* handling of metaphysical modality as it is done in metaphysics—an epistemic context where unrestricted modality is much more used.

5.5.2 Starting and stopping

Vetter emphasizes that generalization away of circumstances is not enough to guarantee the full concept of metaphysical modality, but it is meant to provide a simple, anti-exceptionalist proposal of how understanding of metaphysical possibility is gained:

My favoured approach, proceeding by gradual extension, gives no guarantee of ever reaching the limiting case. I take this to be part of what is otherwise an attractive feature of the approach: it provides a degree of continuity between ordinary and metaphysical modal thought that seems [true] to the spirit of anti-exceptionalism. (Vetter [2016](#), 775)

There are several things to unpack in this last statement, which I will do in the remainder of this chapter.

In the quote above, Vetter speaks about there being no guarantee that this gradual epistemology of metaphysical modality ever reaches the limiting case or, indeed, acquisition of the concept *metaphysical modality*. There is also the opposite problem: it seems that there is the possibility of generalizing ‘too far’, as it were. By abstracting from the context in ordinary can statements, we extend the ‘realm of true possibility statements’ as Vetter puts it. (cf. [ibid.](#), 773)⁹

⁹In terms of possible worlds, we extend the number of possible worlds the restricted possibility

There is, here, the danger of *over-generating* possibility claims. Vetter seems to be aware of this problem when she states that generalization ‘ends somewhere. I cannot think of a context that would make me assent to ‘Mount Everest can speak Finnish’ (and if you can, then try ‘the number two can speak Finnish’).’ (Vetter 2016, 773) But why is that so? And what stops me from doing so?

Vetter’s possibility-based epistemology aims at providing ‘an account of how we come to think about (and consequently to know about) metaphysical possibility.’ (ibid., 773) According to this picture, we come to think about metaphysical possibility, *i.e.* acquire an understanding of the concept of metaphysical possibility, by gradually extending our understanding of the more restricted forms of objective modality, such as the circumstantial modality expressed by ordinary can statements. How does this process work?

Assume we start with the can statements ‘I can jump (this) (narrow) stream (right now) (in my current physical shape).’¹⁰ It expresses a circumstantially restricted possibility: the proposition that I can now ... jump this stream. I believe it is correct to say that we do indeed have a grasp on, or understanding of, the kind of modality expressed in this proposition. And with this understanding, we can now start to relax the contextual restrictions present.

We may relax the restriction on *time*: We talk timeless about whether we *can* jump across such-and-such a stream, or such-and-such a gap, or hill, or channel. Some of these proposition will be uncontroversially true, some of them will be clearly false, *etc.* The important point is that, by generalizing away from the particular restrictions in time, we acquire *different* concepts of possibility. These modal concepts are restricted to varying degrees, and, according to the proposal, the *most unrestricted* concept—

statement is true in. A possibility-statement is metaphysical true if it is true in all possible worlds.

¹⁰Contextual restrictions are indicated in parentheses

speaking timelessly—is part of the concept of metaphysical modality. Remember that metaphysical modality is the *limiting* case of the more restricted, circumstantial, kinds of modality.

We may also generalize away from the restriction on *context* present in the example. That I can jump *this* stream, that I can jump *a stream* (and not a river), that I can make such a jump with such-and-such a bodily constitution—all these are circumstances that restrict the modality expressed in the can statement to varying degrees. We may ‘with a little work on the context’ (Vetter 2016, 773) relax these restrictions and speak in an unrestricted sense about whether ‘I can jump such-and-such a gap’, or whether I possess the ability to jump in general. Vetter compares the ability to speak: ‘Compared to an ape, of course, I can speak Finnish – I have the requisite physiological and neural make-up. ... [The ape] contrasts with, say, a rock: no amount of surgery could make a rock able to speak.’ (ibid., 773)

Relaxing restrictions of context and time when generalizing from the concept of circumstantial modality yields an understanding of various and more *unrestricted* notions of possibility, so much is clear on Vetter’s account. The important step is that, for Vetter, the concept of metaphysical modality marks the *limiting* case of such an extension. We arrive at the notion of metaphysical modality, and indeed an understanding thereof, by gradually extending our understanding of the more restricted forms of possibility.

Vetter is confident that this process of generalization ends at metaphysical modality: ‘It seems, though, that this ends somewhere. I cannot think of a context that would make me assent to ‘Mount Everest can speak Finnish.’ (ibid., 773) At the end of generalizing away from contextual restrictions, we arrive at the limiting case—and this process is, although not always easy or uncontroversial, nevertheless a *natural* one.(cf. ibid., 773) Why is that so? What is it that lets us stop at the right kind of

modality?

Is there really a natural limit to relaxing time and contexts? It can't be that there simply is no further generalization *thinkable*. Granted, there does not seem to be an alternative to speaking timelessly or unrestrictedly, but does this *semantic* limitation track, as it were, the concept of metaphysical modality/possibility?

Let us compare Vetter's example with the stone and the ape: Compared to an ape, I *can* (read with the correct unrestricted emphasis) speak Finish, it is possible for me to speak this language *qua* being a human. The ape *can* also speak finish in a certain sense, as Vetter outlines, apes possess in theory possess the right organs and brains to speak *with some surgical alteration* Finish. Stones do not, they do not even have a larynx to surgically alter. I do not speak Finish, but I *can* speak Finish (it is metaphysically possible for me to do so). Apes do not speak Finish, but they too *can* speak it—they possess the organs and the brain to do so *after some alteration*. Stones can not speak Finish, it is metaphysically impossible for a rock to speak Finish. But why is that so?

What does this example really show, though? It shows that in order to *track* the notion of metaphysical modality, we already need quite a lot of *guidance* in our generalization-process. What prevents me of generalizing too far? Why, in forging the concept of metaphysical modality, in playing with the limits of generalizing from restricted possibility, do I stop exactly where I need to stop?

In order to track the concept of metaphysical modality, we must stop generalizing *at some point*. If the process to acquire an understanding of metaphysical modality be reliable, I need to somehow be able to distinguish correct generalizations from incorrect ones. I can *imagine* a context where a stone speaks, quite easily in fact, and there is no shortage of examples in the literature. Of course, we would extend the range of possibility statements that come out as true on this (too wide) a notion

of metaphysical modality *too far*—we *overgenerate* true possibility claims. A concept of modality on which mountains can talk no longer is an objective modality, thus outrunning the concept of metaphysical possibilities we are interested in.

The problem on Vetter’s proposal is that the process described in the possibility-based account—generalizing from an understanding of the restricted concept of modality expressed in can statements—does not guarantee *stopping* at the right kind of concept of modality.

Let me spell out this argument in more detail:

1. Without guidance (on where to stop generalizing) the proposed process of forging the concept of metaphysical modality overgenerates possibilities.
2. Unrestricted generalizing leads to a concept of modality that is *conceptual*, *i.e.* no longer objective. (*e.g.* I can generalize away from the nature of things and reach a notion of modality on which rocks can talk is true.)
3. Thus, we need *some* guidance on what to hold fixed in abstracting away from contexts. (*e.g.* the natures of things must not be generalized away from)
4. But, the account does not provide a rule in selecting such guidance that is independent of the concept of metaphysical modality we are trying to forge.
5. Thus, we can not forge the concept of metaphysical modality in such a fashion without having already a grasp of that concept.

More precisely, Vetter describes a cognitive process of coming to acquire an understanding of *a concept* of modality from a concept of objective modality (circumstantial modality); a process which might not, or so I argue, guarantee acquisition of the *right kind* of modality, *i.e.* metaphysical modality.

It is true that we may, and do, acquire different concepts of modality along the way,

but in order to reliably track the *limiting case* of metaphysical modality the process of acquiring this concept must also reliably stop at this very concept: In order to end at right concept acquisition however, on Vetter's account, we need to be *stopped* at some point in our forging of the concept of metaphysical possibility.

