Book Section:
Bueno, O. and Shalkowski, S.A. (2020) Introduction Modal matters. In: The Routledge Handbook of Modality. Taylor & Francis , London , pp. 1-7. ISBN 978-1-138-82331-0

https://doi.org/10.4324/9781315742144-1

Introduction

Modal matters: philosophical significance

Otávio Bueno and

Scott A. Shalkowski

Life is concerned not only with what is and how it is, but also with how things could or could not have been otherwise. Some of our most practical deliberations about how to act, we think, account for more than how things *are*. The most obvious reason for doing this is that, when we eventually act, things may be different. We are also aware that how things will be is affected by how we, in fact, act. At the very least, mature individuals have the appearance of being able to choose amongst different courses of action, at least some of which sometimes will have different outcomes. Looking backward instead of forward, as it were, we seem also to be aware that had things gone differently, at least some things would now be different. Had we or others behaved differently, the world would be different from how it now is. Thus, we are aware, so we think, of a great deal of contingency.

Our thinking about contingency is done against a background of necessities, things that we cannot change. Millennia of thinking carefully about such matters has yielded many distinctions. Past realities are necessary in one respect, but not in all. They are necessary because they are now a fixed part of reality. No one can change the past. It is what it is. Yet, the past, in another respect, is not necessary. Caesar might not have crossed the Rubicon, and his life might have ended rather differently.

Philosophers have introduced distinctions to help us navigate these matters. The backward-looking temporal necessity of Caesar's crossing the Rubicon is one thing. Caesar's ability to have chosen a different military and political path is another. Forward-looking deliberation might also need to account for some cold, hard physical realities, though. Choose however you like, but given current understanding of the world, you will never travel faster than 299,792,458 meters per second. Yet, the speed of light is also something not amenable to discovery by conceptual or linguistic analysis; one must actually go look to determine its value. That observational requirement lends credence to the judgment that it and other central physical facts are contingent. No background logic or mathematics makes 299,792,458 the unavoidable value of light's speed. No amount of reflection alone renders it inevitable. Thus, it seems that there is some sense in which it is possible that light behaves differently.

At the same time, physical facts like the speed of light also constitute real limits on other physical facts, amongst them the character and consequences of our actions. Thus, there is at minimum the appearance that not only is necessity to be reckoned with, but there are different kinds of necessity, permitting something to be both necessary and contingent, exhibiting one kind of necessity but not some other(s).

If history and science are concerned with contingencies—even as some scientists claim to have uncovered some (physical, chemical, biological) necessities—then philosophy, at least on a given understanding favored by some philosophers within its recent analytic incarnation, appears to be concerned with unrestricted, genuine necessity—necessity *tout court*. Platonists affirm the existence of abstract *ante rem* universals. They do so on the basis of what they take to be required for understanding the possession of properties or the nature of resemblance, wherein two or more things "share" a property. Nothing in those reasons makes sense of contingency in

the matter. If to be human is to bear some relation to a universal—HUMAN—then there is no prospect that it is merely a happy accident that all of us bear this relation to that universal. It is the nature of the beast to be so related. Those rejecting the platonist case do so either because they think that it is possible that such *ante rem* abstract objects do not exist, or for the more modest reason that there is no necessary connection between having characteristics or resembling other things and the existence of universals, each rejection based on something modal. Even if not all problems in metaphysics are problems infused with necessity, many certainly are. Where necessity is not obvious, it lurks beneath. One might maintain that all earthly minds are somehow physical in nature without the commitment that mentality itself is, of its nature, physical, yet an account of the nature of mentality, whether earthly or not, will yield some necessities—if nothing else relative to other states of affairs: given the physical constitution of bacteria, it is just not possible for them to have mental states.

It is no surprise, then, that philosophers turned their attention to modality, originally conceived as modes of being or modes of truth. It is also no surprise that philosophers have proposed rather different answers to whether there is necessity, whether there is necessity to be discovered, how necessity is to be characterized, whether there are more and less restricted kinds of necessity, whether necessity is a fundamental part of reality's architecture, how we might come to know the scope of necessity, and the like.

