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Synopsis: Modality and Explanatory Reasoning

The goal of this book is to shed light on metaphysical necessity and the broader class of modal properties to which it belongs. This choice of topic requires little justification or explanation. Since the work of Kripke, Lewis, and others ushered in the modal turn in analytic philosophy, modality has become one of the most active areas of research in metaphysics and modal notions have been central to philosophical theorizing across the board—from the foundations of logic to moral theory. In view of this trend, it is an important enterprise to gain a clear philosophical understanding of modality, not least in order to determine whether it can bear the weight that so much of recent philosophical practice has placed on it. And yet, while much illuminating work has been done on the formal properties of necessity and its connections to other properties, a deep understanding of its nature has largely eluded us, or so I will argue. The first aim of this book is to plug this gap by offering a new account of what necessity is.

The second goal is to explain why human beings have modal thoughts at all. What is the point of reflecting on unrealized alternatives to actuality—which of our interests and concerns does it address? This second objective can be pursued in close connection with the first. An account of the nature of modality can take inspiration from a hypothesis about the cognitive and linguistic practices of everyday life in which modal thinking originated, while ideas about the nature of modality can in turn suggest an account of the purpose of modal thinking. That is the strategy pursued in this book.

I will argue that to understand modality we need to reconceptualize its relationship to causation and other forms of explanation such as grounding, a relation that connects metaphysically fundamental facts to non-fundamental ones. While many philosophers have tried to give modal analyses of causation and explanation, often in counterfactual terms, I will argue that we obtain a more plausible, explanatorily powerful and unified theory if we regard explanation as more fundamental than modality. The function of modal thought is to facilitate a common type of thought experiment—counterfactual reasoning—that allows us to investigate explanatory connections and which is closely related to the controlled experiments of empirical science. Necessity is defined in terms of explanation, and modal facts often reflect underlying facts about explanatory

relationships. The study of modal facts is important for philosophy, not because these facts are of much metaphysical interest in their own right, but largely because they provide evidence about explanatory connections.

In the remainder of this chapter I will give a brief and highly selective sketch of the position I am going to defend, before giving some advice to those who wish to read only selected parts of this book.

1.1 The Nature of Modality

When asked to set aside sophisticated philosophical theories and give an intuitive characterization of necessity, we may say something like this: a proposition is necessary if its truth is in some sense very secure, invariable, or unconditional. The task of analyzing necessity can be approached by trying to cash out the idea of security, invariability, or unconditionality in non-metaphorical terms. I will argue in Chapter 2 that it is the same notion that we use when we ask of a certain proposition *how easily it could have failed to be true*. The less easily the proposition could have failed to be true, the more secure its truth.

To get a better handle on claims about how easily something could have been the case, it is useful to consider how we ordinarily support such a claim. When talking about a soccer game, we may say: “The game ended in a draw, but our team could easily have won. If the goalkeeper had stood two inches further to the right two minutes before the end, the other team would not have scored their goal.” In less favorable circumstances, we may say instead, “Our team couldn’t easily have won. They would have beaten their opponents only if they had started to train much earlier, had recruited Mary and Bob, and had done a million other things differently.” How easily our team could have won depends on how great a departure from actuality is required for them to win. If they win in some scenarios that are only minimally different from the way things in fact are, then we can say that they could easily have won. We can say the opposite if all scenarios where they win depart very significantly from actuality. More generally, for any true proposition P , how easily P could have failed to be true depends on how great a departure from actuality is required for P not to be true. The greater the departure required, the more secure P ’s truth.

It is often assumed that necessity and possibility are all-or-nothing matters. But how easily a proposition could have failed to be true is clearly a matter of degree, and I will argue on that basis that we should think of necessity and possibility themselves as coming in degrees. To say that P could more easily have been true than Q is to say that P has a higher degree of possibility than Q .

Talk about degrees of possibility is ubiquitous in ordinary life, but the idioms we use are not always overtly modal. You are running to catch the train, but the doors close on you before you can jump in, causing you to sigh in frustration “I almost made it.” Your

utterance expresses the thought that you could easily have caught the train: a minimal departure from actuality—the doors closing half a second later—is all that was necessary. Similarly, in a sentence like “Smith got closer to winning than Jones,” we compare two unrealized scenarios—Smith’s winning and Jones’s winning—by their proximity to actuality. I think that such comparisons also underlie counterfactual judgments like “If I had pressed this button, there would have been an explosion.” For on the best known view of counterfactuals, which I accept, the conditional is true just in case some button-pressing scenarios where an explosion takes place depart less from actuality than any button-pressing scenarios without explosion.¹

The idea that necessity can be explained in terms of closeness of non-actual scenarios to actuality is likely to meet with protest, since the very property of being a non-actual situation is often thought to be modal. Many philosophers, when they hear “non-actual situations” or “alternatives to actuality,” think of *unactualized metaphysically possible situations* or *unactualized ways things could have been*. From their point of view, any attempt to analyze modality in terms of a closeness ordering of non-actualized situations will seem blatantly circular. However, I think that it is a mistake to identify the space of unactualized scenarios with the class of metaphysically possible scenarios. Consider counterfactual conditionals as an example. Roughly speaking, a counterfactual is true just in case its consequent is true at the closest worlds where its antecedent holds. On the assumption that all worlds are metaphysically possible, this account yields the dubious consequence that all counterfactuals with metaphysically impossible antecedents are vacuously true (since there are no antecedent-worlds), irrespective of the specific contents of their antecedents and consequents. But that seems very implausible. It’s metaphysically impossible for Hillary Clinton to be Antonin Scalia’s daughter. But that doesn’t trivialize the question how Clinton’s views would differ if Scalia were her father. Similarly, it is metaphysically impossible for there to be no numbers. And yet, in discussing whether mathematical facts contribute to explaining physical events, we may ask—non-trivially, it seems—whether these events would unfold any differently if numbers didn’t exist.² Since this problem arises from disallowing worlds where

¹ That’s the “standard” account of counterfactuals, as proposed by Stalnaker (1968, 1984: ch. 8) and Lewis (1973a, 1986c).