Recall the example above: I cannot think of a context *given some guidance on what to hold fixed in our generalization*, in which 'rocks can speak Finnish' is an option to consider. It is not in the nature of rocks to speak, might be something (a law) to hold fixed in our generalizing away from contexts: The *nature* of a thing must not be generalized away from, might be one such guidance. The problem is, however, that already accepting the fact that *any* guidance on what to hold fixed, or on where to stop generalizing, already presuppose *some* understanding of the concept the process is trying to forge.

The possibility-based account's story of how we grasp the concept of metaphysical modality is thus not convincing: there is no guarantee that, if we engage in the generalization process described, either reach the *right* concept of objective modality, *viz.* metaphysical modality, or do not overreach into an unbound concept of conceptual modality—We already need some independent *guidance* in our generalization-process.

In order to grasp the *correct* concept of modality, *i.e.* the concept of metaphysical modality, we need to have a certain guidance in our development of the concept; certain rules must guide our generalization towards the concept of metaphysical modality. For example, the *nature* of a thing must not be generalized away from.

Let me dwell on the similarities to the counterfactual-based account bit more. We find ourselves at a remarkably similar problem as our conclusion from chapter 4, where I discussed the problem of cotenability and the counterfactual-based account of modality and its purview for a modal epistemology of mathematical propositions.

Recall that the problem of cotenability is one where in order to counterfactually develop a supposition, certain pieces of background knowledge must be held fixed. However, in order to assess *which* pieces of background knowledge are to be held fixed, we need to evaluate the logical connection of such a piece to the supposition—and this assessment of the connection involves evaluation of the truth or falsity of yet another counterfactual, *ad infinitum*.

In the discussion of the counterfactual-based epistemology of modality, we eventually ended up—by biting a bullet twice—with a non-uniform picture of our epistemology of modality because the account faced a similar problem: Coming to know a modal proposition involves counterfactually developing a supposition, while at the same time ‘bracketing’ certain pieces of background knowledge. However, in the case of impossible propositions, the relevant pieces of background knowledge that might lead to an end of the counterfactual development, are not sufficiently independent from the supposition itself.

In order to escape this problem of cotenability, we must admit that certain pieces of *constitutive* knowledge must be held fixed in the counterfactual development (such as the ‘constitutive’ knowledge that gold has the atomic number 79)—and knowledge of ‘the constitutive’ is delegated to another epistemology of modality, which needs to be different from the counterfactual-based one. We thus accepted a *non-uniform* epistemology of modality.

The same conclusion is reached with respect to the grasp of the concept of metaphysical modality as proposed by the possibility-based account. In order to guide the relevant grasp of the concept, we need to have *independent*, modal guidance: We need to, as it were, hold certain pieces of *constitutive* or essentialist knowledge fixed so that we can guide our generalization process accordingly and not ‘overshoot’, delivering an unbounded concept of modality that is too general for the purposes of an

epistemology of modality.

5.6 Conclusion

In this chapter, I have outlined Vetter’s possibility-based epistemology of modality, an account that features a three-step model of an coming to know metaphysically modal propositions and retains a ‘Williamsonian’ anti-exceptionalist outlook.

The first step, the ‘entry point’ into modal thought, are can statements such as ‘I can jump this stream’—modal statements which express *circumstantial* modality, a kind of objective modality that is restricted in time and context. The second step is to grasp the *concept* of metaphysical modality. Vetter describes a cognitive process of generalization away from the modality inherent in can statements. The third step is to reach *knowledge* of metaphysical modality with the help of a closure principle.

I laid out a challenge of *access*: the problem of properly addressing what it means to gain ‘access’ to modal knowledge in the first place without already presupposing some modal knowledge of the same kind. Vetter’s possibility-based account locates the ‘entry’ to modal thinking at the level of can statements, a location that is to be understood as a *where*, rather than a *how* to achieve modal knowledge.

This *how*-question is in turn answered by reliance on other epistemologies of modality; and the possibility-based account thus inherits certain restrictions of scope from them. These ‘outsourced’ epistemologies of modality, furthermore, are epistemologies of *possibility* in their own right, thus opening up an already built-in non-uniform picture of the epistemology of modality at the foundational level of the possibility-based account.

How we grasp the concept of modality is the second step in Vetter’s account, and the possibility-based account’s story of this grasp is not entirely convincing, I argue:

there is no guarantee, that if we engage in the generalization process described by Vetter, we either reach the *correct* concept of objective modality, *viz.* metaphysical modality, or do not *overreach* into an unbound concept of conceptual modality.

This problem is similar to the problem outlined in the last chapter for a counterfactual-based epistemology of modality, in that it points to an inherent difficulty of dealing with the concept of metaphysical modality without already presupposing an independent understanding of that very concept. The solution there, as here, is the same: In order for our process of grasping the correct concept of metaphysical modality, we need to have *further* knowledge of modality that is achieved independently from the epistemology of modality discussed.

Where a non-uniformity is already built into the possibility-based account in the case of accounting for how we gain modal knowledge of can statements, a non-uniform epistemology of modality is furthermore necessitated by the specific process through which we grasp the concept of metaphysical modality on the possibility-based account. This non-uniformist conclusion is also firmly anti-exceptionalist in spirit: We need not posit any exceptional modal faculty that ‘magically’ guides us toward the correct concept of modality; rather, our knowledge of the constitutive can be attained by other anti-exceptionalist epistemologies of modality.

Chapter 6

Essentialist Modal Epistemology

6.1 Introduction

According to Hale (2013), an *essentialist* theory about modality is an account where ‘metaphysical necessities have their source in the nature of things, and metaphysical possibilities are those left open by the natures of things’ (ibid., 250). Hale’s *epistemology* of modality mirrors this metaphysical picture. It is an asymmetric, necessity-first theory which takes knowledge of necessity to be the basic epistemological state. As an essentialist theory, the view aims at explaining knowledge of necessity (both *a posteriori* and *a priori* knowledge) in terms of knowledge of essence.

In the first sections of this chapter, I outline this essentialist account. After giving a brief overview of the metaphysical and the epistemological essentialist claims of Hale’s modal epistemology, I continue to outline his explanations of *a priori* and *a posteriori* knowledge of essence. This preliminary discussion focuses mainly on the essentialist’s account of our knowledge of necessity.

The focus of this chapter is on Hale’s epistemology of *possibility* rather than the epistemology of necessity, for broadly dialectical reasons. The essentialist epistemology

of modality describes a robust way of coming to know essentialist propositions—a crucially missing piece, we discovered, in both previously discussed epistemologies of modality: Both the counterfactual-based as well as the possibility-based accounts are missing some story of how we come to know essentialist, constitutive propositions independently from their main accounts of how we come to achieve modal knowledge in general.

For the remainder of this chapter I therefore concentrate on Hale’s epistemology of *possibility*, where I argue that this account on its own does not deliver a psychologically realistic *genetic* story of how we acquire specific pieces of modal possibility knowledge in very obvious cases—even though the account does provide a satisfying *rational reconstruction* of our modal knowledge in general.

Thus accepting the essentialist epistemology of modality for our account of constitutive knowledge, together with the anti-exceptionalist counterfactual and possibility-based epistemologies, we can thus paint a non-uniform picture of the modal epistemic realm. This is, of course, not a deductive argument for non-uniformism but might serve as a case for weak non-uniformism of the modal epistemic realm.

6.2 Overview

The metaphysical essentialist theory of modality answers the metaphysical question ‘What is the source or ground of necessities and possibilities?’ (Hale 2018, 137) by claiming that what is necessary is what is given by the natures, or essences, of things. Conversely, what is possible is what is not ruled out by the essences of things.(cf. [ibid.](#), 137)

This statement of an essentialist theory leaves open two questions:

1. What entities are the ‘things’ in this definition, and what kind of things are

they?

2. What is the logical structure of the operator ‘... in virtue of ...’?

With regards to the second question, Hale gives us two interpretations: On the *structured* interpretation the above operator is to be read as a binary operator that takes a proposition in its first argument place and a term as the second. (cf. Hale 2018, 138) On the *austere* interpretation, ‘we should regard ‘It-is-true-in-virtue-of-the-nature-of... that __ ’ as an unbreakable binary operator, with one argument-place to be filled by a singular term (or variable) for a thing and the other to be filled by a sentence.’ (ibid., 138) Note that both interpretations face the first question ‘What things have natures?’.