What is somewhat surprising is that there has been no handbook guiding interested parties through some of the deep and sometimes subtle and difficult philosophical waters of the philosophy of modality. We are delighted to present here some essays from first-rate scholars on some central themes regarding the necessary and the possible. The contributions to this volume cover four major areas of philosophical concern regarding modality: metaphysics, epistemology,

applications (in the context of the sciences, logic, and mathematics), and contributions from historically significant authors. Articles in the first three parts of the current volume treat what, until recently, had been the main focus of attention: the nature of modality and other related phenomena, such as the existence of possible worlds, the semantics for counterfactual conditionals, whether individuals have essential properties, whether there is non-causal ontological dependence, and the overall interpretation of modal discourse, whether realistically (broadly construed) or not. As important as these issues are, how we can know any of these metaphysical claims is equally important. These issues are addressed by contributions to the fourth part of this handbook. The fifth and sixth parts address the applications of modality in science as well as in logic and mathematics. The seventh and final section contains contributions providing some historical background, from ancient and medieval sources through to some major modern and contemporary contributions to the subject of modality.

Part 1 is devoted to the topics that received a great deal of attention in the second half of the twentieth century and informed work in the early twenty-first: worlds and modality. There is, of course, a very intuitive but not philosophically rigorous way of mixing our thinking about modality with our thinking about worlds. Intuitions may be pumped by asking whether one can imagine a scenario in which thus-and-so occurs. A world is just an extended, complete scenario. Possibilities are just alternatives, but alternatives do not exist in isolation. They exist within a totality—a world. Those coming from the study of formal logics are familiar with treating valid inferences as those for which all models of the premises are models of the conclusion. Similar treatments of the logic of modal operators, '$\Box$' or '$\Diamond$', expanded the domain of models so that not only were alternative assignments to sentential, predicate, and individual variable from within the existing stock of sentences, predicates, and individuals permitted, but alternative "worlds"

were envisioned, each with its own ontology, to model valid inference involving the formal expressions for necessity and possibility. For a useful presentation of this "possible worlds semantics", see Copeland (1996). David Lewis was instrumental in bringing a serious, realist, treatment of possible worlds to bear on many philosophical problems, including the philosophy of modality. His influential *On the Plurality of Worlds* (Lewis 1986) provided the primary version of this approach.

Michael De begins this opening section with an article focused directly on possible worlds, addressing what roles philosophers have asked possible worlds to play and whether they are suitable for those roles. By examining the analyses of modality, belief, and conditionals, he concludes that worlds are not as suitable as they first appeared to be, requiring either supplanting or supplementing. Karen Bennett follows with a discussion of actualism, the view that only actuality exists, or, in her preferred formulation, "absolutely everything actually exists". No alternate realities exist, which is not to say that possible worlds do not exist. Those thinking that worlds are maximal sets of propositions, or of states of affairs, or complex properties maintain that possible worlds exist, though not all things mentioned in propositions exist, not all states of affairs obtain, and not all properties are exemplified. Actualism stands in contrast to possibilism, the view that merely possible objects do, really, exist, even if not within our own possible world. Though many find actualism natural, it is difficult to make actualism perfectly clear, as she demonstrates by discussing some of its challenges. Dorothy Edgington provides the reader with an introduction to and overview of the nuances required for understanding counterfactual conditionals, those that tend to be about unrealized possibilities. The most common treatments, due to David Lewis and Robert Stalnaker, respectively, have availed themselves of a framework of possible worlds to account for the conditions under which these conditionals are true or false.