² The first example is unlikely to worry anti-haecceitist counterpart theorists like David Lewis (1968, 1971, 1986e: ch. 4; for discussions of different versions of the theory, see, e.g., Forbes 1982, 1987, 1990; Ramachandran 1989, 1990a, 1990b; Fara and Williamson 2005; Kment 2012). Their view entails that the truth-values of *de re* modal claims can change with contextual variations in the extension of the counterpart relation. In most contexts, we operate with a counterpart relation that makes it true to say that Clinton could not have been Scalia’s daughter. That accounts for our impression that this proposition is impossible. But when someone raises the question of how Clinton’s views would have been different if she had been Scalia’s daughter, then we shift to a different counterpart relation in order to give the speaker some chance of making a non-trivial claim. That is to say, we move to a context in which it is true to say that Clinton could have been Scalia’s daughter and in which there is a non-trivial answer to the question of what her political views would have been in that case. That explains the impression that the question is a substantive one. Both impressions can be accommodated within the counterpart-theoretical framework. I have argued elsewhere that there are strong reasons for rejecting anti-haecceitist counterpart theory (Kment 2012). In

impossible propositions are true, the obvious remedy—suggested and developed by a number of philosophers—is to lift this restriction. Instead of appealing to *possible* worlds, we can formulate the account in terms of worlds more generally, including both possible and impossible worlds. Worlds are simply ways for reality to be, and they include both ways reality *could* have been and ways reality *couldn't* have been.³

In Chapters 4 and 5 I try to show that worlds can be defined non-modally as classes of propositions that describe reality in logically consistent and maximally detailed ways. This framework can be used to sharpen the account of modality sketched above. One world, called the “actual world” or “actuality,” has the special distinction of being a wholly correct description of reality. Other worlds differ from actuality to varying degrees. The degree of possibility of a proposition *P* is determined by how close the closest *P*-worlds are to actuality: the closer these worlds, the more easily *P* could have been true. The class of all worlds within a certain distance from actuality may be called a “sphere” around the actual world. The ordering of unactualized worlds by their closeness to actuality generates a system of nested spheres. For each sphere there is a grade of necessity that attaches to just those propositions that are true at *every* world in that sphere, as well as a grade of possibility attaching to all propositions that are true at some world in the sphere. The larger the sphere, the greater the associated grade of necessity. One specific sphere, described in more detail below, corresponds to metaphysical necessity: the metaphysical necessities are the propositions that hold at every world in that sphere. Another, smaller sphere corresponds to nomic necessity, a form of necessity associated with the laws of nature. Other spheres give us yet further grades of necessity, some of them lower than nomic necessity, some intermediate between nomic and metaphysical necessity, and some greater than metaphysical necessity.

I will argue in Chapters 2 and 3 that this theory does a good job of capturing our core beliefs about what necessity is, and that it illuminates various features of modality and modal discourse. To complete the analysis of modality, we need to give an account of the rules that determine the ordering of worlds by their closeness to actuality. Different worlds differ from or resemble actuality in different respects, and a theory of the closeness ordering needs to specify how much weight attaches to these different similarities and differences. It is a common observation that we employ different standards of closeness in different contexts. However, following David Lewis, I believe that there is a specific set of rules about the weights of different similarities and differences that applies in most contexts. Metaphysical and nomic necessity, as well as the other modal properties and relations discussed in this book, are defined in terms of the standards of closeness

any case, counterpart theory doesn't help with the second example of seemingly non-trivial counterpossibles: the counterfactual about the non-existence of mathematical entities.

³ For uses of impossible worlds in accounting for counterfactuals with impossible antecedents, see, e.g., Routley (1989), Read (1995), Mares and Fuhrmann (1995), Mares (1997), Nolan (1997), Zalta (1997). See Williamson (2007: 171–5) for an argument against non-trivial truth-values for counterpossibles. For replies to these arguments, see Brogaard and Salerno (2007a, 2007b, 2013). Also see Baker (2007). For some arguments against impossible worlds, see Stalnaker (1996).

determined by this set of rules. I hold that a theory of these standards needs to appeal to the relation of explanation. Before describing what motivates this claim, I need to say more about how I conceive of explanation.

1.2 Modality and Explanation

1.2.1 *Explanation*

To say that x explains y is to say that x is the reason why y obtains, or that y is due to x . Explanation in this sense is a metaphysical relation, not an epistemic one.^{4,5} A cause partly explains its effect, but x can also partly explain y without being a cause of y . My first example of such non-causal explanation will stay fairly close to the causal case. I hold that effects are typically explained not by their causes alone, but by these together with certain facts about the laws of nature. The coffee cup falls, hits the floor, and breaks into a million pieces. Why did it happen? In part, it's because you pushed the cup off the table and because you have a planet under your kitchen floor. But another part of the reason is that there is a law of nature to the effect that any two massive bodies attract each other with a certain force. It's partly because that is a natural law that the planet attracted the cup.⁶ This is an example of non-causal explanation: the fact that a certain law is in force partly explains certain goings-on but it doesn't cause them.

My second example of non-causal explanation is the relation often called "grounding," which I will discuss in Chapter 6. Grounding is the kind of explanatory connection described in statements like the following:

What *makes* 28 a perfect number is the fact that it is a positive integer equal to the sum of its proper positive divisors.

This particle is a hydrogen atom *because (in virtue of the fact that)* it is composed of one proton and one electron in such-and-such configuration.

I will argue that there is a far-reaching structural analogy between causation and grounding. Just as earlier states of the universe typically give rise to later ones by causing them, metaphysically more fundamental facts give rise to less fundamental ones by grounding them. Certain general metaphysical principles, which I will call "laws of metaphysics," play essentially the same role in grounding as the natural laws do in causation. The metaphysical laws include the *essential truths*, in a broadly Aristotelian sense of that

⁴ Compare Wesley Salmon's distinction between ontic, epistemic, and modal senses of "explanation" (Salmon 1984). My use of "explanation" is closest to what Salmon called "ontic explanation."