Furthermore, Hale identifies a problem for the structured interpretation that leads to a differentiation of essentialism into a *weaker* and a *stronger* version. On this interpretation, the operator ‘... in virtue of ...’ takes in the essentialist claim on its right-hand side a structured argument of the form ‘the nature of (x)’, where x is a thing suitably qualified according to the first question above. The complication for this account stems from elucidating the relationship between the nature of x and the thing x itself. In general, if we take the nature of a thing to be the conjunction of its essential properties, we might hold that the existence of such a general property does not depend on the existence of the thing.

In the case of claims about individuals, we end up with the individual’s essential properties not requiring the individual’s existence. Hale distinguishes at this point between a *weaker* and a *stronger* version of essentialism regarding individuals. (cf. ibid., 139) Regarding the question ‘What is it to be { proper name }?’ the weaker version claims that an answer to this question can be given specifying general properties of the individual in question. The stronger version, however, demands that it also needs to be specified what distinguishes that individual from any other individual of

that kind.

Hale claims further that what we end up with when individuating *that* individual from others, are non-general properties relating the individual in question to others (*e.g.* their parents). (cf. Hale 2018, 140) These properties will be not purely general, as they involve certain particular individuals—and, if the existence of those individuals is a contingent matter, this will also affect the modal status of the existence of the natures of the individual we wanted to specify the nature of—even if does not impact the existence of the individual itself. More specifically, the problem is that the contingent existence of individuals may bring with it the contingent existence of the natures of individuals.

6.2.1 Knowledge of Modality

The metaphysical essentialist claim above does not by itself, as Hale acknowledges, tell us anything about the *epistemology* of modality, *i.e.* how we come to know what is necessary or possible. Given that necessity and possibility are inter-definable and that their operators are dual, Hale distinguishes between two asymmetric¹ approaches in the epistemology of modality. (cf. Hale 2013, 250) First, *necessity-first* accounts take knowledge of necessity to be the more basic epistemological state. Second, *possibility-first* accounts take knowledge of possibility to be prior to knowledge of necessity. These two positions may come in varying degrees of strength—an extreme approach would account priority of knowledge of one kind of modality over any knowledge of the respectively other kind. Hale’s theory is using the moderate approach which ‘allows that there may be interdependence of the dominant and recessive modalities, in the sense that some knowledge of dominant modal truths may depend upon some

¹As discussed in chapter 3, an asymmetric epistemology is one where there is a base class of known modal propositions on which other, derived, knowledge of modality depends.

knowledge of recessive truths' (Hale [2013](#), 250).

Although this epistemological picture is, as indicated above, *prima-facie* independent of the metaphysical essentialist claim, Hale nevertheless prefers a 'mirroring epistemology of modality' (Roca-Royes [2018](#), 2). The reasons for this are less clear than we might wish, and consist in conditional explications about how an epistemology should look, given that the metaphysical picture is an essentialist one. Hale gives two considerations in support of such a 'mirroring epistemology'. Both stem from the specificities of essentialism. The suggested picture is one of two levels: one at the level of *modality*, where we can further sub-categorize in *dominant* and *recessive* modalities, and one at the ('lower') level of *natures*, or essences.(cf. Hale [2013](#), 253)

The first consideration is that, since the metaphysical picture is an asymmetric necessity-first picture, where possibilities are determined by the metaphysical necessities, 'one might expect an essentialist explanation of modal knowledge to follow a necessity-first approach' ([ibid.](#), 251). The second consideration establishes that on an essentialist picture, metaphysical necessity has its ground in the nature of things.(cf. [ibid.](#), 251) What does it mean to say that the *essence* of a thing is the ground of metaphysical modality? Here we can distinguish between two interpretations of this *Finean essentialist*² claim:(cf. A. J. Vaidya and Wallner [2018](#), 19) On a *reductive* interpretation, essences are non-modal themselves. On a *non-reductive* interpretation, 'Essences are in some sense modal. They belong to the larger family of modality.' ([ibid.](#), 19) Hale endorses the latter interpretation, *i.e.* Non-reductive Finean Essentialism:

I shall construe the term quite broadly, so as to cover not only the obviously central notions of necessity and possibility, and others straightfor-

²Finean essentialism (so called after Fine [\(1994\)](#)'s neo-Aristotelian theory of essence) holds that 'essentialist information concerning the relevant objects in a scenario grounds (i.e. determines) the modal information about them.' (A. J. Vaidya and Wallner [2018](#), 12)

wardly definable in terms of them, such as impossibility, contingency, and the like, but also what seem to me quite certainly modal notions, even if they are not strictly definable in terms of necessity and possibility - such as entailment, counterfactual dependence, and perhaps others. It is worth remarking here that in my view, the notions of essence and essential property, even if not definable in terms of de re necessity, are to be regarded as modal notions. (Hale [2013](#), 63)

Note that the adoption of a *non-reductive* Finean essentialism by itself can not be seen as a reason to support the view that the epistemology of modality should or does mirror the metaphysics of modality. Nevertheless, the focus on the two levels of explanation is important and opens at least two interesting epistemological areas of inquiry: one at the level of metaphysical modality and another at the level of essences or natures. The first area of inquiry is located at the level of metaphysical modality. The general epistemological question here is how we gain knowledge of necessity and possibility. Two questions are to be answered: What Hale calls ‘recessive modality’ ([ibid.](#), 250), *i.e.* in a necessity-first epistemology, the derived class of modalities: the possibilities.

An answer to the first question, at least in the suggested picture, will involve an appeal to a base class of ‘dominant’ ([ibid.](#), 250) modalities, and we can ask a corresponding question on this level as well: How do we gain knowledge of the dominant modalities (necessities)? So far, these questions have been left open and answers are entirely neutral on the metaphysical picture—all we have assumed is an asymmetric approach to the epistemology of modality.

The second question becomes more interesting as soon as one decides on one asymmetric approach and, as does Hale, *combine it with an epistemology that mirrors the underlying metaphysics*. Note that simply accepting the metaphysical claim of non-reductive Finean essentialism, *i.e.* the claim that essences themselves are *in some sense* modal, does not by itself open any interesting avenues with regard to the

epistemology of modality or essence. Combining this claim, *viz.* that metaphysical necessities have their ground or source in the nature of things, with a mirroring epistemology will however add a layer ‘below’ the level of metaphysical modality. Hale thus at once gives the basing epistemological question a specific content—how is it exactly that we gain knowledge of necessities in terms of the essences—and opens a further epistemological field of inquiry at the level of essence: ‘This makes the epistemology of essences not only a precondition for the epistemology of modality but *part and parcel* of modal epistemology.’ (A. J. Vaidya and Wallner 2018, 20)

A. J. Vaidya and Wallner provide a useful framework to elucidate and evaluate these two levels. They distinguish between two epistemological questions ‘refining’ the general question of how we gain knowledge of modality: First, the *access question* asks ‘how is it that we gain access to or acquire epistemic standing for beliefs about modality, such as that it is possible for x to be F?’ (ibid., 1) Second, the *navigation question* asks ‘how we can reason with justification from one kind of modality to another, say from logical to metaphysical to physical modality?’ (ibid., 1)—for the epistemology of modality.