These conditionals concern possibilities, but only some within a region of logical space where things mostly resemble how things actually are. Our attention to the array of possibilities must be restricted when thinking about counterfactuals. Let the relevant unrestricted modality be metaphysical modality. Daniel Nolan shows how some of the same problems—such as giving accounts of the contents of belief—and some of the same methodological considerations—assessing theories according to their value—lead to taking impossible worlds no less seriously than possible worlds. In the end, the scope of modal realism may turn out to be even broader than initially anticipated. Brian Leftow closes this part of the handbook with a challenge to a nearly universal assumption, i.e., that so-called logical space has no origin. It just is what it is. Continuing with attention to philosophical method and to common Ockhamist tendencies amongst philosophers, Leftow proposes that we rethink the standard no-origins thesis about logical space.

Part 2 moves attention away from a direct focus on worlds to the relations, if any, between modality and issues of whether objects have essential properties—those without which they could not exist—and whether there are relations of ontological dependence amongst objects or phenomena. If there is non-causal, ontological dependence, then some things will be prior to or metaphysically more significant than others, even if all exist necessarily. Penelope Mackie begins this portion of the volume with an article on essentialism and modality, noting that some use modality to articulate essentialism, while others not, and some even reverse this order of treatment. Boris Kment follows this with a complementary piece on *de re* modality, where his discussion revisits concerns, some made prominent by W. V. Quine, about the legitimacy of any attributions of necessity to individuals and whether quantifying into modal contexts is philosophically well behaved. By way of discussing whether qualitative identity fixes numerical

identity, Kment ends by discussing modal contingentism, whether claims of the form $\Box P$ and $\Diamond P$ are themselves necessary. This provides a route into the issues that concern Benj Hellie, Adam Murray, and Jessica Wilson in the essay that follows. They give a formal framework for what can be thought of as a classical treatment of metaphysical modality. After introducing the reader to puzzles that arise on this treatment, they suggest that philosophical sophistication requires relativized metaphysical modality, demanding a significantly more complex semantics to account for plausible judgments about how it is that some things are not possible, but could be. As simple uses of possible worlds may not suffice for all philosophical purposes, so possible worlds themselves may be insufficient for some purposes to which they have been put, without pragmatic considerations. Fabrice Correia surveys relatively recent developments in thinking about metaphysical matters, specifically developments regarding grounding and ontological dependence. Metaphysicians sometimes think that one phenomenon explains another, when that explanatory relation is not causal and may even involve matters that are themselves necessary. Grounding and ontological dependence are to be the relevant explanatory metaphysical relations. The most natural ways of understanding these relations is in terms of modality. Scott A. Shalkowski closes this part of the book with a focus on whether modality is reducible to non-modal items. Since Mackie's essay has covered the challenge from essentialists, such as Kit Fine, E. J. Lowe, and Bob Hale, Shalkowski focuses attention on other reductive programs intended to undermine the thesis that modality is primitive, metaphysically ineliminable. If modalism is correct, then possible worlds cannot be used in service of ontologically serious claims, even if their heuristic and modeling virtues remain intact.

Up to this point, the literature surveyed and critiqued has assumed that modality is something real, something objective, something discoverable. Part 3 contains three contributions

questioning this assumption. John Divers helpfully begins with a taxonomy of different kinds of realism about modality—ideological and ontological—and correlated kinds of anti-realism. As one may well have come to expect, the issues are often subtle, and navigating them requires great care. Ross Cameron follows with an entry on modal conventionalism. As Divers distinguished different forms of (anti-)realism about modality, so Cameron guides us through conventionalisms of varying degrees of sophistication. Amie Thomasson closes this part of the book by noting ontological and epistemological problems for modal claims, when interpreted realistically. She argues that typical modally qualified metaphysical claims are not really descriptive claims, but are instead normative. Their function is to convey semantic rules and their consequences, thus avoiding difficulties in the epistemology of modality.