⁵ I will also occasionally use "explanation" in other senses, e.g. in the sense of "account of why x obtains," and I will similarly use "explain" in the sense of "provide an account of why x obtains." This is the sense in which I will be using the term when I speak of a theory's power to explain certain data, or of inference to the best explanation. The context will always disambiguate.

⁶ I am simplifying by pretending that Newtonian physics is true.

term. To a first approximation, the essential truths about a property state what it is to have that property. For instance, the essential truths about the property of being a gold atom lay down that to be a gold atom is to be an atom with atomic number 79. Metaphysically non-fundamental facts are explained by their grounds together with facts about the metaphysical laws. For example, *a* is a gold atom because *a* is an atom with atomic number 79 and because that's what it is to be a gold atom.⁷

Grounding and causation are closely intertwined. In many cases, *X* causes *Z* by causing some fact *Y* that in turn grounds *Z*. For example, I hold that if the mental is grounded in the physical, then that's how physical occurrences cause mental ones. You sip your coffee, which brings about the occurrence of certain brain events, which in turn grounds a taste sensation. The explanation of the sensation involves the sipping, the natural laws that connect it to the fact that the brain events occur and the metaphysical laws connecting that fact to the sensation. The example illustrates how natural and metaphysical laws can both figure in the causal explanation of a fact.

My view of laws and explanation is anti-Humean. What the laws are isn't determined by the patterns that prevail in the universe; on the contrary, it's the fact that certain laws are in force that explains the patterns. In my view, the implausibility of the Humean approach and its various problems more than outweigh its benefits, but I won't argue for that claim in this book. The debate about the virtues and vices of Humeanism has been raging on for many years, and I have little new to add. In any case, a proper evaluation of the approach would require another book. A dispute as fundamental as this should perhaps be decided partly in light of how theoretically fruitful the opposing approaches are. This book can be viewed in part as an attempt to contribute to this assessment. For I hope to show that a plausible, unified, and highly explanatory account of the nature of modality and of the purpose of modal thinking can be built on an anti-Humean basis.

1.2.2 *The Direction of Analysis*

The connection of modality to causation and explanation is perhaps clearest when we use counterfactuals to answer questions about explanatory relationships. If you want to know whether Fred's tactless remark on Friday caused his fight with Susie on Sunday, then the natural question to ask is whether they would have fought without the remark. If the answer is "no"—if the fight counterfactually depends on the remark—then you can infer that the remark caused the fight. Similarly, if it can be shown that life wouldn't have developed if the value of some physical constant had been outside a certain range, then that supports the claim that the existence of life is explained in part by the fact that the value was within that range. Counterfactuals guide our judgments about explanatory relationships. This observation has motivated analyses of causation and explanation in

⁷ I don't claim that the foregoing constitutes an exhaustive list of all kinds of non-causal explanation. But the cases I mentioned above are the only ones that will concern me in this book.

counterfactual terms. For a counterfactual analysis gives a straightforward account of the connection between counterfactuals and judgments about explanation: Explanatory relationships *consist* (at least partly) in certain patterns of counterfactual dependencies. To ask whether *X* partly explains *Y* is (at least in part) to ask whether certain counterfactuals hold.

There is, however, an obvious problem that besets any attempt to motivate an analysis of *D* in terms of *C* by appealing to a seemingly correct inference from a claim about *C* to another that is about *D*. If the inference is valid, then so is its contrapositive. But *that* inference leads from a claim about *D* to one that is about *C*. We could take the first inference to motivate an analysis of *D* in terms of *C*. But we could equally well take the second inference to support an analysis of *C* in terms of *D*.

This observation can be applied to the present topic. Just as we can often infer that *A* partly explains *E* if we know that *E* counterfactually depends on *A*, we can often infer that *E* is counterfactually *independent* of *A* if we know that there is *no* explanatory connection. Moreover, just as beliefs about explanatory relationships are often guided by counterfactual judgments in accordance with the former inference, so counterfactual judgments are often informed by prior beliefs about explanation in accordance with the latter. The second phenomenon is amply illustrated by examples in the recent literature on counterfactuals.⁸ Here is a variant of an example due to Dorothy Edgington (2003). As you are about to watch an indeterministic lottery draw on television, someone offers to sell you ticket number 17. You decline. As luck would have it, ticket number 17 wins. It seems true to say “If you had bought the ticket, you would have won.” But this presupposes that

If you had bought ticket number 17, that ticket would still have won.

Now suppose that the company that is organizing the draw has two qualitatively indistinguishable lottery machines that give the same chance to every possible outcome. They used machine A in the draw, but could have used machine B instead. Consider:

If a different machine had been used in the draw, 17 would still have won.

That seems false. If a different machine had been used, then 17 *might* still have won, or some other number might have won. It is not true that 17 *would* still have won. In the first case, we hold the outcome of the lottery draw fixed, in the second we don't. It seems very plausible that this difference is due to underlying causal judgments. Your decision whether to buy the ticket is not causally connected to the outcome of the draw (or so we believe). That's why the outcome can be held fixed when we are thinking about what would have happened if you had made a different decision. By contrast, the use of a particular lottery machine is part of the causal history of the outcome. Hence, which machine is used makes a difference to the causal history of the result. That's why the

⁸ Examples similar to the one that follows are discussed in Adams (1975: ch. IV, sct. 8, in particular pp. 132–3.), Tichý (1976), and Slote (1978).

outcome of the draw cannot be held fixed in the second case. In these examples, we are drawing on prior causal judgments to decide whether certain facts can be held fixed—i.e., whether they would still have obtained if the antecedent had been true, or in other words, whether they are *counterfactually independent* of the antecedent.

Just as our counterfactual judgments are often informed by pre-existing causal beliefs, they frequently draw on prior judgments about non-causal explanation, as a second example will illustrate. In most cases of ordinary-life counterfactual reasoning, we can hold fixed the fact that material objects conform to the law of gravitation (call that law “G”). For example, we accept that

If I were to suspend my pencil in the air and then release it, it would fall to the ground.