Assuming a tight, mirrored, connection between the epistemology and the metaphysics of modality, Hale identifies two tasks for an essentialist epistemology of modality:

(...) it sees the primary task as that of explaining how we can get knowledge of necessities, and it further takes it that, at least in fundamental cases, our knowledge of necessities is to be explained by explaining how we can have knowledge of essence, or the natures of things. (Hale 2013, 251)

To summarize, we end up with two epistemological questions on Hale’s essentialist epistemology of modality:

1. How are modal (necessary, possible) propositions known?

2. How are essential propositions known?

We can now use the framework of *access* and *navigation* questions to classify Hale's approach. Assuming, as Hale does, that essences themselves are modal and that the epistemology of modality has an asymmetric necessity-first structure, answers to (1) are answers to *navigation* questions: 'That is to say that even if [such answer] cannot by themselves give us access to the modal realm *from outside the modal realm*, they are still apt ways to reason from one kind of modality (essences) to another.' (A. J. Vaidya and Wallner [2018](#), 21) The question of how we gain knowledge of possibility is evidently a navigation question: On the essentialist epistemology of modality knowledge of possibility is gained by reasoning from knowledge of necessity, *viz.* by reasoning from 'what is left open' by our necessity-knowledge. More interestingly, on a mirroring epistemology, where knowledge of necessity is grounded in knowledge of essence, any reasoning that has knowledge of essence as ground and knowledge of necessity as outcome, *and* assuming that essences themselves are modal, is reasoning that occurs strictly *within* the modal realm. The question of how we gain knowledge of necessity, thus, is also a navigation question.

6.2.2 Knowledge of Essence

The locus of an answer to the *access* question is on Hale's essentialist epistemology of modality therefore at the level of essences. Essences, being modal themselves, represent the access point for epistemological inquiry into the modal realm, into knowledge of modality. As Hale states:

in my view, knowledge of necessity (both *a posteriori* and *a priori* knowledge) is rather to be explained in terms of knowledge of essence. This may reflect a deeper difference of view about which is more basic, essence or necessity - for it may be that Kripke sees essence as something to be explained in terms of *de re* necessity, whereas I see necessity as something to be explained in terms of essence. (Hale [2013](#), 267)

Consequently, Hale's essentialist epistemology of modality seeks to explain knowledge of essence, where he further divides this problem in two parts: *a priori* knowledge of essence and *a posteriori* knowledge of essence. I shall go over these in turn.

A priori knowledge of essence

Against the background of Hale's dictum that '... a thing's essence or nature is given by its definition' (Hale 2013, 254)³, he outlines an essentialist path to *a priori* modal knowledge: Given that in general the definition of a thing (the *real essence*) and the definition of a word for a thing (the *nominal essence*) can come apart, the first clear-cut case of *a priori* modal knowledge occurs when 'what are plausibly taken to be the correct definition of a thing and the correct definition of a word for the thing can be stated using the very same words.' (ibid., 254)

Hale furthermore identifies two sub-cases for the case of 'a priori' essentialist knowledge: First, there are cases where the word for a thing can be explicitly defined. Second, the negation: there are those cases where the word for a thing cannot be explicitly defined, where an explicit definition is 'a statement giving analytically necessary and sufficient conditions for the application of a word, using another word or phrase which could be used in place of the word.' (ibid., 255) Hale argues that in these cases 'essence is transparent' (ibid., 255) - there is nothing *more* to know than the content of the explicit definition.

An example for the first kind, where the definition of the thing and the definition of the word for a thing coincide—and thus of essentialist knowledge of the first sub-case—is knowledge that 'Necessarily, a "square" is a plane figure made up of four straight sides of equal length, meeting at right-angles'(cf. ibid., 255). As Hale states,

³'where definition is understood in a broadly Aristotelian sense - so that what is defined is the thing, rather than a word for or concept of the thing.' (Hale 2013, 254)

‘we may define a circle as a collection of all (and only) the points in a given plane equidistant from some given point—but this would also serve as a perfectly good definition of the word ‘circle’.’ (Hale 2013, 254)

In this example, the real essence (the particular qualities of a square) and the nominal essence (the definition of the abstract *idea* of a square) coincide. There is nothing *more* to know about what makes a square *a square*—precisely because explicit conditions give sufficient and necessary conditions for the word to apply. Knowledge of essence here is grounded in knowledge of *meaning*, *i.e.* knowledge of what the word ‘square’ means. More explicitly, in the case of explicit definitions, we need to be able to define words by some restriction of more general terms. Cases like these, however, are ‘rare and special’ as Hale acknowledges. (cf. *ibid.*, 255)

It is unclear whether Hale refers in this example to a definition of any given circle, or to the definition of the *property* of being a circle. This distinction is important in mapping the scope of Hale’s account of a priori knowledge of essence: whether Hale’s target is *a priori* knowledge of *de re* essentialist propositions (a given circle) or *a priori* knowledge of *de dicto* essentialist propositions (the property of being a circle). I shall come back to this point in chapter 6.3.

The second sub-case are cases where the meaning of the relevant words can only be given by an *implicit* definition, or no definition at all. Hale’s first example—knowledge of the essence of cardinal numbers—is one where the definition of the word ‘cardinal number’ also serves as a definition for the abstract object cardinal number, even though no explicit definition can be given: ‘knowledge of essence (*i.e.* of the definition of the thing) can be explained as a direct product of our grasp of the definition of a corresponding word.’ (*ibid.*, 258)

To summarize, Hale’s epistemology of modality makes it plausible that there is *a priori* knowledge of essence, where this knowledge is ‘direct product’ (*ibid.*, 258) of

our grasp of *meaning*. Cases of *a priori* modal knowledge are found where the real essence (the definition of the thing in question) coincides with the nominal essence (the definition of our word for the thing). Definitions may be either explicitly or implicitly given, and Hale is confident that ‘knowledge of word meanings (or grasp of concepts) may still give rise to knowledge of essence in essentially the same way’ (Hale 2013, 258).

Cases where the definition for a thing and the definition for the word for the thing do *not* line up are generally such that we can have *a posteriori* knowledge of essence. (cf. [ibid.](#), 254) It is interesting to note that Hale’s account of *a posteriori* knowledge of essence heavily relies on his account of *a priori* knowledge of essence, as we shall see in the remainder of this chapter.

A posteriori knowledge of essence

According to Hale, *a posteriori* knowledge of essence may be achieved via the Kripkean inferential model (the ‘simple inferential model’ ([ibid.](#), 258)): An *a posteriori* necessity $\Box p$ can be known by inference from a major premise $p \rightarrow \Box p$ together with its antecedent p , where the major premise is known *a priori* and the minor premise is known *a posteriori*. The resulting knowledge of the necessitation will therefore be known *a posteriori* in this case.

The important epistemological step in this approach is how the (*a priori*) major premise is known. Generally, *a priori*-known principles must be found from which specific Kripke-Conditionals may be construed. (cf. [ibid.](#), 259) These, in turn, will serve as premises – together with their empirically-known antecedents – in an inference to the consequent, an *a posteriori* known necessity. Hale follows Kripke in that we come to know these *a priori*-known major premise in the simple inferential model

via ‘a priori philosophical analysis’ (Hale 2013, 259).⁴ Hale concedes that this is not particularly enlightening, but outlines some examples of applications of the simple inferential model.

The examples given include general principles for necessities of the *identity and necessities of origins*, along with principles of ‘substance, kind membership and kind inclusion, and what Kripke calls theoretical identifications’ (ibid., 267). Providing general principles of essence for these areas, will allow us to formulate specific Kripke-Conditionals and, in turn, explain how we can have *a posteriori* knowledge. Hale provides a number of essentialist principles which, according to his essentialist account, allow for essentialist (and therefore modal) knowledge of the following classes of propositions, respectively. Below is a list of essentialist principles and examples of propositions that may be inferred from knowing them (together with a suitable posteriori-known proposition):

1. (Necessities of Identity): ‘(If Hesperus and Phosphorus exist, then) Necessarily, Hesperus is Phosphorus’.
2. (Kind Membership): ‘What makes that object the object it is, and so distinguishes it from every other object?’ ‘Necessarily, Bigwig is a rabbit’, ‘Necessarily, Moby Dick is a whale’.
3. (Higher Kind Membership): ‘Necessarily, Bigwig is an animal’.
4. (Origins of Organisms): ‘Necessarily, this frog necessarily originates from/is the same living thing as that fertilized egg/tadpole.’ ‘Necessarily, Bigwig originates from that fertilized egg cell.’
5. (Origins of Artefacts): ‘Necessarily, this chair necessarily originates from/is the

⁴Thus Hale’s epistemology of *a posteriori* knowledge of essence is heavily dependent on the validity and success of his account of *a priori* knowledge.

same thing as that hunk of wood.’