That knowledge of necessity and possibility should be accounted for by those thinking that reality is modally informed has led to the development of various approaches to the epistemology of modality. Part 4 contains essays on some of the most significant attempts to address these matters, without taking anti-realist options. Sonia Roca-Royes kicks off this part of the handbook by bringing to our attention the integration challenge. Intuitively, the challenge is quite general: claims we are inclined to make should be those to which we can have epistemic entitlement. Though the challenge is not limited to the philosophy of modality, Roca-Royes moves past the intuitive formulation of the challenge to note some of the varieties of issues that arise and the options one has to meet the challenge. One of the most natural ways to engage claims of possibility and necessity is to think, to cogitate, to engage in trying to conceive of how things could be, even if they are not, and of how things go beyond our capacity to conceive of things. M. Oreste Fiocco's chapter discusses the prospect of this armchair route into modal knowledge, concluding that ultimately conceivability is idle, epistemically speaking, and thus not

suitable for modal epistemology. Having prompted the current interest in the integration challenge, Christopher Peacocke proposed a principle-based account of metaphysical necessity. Since he introduced this account in 1999, it has been subjected to challenges. In his contribution to this volume, Peacocke addresses those challenges in a defense of his rationalist approach to the epistemology of modality generated from a theory of modal understanding. In contrast, Timothy Williamson has argued that there is a close link between the metaphysical modality and counterfactual conditionals. In his essay here, Williamson defends his account of our knowledge of modality by way of our knowledge of counterfactuals through the development of counterfactual suppositions. Both Peacocke's and Williamson's views deviate in their respective ways from what had been, at least until the 1970s, a rather standard, even if not wholly uncontroversial, claim that knowledge of necessity is a priori—it is not tied, in one way or another, to experience. Albert Casullo's contribution takes readers through important nuances and complexities regarding the nature of a priori knowledge itself, as well as its alleged involvement in knowledge of necessity. Finally, intuition is often used in metaphysical discussions to label some basis for judgment. Anand Vaidya closes this part of the volume by focusing on intuition. After considering the kind of mental state intuition is and whether the mental faculty from which intuition emerges is reliable, he advances an intuition-based account that recognizes the role played by a social dimension in knowledge of modality.

In the foregoing chapters, some attention is given to the relatively common view that if there is modality at all, there are different kinds. Perhaps there is a basic, most general kind and others are restricted by holding some things fixed. If the most fundamental, absolute, necessity can be axiomatized, think of a restricted necessity as that articulated with additional axioms. Different modalities structured in this way permit us to make sense of something being both

necessary and contingent while saving ourselves from contradiction. We are unable to violate laws of nature, if such there be. Yet, these laws might themselves be contingent. So, there may be some actions that are both possible and impossible for me. In one, say, metaphysical sense, we can violate laws of nature because those laws are themselves contingent, yet at the same time there is a sense that we cannot violate those laws, since we live in a world governed by those laws.

Part 5 takes us away from metaphysics broadly and focuses attention on the role that modality plays in the articulation and understanding of science. Laws of nature are the most common locus of necessity. Steven French begins this part of the handbook with some direct examination of the status of laws in the context of modern physics. Three major views are discussed: Humean eliminativism of the modal status of laws, its reduction by way of dispositions, and its treatment as primitive, as is articulated in ontic structural realism. When distinguishing laws of nature (i.e., nomic regularities) from accidental regularities, we often advert to counterfactual conditionals, those expressing that had reality been different in one respect, it would have also been different in some other respect. Marc Lange sketches an account of the interrelations of laws of nature, their attending nomic necessity, and counterfactual conditionals. If there are laws of nature that science sometimes discovers, in what terms are those laws formulated? They report nomic facts about what? One natural answer is that as well as uncovering nature's constraints—the laws—science also uncovers its natural objects that fall into natural kinds. Alexander Bird revisits the reintroduction of natural kinds into philosophical discussions via concerns about theories of reference by Saul Kripke and Hilary Putnam. This discussion was instrumental in bringing back into fashion essentialism, specifically but not exclusively, essentialism regarding natural kinds. Science, on their views, uncovers not the mere

fact that water is H_2O, for example, but that water is essentially H_2O. It could have no other structure. Sam Fletcher follows with a broad survey of how modality is thought to figure in physics, charting issues regarding not only the status of laws, but also specific issues that arise for thermodynamics and statistical mechanics, space-time theory, and quantum theory. Ned Hall closes this part of the volume by arguing for the unorthodox idea that the real struggle in the philosophy of modality is not to find room for a modality appropriate for the sciences. Rather, the struggle is to find a place for so-called metaphysical necessity. Necessity's role is primarily in explanation, and that seems to be the domain of the physical modality.