But there are also cases where we can’t hold fixed the fact that events conform to G. For instance, the following conditional doesn’t sound true:

If G weren’t a law of nature, events would still conform to G.

It seems plausible that this difference is due to certain underlying facts about explanatory relationships: at the actual world the fact that G is a law of nature explains the fact that events conform to G. By contrast, what I do with my pencil is not explanatorily relevant to whether events conform to this law.

Examples like these might motivate the thought that counterfactuals should be analyzed in terms of explanation rather than the other way around.⁹ So far, then, there is no reason for preferring one direction of analysis to the other. The only way to decide between them is to look at the two options in more detail in order to determine which of them can better account for the complex relationship between counterfactuals and explanation. It is well known that counterfactual analyses of causation and explanation face considerable problems at this point. Counterfactual dependence is neither necessary nor sufficient for the existence of an explanatory relationship, and decades of sustained effort have failed to yield a counterfactual analysis that isn’t subject to clear counterexamples. There is plenty of motivation for trying out a theory that rests on the opposite order of analysis. Such an account will appeal to explanation to explain the standards of closeness to actuality that figure in the analysis of counterfactuals (and of possibility and necessity claims).¹⁰ I will aim to show in the course of this book that this approach can give a better account of the data. A brief summary of my theory is given in the next section.

⁹ See Mårtensson (1999), Edgington (2003), Bennett (2003: ch. 15), Hiddleston (2005), and Wasserman (2006) for causal analyses of counterfactuals motivated by examples like the above lottery case, and see Kment (2006a) for an analysis in terms of (causal and non-causal) explanation.

¹⁰ It is a good question whether explanation itself is definable or should be taken as fundamental. I will remain neutral on this issue. My account is consistent both with primitivism about explanation and with the view that explanation can be analyzed (perhaps in terms of the relation of nomic determination discussed in Chapter 10).

1.2.3 Closeness to Actuality

Chapters 7–9 will discuss a variety of modal data and will offer an account of the standards of closeness that explains them. Simplifying somewhat, we can say that the comparative closeness to actuality of two worlds is determined by weighing the similarities that the first world has to actuality against those that the second world has to actuality. Not all similarities carry weight—some count for nothing. Of the similarities that are relevant, some count for more than others. The first part of my theory distinguishes the relevant similarities from the irrelevant ones. The second part specifies the relative weights of different kinds of relevant similarities.

The explanatory criterion of relevance. Suppose that fact f obtains at the actual world and also at world w . Then that similarity carries non-zero weight just in case all parts of f 's actual explanatory history obtain at w as well—including f 's actual causes and grounds, and the facts about the laws that partly explain f at the actual world. The lottery example of section 1.2.2 illustrates this. In the first version of the case, we are wondering whether you would have won if you had bought the ticket. Antecedent-worlds where the outcome of the draw is the same as in actuality are closer than those where the outcome is different. Match in the outcome of the draw carries non-zero weight because all elements of the actual explanatory history of the outcome are present at the closest antecedent-worlds. Matters are different when it comes to the second version of the example, where we consider the question whether the same ticket would have won if the other machine had been used. In this case, some parts of the actual explanatory history of the outcome fail to obtain at the closest antecedent-worlds, and it is therefore irrelevant to the position of such a world in the closeness ordering whether the lottery draw has the same outcome as in actuality.

The gravitation example can be given a similar treatment. In the second version of this case, where we were wondering what would be the case if G weren't a law, antecedent-worlds that conform to G aren't closer than those that don't. The explanatory criterion of relevance explains this finding: at the actual world events conform to G because G is a law. But G isn't a law at a world where the antecedent is true. Therefore, even if such a world conforms to G , that isn't a closeness-relevant similarity. Matters are different in the first version of the example. At the closest worlds, where I release my pencil in mid-air, G is still a law. Hence, other things being equal, such worlds are closer to actuality if their events conform to G than if they don't.

*The weight of relevant similarities.*¹¹ The explanatory criterion of relevance specifies the conditions under which a similarity carries non-zero weight, but it doesn't tell us *how much* weight it carries when these conditions are satisfied. The second part of my theory addresses that question. Of all the similarities that meet the explanatory criterion of relevance, similarities in the metaphysical laws are the weightiest. To simplify somewhat,

¹¹ What follows is a simplified statement of my account of the relative weights of different similarities. The full view will be given in Chapter 8.

any world with the same laws of metaphysics as actuality is closer to actuality than any world where these laws are different, no matter how closely the second world matches actuality in other respects. Worlds that have the same metaphysical laws therefore form a sphere around actuality. The second most important criterion is match in natural laws. Worlds with the same metaphysical *and* natural laws as actuality are closer than worlds that don't meet this condition. They form a second, smaller sphere within the first sphere. Similarities between the histories of two worlds matter to the closeness ordering as well, although to a lesser degree. For each sphere, there is a grade of necessity that attaches to the propositions that hold at every world in that sphere. Metaphysical necessity is the grade corresponding to the sphere of worlds with the same metaphysical laws as actuality, while nomic necessity is the grade connected to the sphere of worlds that match actuality in *all* laws (metaphysical and natural).

In the second half of the book I will try to show that this account affords an attractive and unified explanation of a variety of data about modality and its connection to explanation. Moreover, it can serve as the basis of a plausible account of the function of modal thought.

1.3 The Function of Modal Thought

My discussion of the purpose of modal thinking will start from the above observation that counterfactual beliefs often guide judgments about explanatory relationships. In Chapters 10–12 I will aim to explain how counterfactual reasoning can serve this function, and I will argue that modal thinking developed at least in part because of its utility for evaluating explanatory claims. The brief summary that follows will focus on my account of counterfactual reasoning under determinism. Indeterministic cases will be discussed in Chapter 12.