6. (Theoretical Identifications): ‘Necessarily, gold is the element with atomic number 79.’

According to this picture, the strategy for the essentialist epistemologist is to find suitably general principles of essence from which then, in turn, specific instances of the general Kripke-Conditionals are inferred. These major premises govern, then, the simple inferential model and we are then in a position to infer specific necessary, and essential, conclusions according to the model and gain modal knowledge. Let me go over these examples in turn:

Necessities of Identity. Necessities of identity, of the form $\Box(a = b)$ are, according to the *Simple Inferential Model*, inferred from knowledge of a Kripke-Conditional of the form $a = b \rightarrow \Box(a = b)$ together with a known proposition of the form $a = b$.

The minor premise may be known *a posteriori* or a priori. If it is known *a posteriori*, this will make the inferred proposition known *a posteriori* as well. The major premise (the Kripke conditional) will always be known a priori on this picture, and Hale provides an *a priori* explanation for the essentialist principle.(cf. Hale [2013](#), 270f)

One interesting detail in Hale’s argument is the commitment to contingent existence constrains the essentialist principle on which we base our knowledge of the essentiality of identity rests. Hale ‘... make[s] the claim of necessary identity conditional upon the existence of the object in question’ ([ibid.](#), 260). The principle would then only express the fact that ‘necessarily, should an object exist, it is identical with itself’. Correspondingly, we can restrict the Necessity of identity in the same manner: if two objects are identical then, necessarily, given that both objects exist, they are identical. Our epistemological conclusion will be weakened as well: we can only know *a posteriori* and in accordance with Kripke’s model that necessarily, should a and b

exist, then a and b are identical.

Kind Membership. Objects belong to *kinds*: there are all kind of objects - *concrete* objects such as cats, dogs or humans, trees, mushrooms or rocks. Or, still concrete, objects may belong to the kind *artefacts*: something can be a table, a sickle or a vase. There are also *abstract* objects like numbers, a musical piece, Muster Mark or the Jabberwocky.

In accordance with the simple inferential model, we may know a proposition like ‘Necessarily, Bruno is a cat’, by inferring it from the *a posteriori*-known proposition that ‘Bruno is a cat’ along with a suitable essentialist principle. Hale formulates such a general essentialist principle of kind membership as follows:

KIND MEMBERSHIP Any object is essentially an object of a certain general kind (cf. Hale [2013](#), 270), where ‘the general kind’ is a *pure sortal*.

Kinds of objects are represented by sortal predicates⁵, whereas sortal *concepts* are expressed by sortal predicates and admit of criteria of *identity* and criteria of *application*, corresponding sortal properties are individuated intensionally. (cf. [ibid.](#), 271) A pure sortal is a sortal which is not merely a semantic restriction of other sortals. (cf. [ibid.](#), 273) Merely semantic relations hold exclusively in virtue of the concepts employed. Such a pure sortal might be the concept ‘whale’, which is a restriction on the concept ‘mammal’ and ‘animal’ - however, it is not a ‘merely’ semantic restriction on the concept ‘mammal’ - though it is *a* semantic restriction, it is also a *natural* one. ‘All the king’s men’ on the other hand, is not a pure sortal, it is a restriction on the sortal ‘man’, but a *merely* semantic one that holds simply in virtue of the concepts.

⁵Sortal predicates are opposed to adjectival predicates like ‘red’, ‘brown’ or ‘drunk’, which describe how something (is like). Sortal predicates, on the other hand, describe *what* some is: an aunt, a bus, a prime number.

According to Hale’s picture, we may thus come to know the modal truth that ‘Necessarily, Bruno is a cat’ by inferring it from the *a posteriori*-known truth that ‘Bruno is a cat’ together with knowledge of the general principle that ‘Any object necessarily belongs to a pure sortal’. We also need to know at least one bridge principle such as ‘being a cat is a pure sortal’.

Any object can belong to more than one kind. Whales, for example, are *mammals*—and they are also *animals*. What about essentialist knowledge of statements of the form ‘Necessarily, Moby Dick is an animal’? That necessarily, Moby Dick is a whale can be known, we recall, by *a priori* means and by the simple inferential model from the minor premise ‘Moby Dick is a whale’ together with the essentialist major premise KIND MEMBERSHIP. But what about the indirect claim that Moby Dick is necessarily an animal?

Hale proposes the following essentialist principle: KIND INCLUSION ($\text{Kind } F \wedge \text{Kind } G \wedge F \subseteq G \supset \Box(F \subseteq G)$)

Where ($F \subseteq G$) is understood intensionally in the sense that ‘F is intensionally included in G only if being G is part of the definition of being F’ (Hale 2013, 273) for kinds F and G.

Together with the general principle stated above we can derive particular Kripke-Conditionals such as ‘Whales are animals $\supset \Box$ Whales are animals’ and thus gain (together with the *a posteriori* truth that ‘Swans are animals’) knowledge of the modal truth that ‘Necessarily, whales are animals’.

Remember that the Kripke conditionals themselves are known a priori, thus we also may use such Kripke conditionals, that state facts about kind inclusion, to gain *de re* knowledge about individual objects themselves. Since most individuals belong to more than one kind, have more than one pure sortal property, we may know modal propositions like ‘Necessarily, Bruno is an animal’ by simple inference from ‘Necessar-

ily, Moby Dick is a whale' and the a priori-known principle KIND INCLUSION.

Origins of Organisms and Artefacts. Modal claims related to the origin of organisms and artefacts may include statements like 'Necessarily, this frog has originated from this egg' or 'Necessarily, this frog is the same creature as this tadpole' or 'Necessarily, this chair has originated from this hunk of wood'.

There are essentialist principles that may be used to gain knowledge of the origins of organisms. Hale claims that 'deploying the identity-conditions distinctive of that kind together with the Necessity of Identity, [allows us to know] that each living thing of that kind necessarily has the particular origin it has.' (Hale 2013, 278) The relevant identity conditions which are distinct to a specific kind are for example *to have a certain sort of origin* as well as to have certain *persistence conditions*.

Persistence conditions may include general principles about what it is for a specific kind of animal to have a continuous identity over time, a distinct life-cycle and a type of origin. Hale's example of persistence conditions include only specific examples of particular animals, such as 'this particular adult frog is one and the same organism as a particular tadpole, which in turn developed from, and so is one and the same living thing as a particular fertilized egg' (ibid., 278).

It is unclear whether a similar argument as in the case of organisms can be given for artefacts. An argument from persistence conditions in the sense of life-cycles and certain types of origin is obviously hopeless. The persistence conditions of artefacts are rather characterized by a function of the artefact, Hale argues, and that 'having a certain function, in contrast with having a certain life-cycle, places no very specific demands on its possessor's previous history.' (ibid., 278) A chair, for example, with its characteristic function (allowing someone to sit on it) does place some demands on the matter the chair is composed of *right now* (it has to be arranged thus-and-so) and if the chair remains in existence for some time then there are further demands

on the matter (any changes to it have to be suitably gradual).

None of these demands, Hale contents, are demanding enough for any particular piece of *original* matter to be held essential to the chair. An egg or seed, on the other hand, *is* essential to a certain animal or a plant. (cf Hale 2013, 278)

Theoretical Identifications. Hale closes his discussion of *a priori* knowledge of essence with plausible essentialist principles for ‘theoretical identifications’, such as ‘Gold is the element with atomic number 79’. The essentialist principle in this case states that ‘[t]o be a pure substance, in the chemical sense of the term, just is to be matter having a certain chemical composition.’ (ibid., 280) We can, via the simple inferential model, then, come to know the modal truth that ‘necessarily, gold is the element with atomic number 79’. What chemical composition a substance has is known *a posteriori*. And we know *a priori*, by the meaning of the specific term, that if that substance has this chemical composition, it necessarily does so.

Substance terms here are similar to sortals - whereas the former range over *objects*, the latter range over *quantities* of matter. Instances of mixtures range over quantities as well, and are to be explained in the same manner as substances (as substances of substances). Other plausible general principles are theoretical identifications of physical quantities, such as light or energy.