On the received view about these matters, mathematics and logic are common sources of instances of what are supposed to be necessary truths: 7 + 5 does not just happen to be 12, it must be. Similarly, assuming classical logic, there seems to be no way around Q following from $P \rightarrow Q$ and P. Part 6 is devoted to the role that modality plays in these disciplines. Øystein Linnebo and Stewart Shapiro begin by showing how modality has entered into accounts of mathematics, first in accommodating the objectivity of mathematics when platonic objects are rejected and also in making room for the potentiality of infinity. Modality is useful, though, even when an objective mathematical ontology is granted. How does that ontology behave when we account for multiple possibilities and the relations between concrete objects and the sets to which they belong? Those are issues discussed by Chris Menzel in his chapter on modal set theory. Suppose, with Linnebo, Shapiro, and Menzel, that modality is required for a proper understanding of mathematics. What exactly is the import of that modality? What is its logic? There are, of course, many different formal systematizations of the logic of modalities. Bob Hale takes us through issues bearing on the logic of metaphysical modality. As there are different claimants to metaphysical necessity, there is a plurality of non-modal logical systems. Otávio

Bueno sets out the thesis not just that there is a plurality of logics, but that one should be a pluralist in one's embrace of a multiplicity of logics as in good, useful standing, arguing that modalism permits this embrace in a way that other approaches do not.

Finally, this handbook treats the reader to some important historical antecedents to the present currents in the philosophy of modality. Robin Smith introduces Part 7 by presenting the developments of the logic of modality in Ancient Greek philosophy. Stephen Read notes the continued influence of Aristotle in the medieval period as he presents how thinking about modality developed amongst influential medieval thinkers. Earlier, Brian Leftow invited us to consider the prospect of the space of possibilities having an origin. Descartes is (in-)famous for having maintained that seeming necessary truths are subject to divine will or creation. Alan Nelson's contribution examines what Descartes actually maintained about modality, divine attributes, clear and distinct ideas, and the like, to determine both what Descartes's understanding of modality was and whether Descartes held the view some have attributed to him. David Hume was a well-known critic of many aspects of Descartes's philosophy. Famously, he questioned whether we are entitled to think that causal relations involve any kind of necessity at all, and he maintained that necessities were relations of ideas rather than matters of fact. Peter Millican explores Hume's treatment of modality and whether Hume had the resources to unify causal and conceptual modalities. Kant's difficult but influential philosophy can hardly be articulated without modality. Nick Stang provides an opinionated introduction to the role of modality in Kant's critical philosophy, which until relatively recently has received little attention. This handbook concludes with entries on two very influential contemporary philosophers: W. V. Quine and Saul Kripke. Quine has the reputation of being a severe critic of modal discourse, particularly of any that seems to commit users to what he took to be

disreputable Aristotelian essentialism, while Kripke is credited with rehabilitating that essentialism. Roberta Ballarin sets Quine's critiques in their historical context to clarify those critiques and to argue that, in the end, Quine made his peace with modal discourse. John Burgess closes the handbook with attention to Kripke's work, taking readers through Kripke's route to essentialism, his epistemology of modality as well as his more technical work on modal logic and its model theory.

We are grateful to all of the contributors, who have made this handbook a valuable resource to those interested in the philosophy of modality with their significant and philosophically illuminating work. The chapters themselves, along with their accompanying references, will orient readers in shaping their own understandings of modality and its importance.

References

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