I hold that the use of counterfactual reasoning to assess explanatory claims is an extension of a very common procedure for investigating causal relationships that John Stuart Mill called “the method of difference.”¹² Consider a humble example of this method. Your laptop is plugged in but the battery, though nearly depleted, is not charging. To find out whether the problem is due to a battery defect, a malfunctioning adapter, or a dead outlet, you vary one factor at a time while holding the others fixed. For example, using the same battery and adapter, you plug into a different outlet. If the battery starts charging, you conclude that the issue was caused by an outlet problem.

Scenario 1: A B C D
E

Scenario 2: \bar{A} B C D
 \bar{E}

Idealizing somewhat and focusing on deterministic contexts, we can give the following simplified and schematic description of the method of difference. The agent

¹² Mill (1956: bk. III, ch. VIII, sct. 2).

observes a scenario where A is present, accompanied by the surrounding conditions $B-D$, and where E obtains a moment later. She also observes a second situation where A is absent but which matches the first scenario in containing $B-D$. This time, E does not occur. If she believes that in the first scenario no factors other than $A-D$ were causally relevant to the presence of E , then she can take her observations to support the claim that A is a cause of E in the first scenario. Sophisticated versions of this procedure are applied in scientific experiments. (In these cases, Scenario 1 is the “experimental condition,” Scenario 2 is the “control condition,” and $B-D$ are the background factors that the experimenters are controlling for.) However, my discussion will largely focus on everyday uses of the method.

I will argue that ordinary-life applications of the method of difference rest on an assumption that I will call the *determination idea*. When applied to causation under determinism, the determination idea amounts to the assumption that (to simplify somewhat) E 's causes and the laws involved in E 's explanation together determine that E obtains. The determination idea provides a straightforward explanation of how the method of difference works. Since $B-D$ obtain in Scenario 2 but E doesn't, the agent can conclude that $B-D$ and the laws don't determine E . But by the determination idea, the factors that caused E in Scenario 1 and the laws must together determine E . So, $B-D$ can't include all of the causes of E in Scenario 1. Given the assumption that $A-D$ do include all of these causes, it follows that A must be a cause of E .

The determination idea, which will be spelled out in non-modal terms in Chapter 10, is not an analysis of causation. It merely states a condition that is necessary, though not sufficient, under determinism for certain factors to include all of E 's causes: these factors and the laws involved in E 's explanation must together determine E . Other versions of the idea apply to probabilistic causation and to grounding, as will be discussed in later chapters. While I think that the determination idea is plausible and that some objections to it are misguided, it is not of critical importance for my purposes whether the idea should be regarded as true in light of our best philosophical and scientific theories. My reconstruction of everyday applications of the method of difference requires only the premise that the determination idea is commonly used in ordinary explanatory thinking, at least as a working assumption. Chapter 10 will provide further support for this claim.

The method of difference is limited in scope. If we have observed A followed by E , and we want to show that A was a cause of E , we have to find or create another situation where A doesn't obtain but which otherwise matches the scenario we have observed in all relevant ways. That is often impossible in practice. And the method is useless when our goal is to find out not what caused E , but which *laws* were involved in E 's explanation. For the laws never vary between different scenarios that actually obtain. If my reconstruction of Mill's method is on the right track, however, then there is a straightforward extension of it that remedies these shortcomings. On my account, the sole function of Scenario 2 is to show that $B-D$ and the laws don't determine E . But given a

realistic amount of background knowledge about the laws, we can show the same by mental simulation. We represent to ourselves an unactualized scenario where $B-D$ obtain but A doesn't, and where history then unfolds in accordance with the actual laws. If E fails to obtain in this situation, then $B-D$ and the laws don't determine E . Using the determination idea, we can again infer that $B-D$ don't include all causes of E in the actual scenario. Given our background assumption that $A-D$ do include all of E 's actual causes, we can conclude that A is actually a cause of E . The mental simulation I described is a simplified version of the reasoning by which we determine whether E depends counterfactually on A : we imagine a scenario where A is absent, holding fixed various other facts that actually obtain ($B-D$ and the laws), and we then determine whether E obtains in that situation. The situation imagined serves the same purpose as Scenario 2 (the "control condition") in the method of difference, and by holding fixed the right facts we achieve the same as by controlling for background conditions in an experiment. The same type of mental simulation can also be used to show that a certain law L is involved in explaining E , only in that case we need to imagine a scenario where L isn't a law but where other relevant factors are the same as they actually are.

Chapter 11 will explain why a sophisticated version of counterfactual reasoning requires a closeness ordering of unrealized scenarios that is governed by the specific standards described in Chapters 8 and 9. Roughly speaking, this ordering gives us an easy way of deciding, for any fact A , which unrealized scenarios we need to consider if we want to test whether A partly explains a certain other fact: of all scenarios where A is absent, we should consider those that are closest to actuality in the ordering. The background facts that we need to hold fixed are just those that obtain in these scenarios. As mentioned before, our standards of closeness accord great weight to similarities in the natural laws, and even greater importance to match in the laws of metaphysics. Whenever possible, we should hold fixed which metaphysical laws are in force, and if possible, we should also hold fixed what the natural laws are. (I will argue that the rationale for these rules is closely connected to the distinctive explanatory roles of the metaphysical and natural laws.) The purpose of our various modal notions, including those of metaphysical and nomic necessity, consists in the fact that they make it easier to apply these rules of counterfactual reasoning.

Since comparative closeness to actuality is defined in terms of explanation, we typically need to have some explanatory knowledge already before we can conduct counterfactual reasoning to establish a claim about explanation. But there is no circularity. The explanatory knowledge needed to establish the relevant counterfactual differs from the explanatory knowledge we acquire as a result of the process. Counterfactuals, and modal claims more generally, mediate inferences from old items of knowledge about explanation to new ones. This view explains the phenomenon, mentioned in section 1.2.2, that we commonly draw inferences in both directions, from explanatory claims to counterfactuals and vice versa. Both kinds of inference are usually involved in establish-

ing a claim about explanation through counterfactual reasoning. But inferences in the two directions differ in one important way. Most counterfactuals are made true in part by patterns of explanatory relationships, and that's why beliefs about such patterns are typically required as premises in establishing that one fact counterfactually depends on another. By contrast, the further inferential step from the counterfactual dependence to the explanatory conclusion isn't underwritten by a similar constitutive connection—counterfactual dependencies aren't part of what explanatory relationships consist in. The inference rests instead on the determination idea, as explained above.