6.3 Essentialist Epistemology of Possibility

What can be taken from this overview of Hale’s essentialist epistemology of modality? An asymmetric necessity-first theory, Hale’s essentialist epistemology of modality embraces the metaphysical claim of *Non-reductive Finean essentialism*—metaphysical necessities obtains *because* of essential truths *and* essences are inherently modal things—and the epistemological claim that an epistemology of modality *mirrors* this

metaphysical structure. This combination leads to two important questions an essentialist epistemology of modality faces: (1) How are modal (necessary, possible) propositions known? (2) How are essential propositions known? With that, we may identify two ‘levels’ of, as it were, epistemological action: First, the level of metaphysical modality (necessity, possibility) and, second, the level of essence.

The *access* and *navigation* framework provided by A. J. Vaidya and Wallner [2018], which we have already used in the previous chapter, helps to detail that Hale’s focuses largely on question (2), *i.e.* how essential propositions are known. Furthermore, Hale’s epistemologies of *a priori* and *a posteriori* knowledge of essence are deeply intertwined: Where *a priori* knowledge of essence is a matter of *meaning* and explicit or implicit definition—we may have knowledge of essence when the definition of a thing coincides with the definition of our word for the thing—a *a priori* knowledge of essence on the other hand is no less dependent on *a priori* reasoning. We gain knowledge of essence via Kripke’s ‘simple inferential model’, a deductive model of reasoning with an *a priori*-known major premise (the essentialist principle) and a minor premise that can be *a posteriori*-known.

These two models provide an answer to the *access* question of the epistemology of modality of ‘how we gain modal knowledge in the first place’: On the essentialist modal epistemology Hale details that question (1) is a *navigation* questions, since essences are inherently modal. And ‘moving’ from knowledge of essence to knowledge of necessity or possibility never leads you out of the modal realm.

The essentialist modal epistemology gives us a schematic way of knowing possibilities which mirrors the metaphysical priority of necessity versus possibility, *viz.* possibility is what is *epistemologically* left open by our knowledge of necessity. Given that on Hale’s essentialist metaphysical picture, possibilities are what is ‘left open by the natures of things, and so are determined by the metaphysical necessities’ (Hale [2018],

254), he suggests that the epistemology of possibility follow the same pattern. We have already seen above that such an assumption is not uncontroversial and indeed Hale does not argue for this ‘mirroring’ of the epistemology and the metaphysics in the case of knowledge of necessity; and he does also not give a reason for such a claim here.

Contrary to the extensive discussion dedicated to the epistemology of necessity, Hale is quite vague on the epistemology of *possibility* in general. He only notes that there is ‘at least some knowledge of necessity (...) prior to any knowledge of possibility’ (Hale 2013, 254). This follows straightforwardly from the metaphysical necessity-first picture he adopts for his essential epistemology of modality.

On Hale’s asymmetric necessity-first picture, basic possibility-knowledge cannot be part of the epistemological foundation. Such epistemology claims that *all* knowledge of possibility is grounded in *some* knowledge of necessity.⁶

Consider the following example: I wondering whether it is possible to jump over that gap over there. If there is no piece of necessity-knowledge I have that would undermine my knowledge that I can indeed jump that gap, then I am justified to know the possibility claim.⁷ In the absence of any evidence (knowledge of necessity) to the contrary, one is justified in knowing the possibility *simply* by *not* recognizing a contradiction. It is ‘easy’ knowledge in the sense that *if nothing else*, one can achieve

⁶As already discussed in 6, Hale takes a *moderate* approach with respect to an asymmetric epistemology of modality, which (plausibly) allows for an ‘Hale2013b253’interdependence of the dominant and recessive modalities, in the sense that some knowledge of dominant modal truths may depend upon some knowledge of recessive truths.

⁷There can be other kinds of undermining or defeating knowledge I possess which would make me abandon my belief that I can jump that gap: other non-modal knowledge I possess like ‘the gap is approximately x metres in diameter’, or other impossibility-knowledge like ‘it is impossible to jump 26 miles’. This is however orthogonal to the question at hand, since there are always ways of undermining knowledge without disproving the claim that there are no pieces of possibility knowledge more basic than any knowledge of necessity. The interesting question is whether at all times there is an epistemically sound way of explaining knowledge of possibility by ways of absence of non-necessity-knowledge.

the possibility knowledge without any *further* work than knowing that no pieces of knowledge of necessity I have are contradicting the possibility-claim.

Note that the above explanation describes a *rational reconstruction* of our knowledge of possibility. As discussed in chapter 3, a rational reconstruction of a piece of knowledge may but need not coincide with the *genetic* explanation of how I actually came to acquire said piece of knowledge: I may know that it is, say, impossible that gold has an atomic number of 5 by testimony—but on the rational reconstruction, my justification ultimately may derive from the fact that it is an essential fact of gold to have a certain atomic number and no other.

Hale does not elaborate on a *genetic* story, there is no fleshed-out account of *how* we come to know specific pieces of knowledge. Knowledge of possibility — the *recessive* modality in his asymmetric epistemology as we have seen above — may be acquired according to the essentialist theory: ‘on a necessity-based version of the approach, each particular possibility claim is to be justified by appeal to the fact that we know of no necessity which rules it out.’ (Hale 2003, 6)

Hale is explicit in that coming to know a possibility is not a mere passing from recognizing an absence of contradiction between known necessities and an entertained possibility:

we need not be simply passing, gratuitously, from *mere* lack of knowledge of any relevant countervailing necessities, but may have looked responsibly for them and failed to find any. This requires that we can give decent operational sense to the idea of a well-directed and thorough search for necessities relevant to the assessment of a given possibility claim ... (ibid., 7)

Knowledge of possibility, on this account, is thus neither immediate nor effortless on the reasoner’s part.

In the remainder of this chapter I want to show that such a picture allows for a

non-uniform picture of the epistemology of possibility, and more specifically that the essentialist epistemology of *possibility* allows for a variety of different accounts to fill in the genetic story in this picture. I argue that the essentialist epistemology of possibility naturally lends itself to a non-uniform picture and may reasonably be fleshed out by an appeal to other epistemologies of possibility we have already encountered in the previous chapters.

6.4 Genetic Explanation and Non-Uniformism

In this section I argue that Hale's essentialist epistemology of modality on its own does not deliver a psychologically realistic *genetic* (*i.e.* pertaining to *how* I came to actually acquire a certain piece of knowledge) story in very obvious cases of possibility knowledge—even though it does provide a satisfying rational reconstruction of our modal knowledge. Let me begin by distinguishing three classes of propositions. Picture a spectrum of known⁸ propositions, ordered by how uncontroversial knowledge thereof is. On the left-hand side are the most obvious and uncontroversial cases of knowledge of *impossibilities*, while on the right-hand side are cases of uncontroversial knowledge of *possibilities*. In the middle we may locate propositions one may reasonably be in doubt about their truth value.

The 'extreme' cases on either side of the spectrum are cases of knowledge of possibilities and impossibilities, either so obvious or so trivial that it is uncontroversial to say that one has knowledge of them. Examples of uncontroversial knowledge of *impossibility* include *e.g.* knowing that one cannot jump across the English Channel from Dover to Calais, or that it is impossible to eat Chichester Cathedral. Examples of uncontroversial knowledge of *possibility* include knowing that one can step over an

⁸Ranging of only known propositions is a simplifying assumption for the sake of clarity. Nothing hangs on it for this argument. See below for a minimal list of claims my argument has to assume.

ant, or that it is metaphysically possible for someone to jump, say, a small flower pot. Between the two extremes lie all the propositions that may not be classified as uncontroversially known.

I assume that an ordering of impossible and possible propositions by how ‘well’ they are known is uncontroversial—from most easily-known impossibilities to most difficult to know impossibilities in the middle, along with the most difficult to know possibilities to, on the other end of the spectrum, the most easily known possibilities. The exact ordering, and whether the boundaries are vague, is unimportant for the argument presented here, all I shall assume is the following:.

First, there is a non-empty set of *metaphysically impossible* propositions (propositions that express an impossibility) that may act as a *desideratum* for any epistemology of modality, such that any such epistemology (a) must classify propositions in this set as *known* but (b) should also explain *how* we know these propositions in a psychologically realistic way.

Second, there is a non-empty set of *metaphysically possible* propositions (propositions that express a possibility) that may act as a *desideratum* for any epistemically of modality, such that any such epistemology (a) must classify propositions in this set as *known* but (b) should also explain *how* we know these propositions in a psychologically realistic way.

Third, some more trivial points: The above two sets are not empty, indeed there are interestingly many propositions in them. I believe I can be vague here, and I believe it is uncontroversial to say that there is an *interesting* amount of propositions contained in these sets. I also assume that the proposition *are* interesting in their *content*. Again, I don’t believe these points are crucial to the argument below, and I argue that the example can be made as strong as one might wish by reflecting on the fact that there *is* ample knowledge of possibility we have, and that such knowledge

of possibility is also practically action guiding.

If one were to dispute the fact that there is ample and interesting knowledge of possibility readily available for humans, then (a) I believe such a sceptic would miss important *desiderata* to judge any epistemology of modality in their scope, and (b) I believe the burden of proof would be on *them* to argue for widespread modal-scepticism. I also assume, uncontroversially I hope, that propositions in the two sets described above guide our actions in meaningful ways: The fact that I *know* that I can jump over that flower pot, guides my actions of how I navigate such-and-such terrain—and the same applies with cases of knowledge of impossibility: I do not *plan* my hike such that I have to make an impossible jump—the knowledge that it is impossible to jump across a river guides my actions of hiking through the Cairngorms.

By ‘a psychologically realistic way’ I mean an explanation of how a certain piece of modal knowledge is *actually* known in addition to the rational reconstruction of our justification in point (a). To illustrate this point, take the proposition ‘it is metaphysically impossible that one can jump from Dover to Calais’⁹ I claim that this proposition is, what I call, an ‘extreme’ case—it falls into the first set described above, *viz.* it is a proposition that any epistemology of modality should classify as obviously *knowable* (we are owed a rational reconstruction of our justification and knowledge of the proposition), but a *complete* epistemology of modality should also give us a psychologically realistic story of *how* we come to know it.

It is important to note that this is merely a *desideratum* we might have for *complete* epistemology of modality rather than hard criterion for the modal epistemologies worth. Nevertheless, both the counterfactual-based as well as the possibility-based

⁹On no epistemology of modality should this proposition be counted as *normally* not known, but of course people may in fact do not know such an obvious proposition; the point of carving out a class of obvious, every-day propositions is to have a *desideratum* for epistemologies of possibility.

epistemology do, perhaps because of their anti-exceptionalist stances, deliver a satisfying story out-of-the box: On the counterfactual-based epistemology, the epistemology of modality is by design reduced to an epistemology of counterfactuals; and on the possibility-based account, both our entry-point into modal thinking as well as the limiting case of metaphysical modality are based into every-day operations, *viz.* our proficiency in dealing with can statements and de-contextualizing thought.

In the remainder, I show that Hale's essentialist epistemology of modality does not deliver such a psychologically realistic story in these extreme cases even though it does give us a rational reconstruction of our justification. The essentialist epistemology of possibility does not straightforwardly describe a way of how we *actually* know that it is possible for me to jump over an ant or how we *actually* know that it is impossible to eat Chichester cathedral.

6.4.1 Knowledge of Possibility

Let us start with cases of every-day, obvious knowledge of *possibility*. Recall that according to an essentialist metaphysics, the possibilities are left open by the necessities. In the mirroring essentialist epistemology of modality, *knowledge* of possibility is also what is left open by the *knowledge* of necessity one possesses. Therefore, on Hale's view, one's justification to know a possible proposition is due to a recognition that there is nothing *necessary* in one's knowledge contradicting the possibility claim—it is, thus, 'left open' by the knowledge of necessities one possesses.(cf. Hale 2003, 6)

Consider an example of an obvious piece of circumstantial modality: I know that I can step over an ant. To take the classification outlined above, this proposition is located in the set on the far right-hand side of the spectrum: it is a proposition so obviously known to anyone its knowability and epistemological genesis may serve as a

test for any epistemology of modality. Not every person *does* know this proposition—even though it may well be an empirical fact that everyone does know it, but I doubt it is necessarily so. However, it should be uncontroversial to hold that everyone ‘is in a position to know’ this proposition. Furthermore, *if* one does know it, or any proposition in the set of propositions on the right-hand side of the spectrum, any epistemology of modality must on the one hand describe our *justification* for this knowledge.

Bob Hale’s essentialist epistemology of modality describes it as follows: I know that I can step over an ant, because I know of no necessity that contradicts this proposition—and I can reason from this recognition to the knowledge of the possibility. Recall again the way Hale describes the epistemic process at play:

[B]eliefs about the recessive modality are to be justified by appeal to the fact that we have found no dominant modal truths which rule out the recessive modal claim up for assessment. ... each particular possibility claim is to be justified by appeal to the fact that we know of no necessity which rules it out. (Hale 2003, 6)

This story serves as a *rational reconstruction* of the justification for this particular piece of modal knowledge.

It need not describe how we *actually* come to know such a possibility. In fact, I do not think that this schema *ever* applies to cases of obvious possibility-knowledge we considered: One does not wonder about such an obvious case of possibility-knowledge. In practice however, it seems that one needs no reasoning at all here. Nevertheless, I think it is obvious that we *do* have knowledge of such extreme cases, and it certainly does guide our actions. We do not, when we are standing in front of, say, a mountain stream wonder if there is anything that we know which would contradict the possibility that one can jump across the stream. Rather, one gauges the distance and thereby come to know that one can or cannot make that jump.

It might be objected that the examples which I discuss merely discusses propositions with *circumstantial* modal content and leaves out much more interesting examples of metaphysical modal content. However, this objection is orthogonal to the point I wish to make. If there is a problem of providing a plausible genetic explanation of obvious circumstantial possibility-knowledge on the naive essentialist epistemology of modality, then the same problem surfaces for obvious metaphysically modal propositions. On the other hand, if the essentialist epistemology of modality succeeds in accounting for knowledge of circumstantial modality as well (a claim I am not disputing), we may draw on resources available from our discussion of the possibility-based account.

There is, as Vetter described in the previous chapter, an easy closure principle that governs transitions between knowledge of circumstantial modality and knowledge of metaphysical modality: knowledge of a circumstantial modality (as perhaps expressed in a can statement) implies knowledge of a metaphysical modality. In other words, if I know that I can do something p , I am in a position to know that it is possible that p . Recall that I only wish to advance the rather limited claim that the essentialist epistemology of modality allows for a non-uniform picture of our epistemic access to possibility.

6.4.2 Knowledge of Impossibility

Let us move on to cases of obvious *impossibility*-knowledge. How does one know that it is impossible to make the twenty-six miles jump from Dover across the Channel to the centre of Calais? How do I know that it is impossible to eat Chichester cathedral? According to the essentialist epistemology of modality, knowing that such a thing is impossible is because one recognizes that there is *some* knowledge of necessity that contradicts the possibility at hand.

The same argument we have made above may be applied here as well: There has never been a point where any *reasoning* (as minute as it may be) has to be done to know that such a jump is impossible; or to know that it is impossible eat an Anglican Cathedral—but nevertheless the knowledge of such impossibilities guides our actions every day. Imagine you are hiking in the Cuillin Hills for the first time and are approaching Loch Coruisk. You know you cannot walk *across* the loch, you know you cannot *jump* across it either. Your quite obvious knowledge of these impossibilities guide your actions: Instead of attempting to jump or walk across the loch, you (obviously) take the path leading around it.

As above, at no point in your reasoning, if there was any reasoning involved at all, you had to conduct a ‘well-directed and thorough search for necessities’ (Hale 2003, 7). We do not reason or think like this, when we acquire our knowledge of such obvious possibilities. Instead, you ‘just know’ that it is impossible. I do not seem to have to do any mental work to come to know these propositions - not even the bare minimum of noticing that there is *no* contradiction.