My account explains why counterfactual reasoning is a reliable method of testing causal and other explanatory claims across a wide range of circumstances. But I will argue in Chapter 12 that the view also predicts and explains why the method doesn't work in certain other cases, like those of causal overdetermination and preemption. These are the examples that have dogged counterfactual accounts of causation. My theory can account for them.

I don't pretend that my account of the role of counterfactuals in explanatory reasoning gives us the whole story about why we have modal thoughts. There is no doubt that modal thinking serves other purposes as well. To assess the safety record of a nuclear power plant, we may try to find out how close the plant came to an accident at various points in the past. When making practical decisions, we often determine the likely consequences of a possible action by asking what would happen if we were to perform it.¹³ Beliefs about the proximity of unrealized scenarios also have a powerful and well-documented influence on our evaluative judgments and emotions.¹⁴ Whether you react to an event with joy or with disappointment doesn't depend solely on your perception of its intrinsic pleasantness or desirability. It is equally determined by how the outcome compares to others that could easily have come about. It seems probable that in such cases modal judgments play an adaptive role in regulating emotion and motivation. Modal thinking was most likely molded by a variety of functional pressures. I won't aim to do more in this book than to give an account of one of its uses that seems to be of particular interest to philosophy.^{15,16}

¹³ See Gibbard and Harper (1978) and Lewis (1981), among others.

¹⁴ See, e.g., Medvec, Madey, and Gilovich (1995).

¹⁵ Why, then, does my discussion of the genealogy of modal thinking focus on its role in explanatory reasoning? The reason is twofold. *Firstly*, it is one of my chief aims to argue that explanation is more fundamental than modality. To support this order of explanation, it is important to show that it gives us a better account of the role of counterfactuals in explanatory reasoning than the opposite direction of analysis. *Secondly*, by studying how modal thought figures in reasoning about explanation, we are likely to shed light on the functions of a larger range of modal notions than by investigating other uses of modal thinking. When we use counterfactuals in decision making, our attention seems to be restricted to worlds that differ mostly in what decisions we make, but which are otherwise pretty much like actuality. Similarly, in cases where we respond emotionally to the thought that things could easily have turned out better or worse than they did at time *t*, we typically consider only scenarios where the laws are the same as they actually are and where history unfolds the same way until shortly before *t*. Such uses of modal thinking don't require us to

1.4 Modality in Metaphysics

During the last couple of decades, modality has played a central role in metaphysical theories about numerous topics. For example, many philosophers have defined an essential feature of an object as a property it *must* have if it exists. Others have tried to give an account of truth-making in terms of a modal relationship between worldly entities and true claims. Various relations of supervenience have been used in an attempt to capture theses of the forms *The B-facts are nothing over and above the A-facts*, *The A-facts are more fundamental than the B-facts*, or *All facts are ultimately A-facts*. Counterfactual conditionals have been put to heavy work in several areas of metaphysics as well. And there are many more examples. These developments made it natural to think of the exploration of modal facts as one of the chief occupations of the metaphysician.

More recently, this idea has come in for criticism. Not that there aren't important connections between metaphysical theses on the one hand and modal claims on the other. If understood a certain way, the claim that the A-facts are more fundamental than the B-facts arguably entails a substantive supervenience thesis. From the claim that *x* is essentially *P*, it follows that *x* must be *P* if it exists. And perhaps the thesis that *x* is a truth-maker of *P* entails that *x*'s existence necessitates *P*'s truth (or something along these lines). The problem is that in all of these cases the entailment seems to hold only in one direction—from the metaphysical claim to the modal one. The supervenience of the B-facts on the A-facts alone doesn't entail that the A-facts are more fundamental than the B-facts in any interesting sense; a necessary property of a thing needn't be essential to it, and *P*'s truth-makers may not be the only entities whose existence necessitates *P*'s truth. There is therefore no obvious way of formulating modal claims that are equivalent to the

ask how very remote scenarios are ordered by their relative proximity to actuality, and they consequently don't require us to distinguish between the different degrees of necessity that correspond to spheres large enough to include such remote scenarios. Therefore, to the extent that such high degrees of necessity figure in our thinking, that fact cannot be explained by appeal to the role of modal thinking in decision making or in regulating one's emotions.

By contrast, there is no general limit on the remoteness of scenarios that we can usefully consider when we apply counterfactual reasoning to test explanatory claims. For instance, when we investigate the explanatory role of a certain fact about the metaphysical laws, the closest worlds where that fact fails to obtain may be very far away from actuality. In such cases, we have a use for notions that distinguish between different degrees at the upper end of the necessity scale.

¹⁶ A complete account of the various functions of modal thought would have to take into account the findings of the considerable psychological literature on counterfactual thinking. See, for example, Au (1992), Boninger, Gleicher, and Strathman (1994), Byrne (1997, 2002), Costello and McCarthy (1999), Einhorn and Hogarth (1986), Ginsberg (1986), Hilton and Slugoski (1986), Johnson (1986), Kahneman and Varey (1990), Mandel, Hilton, and Catellani (2005), Reilly (1983), Roese (1994), Roese and Olson (1993, 1995a, 1995b, 1995c), Sherman and McConnell (1996), Shultz and Mendelson (1975), Wells and Gavinski (1989).

metaphysical theses at issue, let alone modal claims that capture the intended contents of these theses.