To summarize, Hale’s rational reconstruction of our justification, an epistemology of modality that is directly informed by the *mirroring* metaphysics of modality, does not immediately translate into a plausible *genetic* story of how we *actually* come to know modal propositions. I can accept Hale’s *rational reconstruction*: Knowledge of possibilities might be justified by what is left open by our knowledge of necessities; but I argue that the *how*-question with respect to our knowledge of possibility—of how we actually come to know what is possible and impossible—does not always mirror the justificatory structure here.

This does not constitute an argument against the essentialist modal epistemology and I am not arguing that Hale’s rational reconstruction of our justification and knowledge of possibility knowledge breaks down in cases of obvious possibility or impossibility

knowledge. My point is also not that we *never* reason like this. I only argue here for the limited claim that Hale's epistemology of modality on its own merely gives us *one* way to come to know (such obvious) impossibilities, and that it is not the way we standardly employ. This result contributes to the case for non-uniformism, since the essentialist epistemology of modality does not, on this picture, provide *one*, uniform, story of how we acquire modal knowledge.

It may be objected that Hale's essentialist modal epistemology does indeed provide *one rational reconstruction* of our justification for modal propositions, but I am happy to bite the bullet here: On the one hand, multiple *genetic* explanations, together with an essentialist modal epistemology is an interestingly non-uniform result in its own right; and on the other hand there is nothing that prevents the essentialist to accept a non-uniformity with respect to modal justification.

6.5 Conclusion

Hale's account of our essentialist modal knowledge gives us a much more robust framework with respect to knowledge of necessity than the two accounts previously discussed — the counterfactual-based and the possibility-based epistemology of modality — , where an account of our knowledge of *constitutive*, indeed essential, facts was needed to account for problems related to cotenability. An analysis of Hale's epistemology of the possible thus completes the non-uniform picture that has been sketched by the previous chapters.

The essentialist modal epistemology paints a plausible picture of our knowledge of necessities and constitutive (essential) truths. As an asymmetric necessity-first theory, the essentialist epistemology of modality embraces firstly the metaphysical claim that essences are inherently modal things, and secondly the epistemological claim that an epistemology of modality *mirrors* this metaphysical structure. Hale's two-pronged

focus on the epistemology of essence, details plausible ways to attaining knowledge of essence for the *a priori* and the *a posteriori* domain.

On the other hand, Hale's account of knowledge of possibility is underdeveloped and profits from a non-uniform epistemology of possibility. I argued that the essentialist epistemology of possibility on its own does not deliver a psychologically realistic *genetic* story of how we actually acquire modal possibility knowledge—but it does provide a satisfying *rational reconstruction* of our justification. Nevertheless, the essentialist epistemology of possibility does provide a structured picture of how we come to know quite a lot of possibilities: We reason from our known necessities and conclude that a certain possibility-proposition is either contradicting or left open by our known necessities. It is simply that we need *another* story to fill in an epistemologically plausible picture of coming to know obvious (im)possibilities.

This opens up the possibility of a *non-uniform* approach for the epistemology of modality—even within the bounds of an essentialist epistemology. Accepting the essentialist epistemology of modality for our account of constitutive knowledge, together with the anti-exceptionalist counterfactual and possibility-based epistemologies, we can thus paint a non-uniform picture of the modal epistemic realm. This is, of course, not a deductive argument for non-uniformism but might provide a case for weak non-uniformism of the modal epistemic realm.

Chapter 7

Concluding Discussion

In this thesis, I have argued for a weak non-uniformism with respect to the epistemology of modality. It is *weak* non-uniformism because I have not attempted to show that all modal epistemologies *must* paint a non-uniform picture of our access to the modal realm, or that any new modal epistemology *must* conform to the non-uniform thesis that there cannot be a single way of attaining modal knowledge for all domains of propositions there are (mathematical, ordinary, logical etc). Instead, my main point was that three influential modal epistemologies, each a member of one of the three major ‘camps’ in the epistemology of modality, each fail to paint a uniform epistemological picture on their own. However, taken together, these accounts form a coherent *non-uniform* picture of our access to the modal realm.

Williamson’s counterfactual theory, which perhaps had the strongest claim to a uniform modal epistemology, failed to provide an adequate answer to the question of how we attain knowledge of necessary propositions. I have discussed this counterfactual-based modal epistemology, which reduces the epistemology of modality to the epistemology of counterfactuals, in chapter [4](#).

This counterfactual approach works well in the case of knowledge of possibility, but

fails to deliver correct results in the case of knowledge of the necessity, both with respect to mathematical propositions as well as certain empirical propositions. Necessary truths simply do not possess the relevant *independence* from each other and have argued that some items of background knowledge cannot be, as it were, ‘imagined away’ during a counterfactual development. No contradiction can be generated, so the argument goes, and the counterfactual-based account overgenerates possibility claims.

Williamson might object to this argument by maintaining that it is exactly this feature that *is* a manifestation of the relevant contradiction. The necessity (or impossibility) of a proposition just *lies in* the fact that it cannot coherently be entertained in conjunction with a constitutive truths. The outcome of an objection along these lines, however, is to my lights an acceptable one: We may accept a *non-uniform* epistemology of modality with respect to our knowledge of constitutive truths as a result.

In chapter [5](#) I have outlined Vetter’s possibility-based epistemology of modality. This modal epistemology may be situated in the empiricist camp, and it is an account which, due to its recency, has not been discussed much in the literature. This thesis is also a contribution to the literature on Vetter’s possibility-based modal epistemology.

The possibility-based account contains three crucial steps. First, our ‘entry point’ into modal thought is our familiarity with can statements. Second, grasping the *concept* of metaphysical modality involves a cognitive process of generalization. Third, *knowledge* of metaphysical modality is reached with the help of a closure principle.

Vetter’s possibility-based account locates the ‘entry’ to modal thinking at the level of can statements. I argued that an answer to the access-challenge (how we gain ‘access’ to modal knowledge without already presupposing modal knowledge of the same

kind) involved ‘delegating’ some epistemic work to other epistemologies of modality—building-in a non-uniform picture of the epistemology of modality at the foundational of the possibility-based account.

I furthermore argued that—absent a certain guidance—there is no guarantee that we, if we engaged in the generalization process described in step two above, either reach the *right* concept of objective modality, *viz.* metaphysical modality, or do not overreach into an unbound concept of conceptual modality.

This problem is similar to the wider problem of cotenability as outlined in chapter 4—in that it points to an inherent difficulty of dealing with the concept of metaphysical modality without already presupposing an independent understanding of constitutive truths. In order for our process of grasping the correct concept of metaphysical modality, we need to have *further* knowledge of modality that is achieved independently from the epistemology of modality discussed, thus establishing a non-uniform epistemology of modality in turn.

So far, both the counterfactual-based as well as the possibility-based accounts have been missing some story of how we come to know essentialist, constitutive propositions independently from their main accounts of how we come to achieve modal knowledge in general. In the last chapter (6) of this thesis, then, I have discussed a rationalist modal epistemology: the essentialist epistemology of modality of Bob Hale.

This account is an asymmetric necessity-first theory, and the essentialist epistemology of modality embraces the claim that essences are inherently modal, and embraces also the epistemological mirroring claim that an epistemology of modality should follow the metaphysical structure of the modal.

The essentialist account describes a robust way of coming to know essentialist knowledge and I therefore concentrated on Hale’s epistemology of *possibility*, where I argued that this account on its own does not deliver a psychologically realistic *genetic*

story of how we acquire specific pieces of modal possibility knowledge in very obvious cases—even though the account does provide a satisfying *rational reconstruction* of our modal knowledge in general.

Accepting the essentialist epistemology of modality for our account of constitutive knowledge, together with the anti-exceptionalist counterfactual and possibility-based epistemologies, we can thus paint a non-uniform picture of the modal epistemic realm. This is, of course, not a deductive argument for non-uniformism but might contribute to the case for weak non-uniformism.

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