Examples like this have motivated some philosophers to question the central role that modality has played in metaphysical theories in the wake of the modal turn, and to hold that that role should instead be given to (for example) grounding, essence, or fundamentality. Maybe the best way of spelling out the idea that the A-facts are more fundamental than the B-facts is in terms of grounding, and perhaps the distinctive feature of the essential truths about a thing is their special explanatory role. Similarly, the truth-maker of a true claim P may be thought of as some entity whose existence (partly) grounds the truth of P .¹⁷

I think that my account underwrites this shift of focus from the modal to the explanatory domain. On my view, modal facts aren't metaphysically deep or fundamental in any sense. They concern a relation of comparative closeness between certain complex classes (the worlds) that is of no special metaphysical importance. We are ordinarily thinking about this closeness ordering only because such thoughts serve useful functions like that of mediating inferences between beliefs about explanatory relationships. Facts about explanatory relationships, and facts about essence and the metaphysical laws, are more fundamental than modal facts and are therefore better suited to form part of the subject matter of metaphysics. At the same time, my theory makes it unsurprising that modal considerations have figured so prominently in many philosophical debates whose ultimate concern is with explanation. For it entails that some modal facts, e.g. certain counterfactual dependencies and supervenience relationships, *reflect* important explanatory connections (such as grounding relationships). Other modal facts reflect facts about the essences of things or about the metaphysical laws, and the latter facts are of interest because of their central explanatory role. Modal facts therefore constitute important data. For example, a hypothesis about essence, grounding, or fundamentality can be evaluated in part by its consistency with the relevant modal data and its ability to explain them. In these cases, modal facts are not themselves the ultimate objects of investigation. They are of interest solely in their role as evidence. I suspect that that is the main way in which modal facts are important in metaphysics. (I will briefly consider some of these implications of my account in section 7.2, and I say a little more about them elsewhere, but it will remain a task for the future to develop them in detail.¹⁸)

¹⁷ For relevant discussions of supervenience, see Horgan (1993), Wilson (2005), Stoljar (2009), Dasgupta (ms-b); for discussions of truth-making, see Restall (1996), Rodriguez-Pereyra (2006); for a discussion of essence, see Fine (1994). For skepticism about the shift of focus to facts about metaphysical forms of explanation, see Hofweber (2009).

¹⁸ See Kment (forthcoming).

1.5 The Question of Reduction

My account analyzes modality in terms of several properties and relations that have often been taken to be modal (the most important ones are listed and briefly discussed below). While I myself don't believe that they are modal and therefore take my account of modality to be reductive, it is beyond the scope of this book to argue for this conclusion in detail. If I am wrong about this, then my account is non-reductive and it could no longer be taken to show how modal facts are grounded in non-modal facts alone. But the loss would be moderate, provided that the account traces what Peter Strawson (1992: 19) called a "wide, revealing, and illuminating circle." I think that the theory would still shed light on questions about the interrelations between different modal properties, the way in which modal facts are connected to facts about explanatory relations, and the function of modal thought.

Essence and laws. It was common for a long time to define essentialist locutions in modal terms.¹⁹ On this account, *a* is essentially *F* just in case it is impossible for *a* to exist without being *F*. However, Kit Fine (1994) has argued, quite convincingly in my view, that this characterization doesn't adequately capture the essence–accident distinction. As Fine points out, it is a necessary feature of the number 2 to be a member of the set {2} and a necessary property of {2} to have 2 as a member. But while having 2 as an element is part of what it is to be {2}, being a member of {2} is not part of what it is to be 2. The distinction between essential and accidental truths about an object cuts more finely than any modal distinction. Moreover, as we will consider in more detail from Chapter 7 onwards, it can be made plausible that modal facts are often explained by facts about the essences of things. I think that these findings make it more promising to give an account of modality in terms of essence than to pursue to the opposite order of analysis. The discussion in the second half of this book is intended to provide further support for this view.

The distinction between essence and accident is sometimes treated as obscure and mysterious. I am not sure what to make of this charge. If the complaint is that talk of essence is esoteric and removed from ordinary thought, then I think that it rests on a false assumption. Essentialist idioms seem to be used frequently in everyday life, e.g. when we talk about what makes a piece of music punk, what it is to be courageous, or what happiness or justice consist in. Admittedly, there are different possible interpretations of such utterances, but in each case it is easy to imagine a perfectly ordinary context in which we can plausibly take them to express essentialist claims. Perhaps the worry is that essence eludes our philosophical understanding. While I will argue that essence is irreducible and indefinable in a sense to be explained, I think that we can gain a better

¹⁹ Fine (1994: 3) mentions Mill (1956: bk. I, ch. VI, sct. 2) and Moore (1922: 293, 302) as proponents of this conception. Also see Kripke (1980), Plantinga (1974: chs. IV–V), and Forbes (1985: 96–100).

understanding of essence by describing its metaphysical role—in particular its role in explanation. That is one of the topics of Chapter 6.

I regard the essential truths as a type of law, and I think that much of what I said in the previous two paragraphs also applies, *mutatis mutandis*, to other kinds of (natural and metaphysical) laws. The laws have distinctive modal features: they support counterfactuals and are associated with special forms of necessity. But I hope to make it plausible that that is so because necessity and counterfactual dependence are defined in terms of laws, not the other way around.²⁰

Propositions. The entities I call “propositions” are the primary bearers of modal properties and form the raw material for the construction of worlds. We can describe these entities, at least to a first approximation, as structured complexes that represent reality as meeting certain conditions. They are similar to Russellian propositions in being constructed from the entities they are about (i.e., from the entities involved in the conditions that they represent reality as satisfying).²¹ At the same time, they are like sentences inasmuch as their representational features depend in a systematic way on what their constituents are and on the ways these constituents are put together. This makes it tempting to talk about them as if there *were* sentences and to use the rich resources of our syntactic and semantic vocabulary to give a compositional account of how their representational properties are determined. It is harmless to yield to this temptation (as I will do when formulating my theory of propositions in Chapters 4 and 5), as long as we bear in mind that semantic claims about propositions need not be taken literally, but can be understood as exploiting a mere analogy to sentences.

Chapters 4 and 5 will present a non-modal theory of propositions as class-theoretic constructions. I call the entities defined by this account “propositions” in part because of their resemblance to Russellian propositions and in part for lack of a better term. But I don’t mean to imply that the structured complexes that figure in my account can play the full theoretical role of propositions. For example, I don’t claim that they can plausibly be regarded as the contents of sentences (relative to contexts) or as the objects of attitudes like belief or hope.²² (In fact, while I will continue to describe these complexes as having representational features, that is not an essential part of my theory. What is essential is merely that each complex is connected to a certain condition on reality. The precise nature of that connection ultimately doesn’t matter. Instead of describing the complexes as *propositions* that *represent* reality as meeting certain conditions, we could decide to

²⁰ Is there a workable non-modal analysis of lawhood? I don’t know that there isn’t, but find the available candidates not very satisfying. Perhaps the best option is to regard lawhood as fundamental (see Maudlin 2007: ch. 1).

²¹ For a well-developed account of propositions along Russellian lines, see Soames (1987, 1989).

²² See King, Soames, and Speaks (2014) for discussion of the question whether structured complexes like those that figure in my theory can play the theoretical role of propositions.

say that the complexes *are* conditions on reality, although that would be a less convenient form of expression.)²³

Logical truth and entailment. My account of modality will appeal extensively to the property of being a logical truth and the relation of logical entailment. (I will always use “entailment,” “consequence,” “follow from,” etc. for logical entailment, not for the weaker relation of metaphysical necessitation, and “consistency” for logical consistency, not for metaphysical possibility.) I have no account of logical truth to offer. I am somewhat attracted to the idea that the logical truths are those claims whose truth is in some sense due to their logical forms, and given the aforementioned analogies between sentences and propositions, this way of thinking about logic could be applied to propositions as well as to sentences. But it doesn’t go very far in illuminating logical truth. It leaves open the question of what logical form is and what it means to say that a proposition owes its truth to its logical form, and I am not sure how these questions should be answered. While I don’t think that there are strong reasons for thinking that logical truth needs to be explained in modal terms, I won’t delve into this complex and controversial issue. For even if it turns out that a general account of logical truth has to appeal to modality, that wouldn’t frustrate the reductive aspirations of my project. We could define a non-modal syntactic property that is coextensive with logical truth over the domain of propositions and could then cast my analysis in terms of this property rather than the property of logical truth.

1.6 A Guide for Selective Readers

The remainder of this book can be divided into the five parts described below. Each of these is either self-contained or has a self-contained portion that can serve as an introduction to the respective part of my theory. It is recommended to read Chapter 1 before turning to other parts of the book, as that will give the reader a mental framework that might make it easier to assimilate the material of later chapters.

The analysis of modality. This part of the book comprises Chapters 2, 3, and 7. Chapters 2 and 3 give an outline of the analysis of modality I will develop, provide some initial motivation for it, highlight a number of its distinctive features, and discuss how it can explain various data about modality. Combined with section 1.1, Chapters 2 and 3 form a self-contained unit that introduces my approach to modality. (It’s also possible to read only section 1.1 and Chapter 2 to get an even briefer but less complete introduction to my theory.) My accounts of metaphysical and nomic necessity are given in Chapter 7 and will presuppose some of the results of Chapter 6.

²³ Of course, *conditions* in the relevant sense aren’t individuated modally (by necessary equivalence), but much more finely than that. For example, the condition that two and two make four is not the same as the condition that water (if it exists) has chemical structure H₂O, despite the fact that the two conditions are necessarily equivalent.

A theory of worlds. Chapters 4 and 5 present my account of worlds. I will defend the thesis that facts about worlds are metaphysically contingent along a number of dimensions: Many worlds are contingent existents and some worlds (including some that are very close to actuality) even fail to exist at themselves—if they had been actualized, then they wouldn't have existed. Which propositions are true at a given world w can also vary between different possible worlds where w exists. Finally, the very property of being a world is a contingent feature of many worlds: some worlds could have been non-maximal situations rather than worlds. These results have noteworthy implications for our understanding of actualization and iterated modality. Chapters 4 and 5 don't presuppose familiarity with earlier parts of the book (except in their respective final sections, which can be skipped by readers only interested in the theory of worlds). To get an overview of my approach to worlds it's possible to read Chapter 4 by itself, although the account presented there faces some problems that are only addressed in Chapter 5. Readers more interested in the general approach to modality than in the account of worlds can skip Chapters 4 and 5, except that they may want to take a brief look at section 4.3, which introduces some logical principles that are occasionally applied in later chapters.

Essence, laws, and grounding. Chapter 6 presents the working account of essence, grounding, and metaphysical fundamentality that I will use in my theory of modality and counterfactual reasoning. This chapter can be read on its own, but it is important to bear in mind that in this book my interest in essence and grounding is subsidiary to the main goal of illuminating modality and its connection to explanation. Consequently, my aim in Chapter 6 is not to develop a comprehensive theory of essentiality and grounding, but only to give a rough working account. Many central questions in this area of metaphysics will be left unanswered.

Counterfactuals and closeness to actuality. Chapters 8 and 9 form a fairly self-contained part of the book that develops an analysis of comparative closeness to actuality and a theory of counterfactuals. Chapter 8 states and motivates my view and can be read on its own. Chapter 9 makes the account more precise and modifies it slightly, before responding to a number of objections.

The function of modal thought. Chapters 10–12 present my theory of the purpose of modal thinking. Chapter 10 explains the general approach I take in this part of the book in an informal way and doesn't require knowledge of the previous chapters. The more detailed development of the theory in Chapters 11 and 12 will rely on the results of Chapter 8. To a lesser extent, Chapter 11 will also draw on the material of Chapters 2 and 6, while section 12.3.2 will use findings from section 9.2. Readers who have read Chapters 1 and 8 and sections 6.1.1, 6.2, and 6.4 and who have glanced over the rest of Chapter 6 should have no difficulty following the gist of Chapter 11 and most of Chapter 12.

Readers who want more information about where to find what are advised to look at the introductions to the individual chapters (or in the case of Chapter 10, at the intro-

duction together with section 10.1), which give brief overviews of the respective chapter contents.

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