Epistemology of Modality: Between the Rock and the Hard Place

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We review some of the major accounts in the current episte-mology of modality and identify some shared issues that plague all of them. In order to provide insight into the nature of modal statements in science, philosophy, and beyond, a satisfactory epistemology of modality would need to be suit-ably applicable to practical and theoretical contexts by limited beings. However, many epistemologies of modality seem to work only when we have access to the kind of knowledge that is at least currently beyond our reach. Or, in the extreme case, it is argued that even if we knew all the relevant infor-mation about the respective domain – or even the entire state of the world – there would still remain a special class of mod-al truths that would be left unaccounted for. Neither picture bodes well for practical applicability, nor for the philosophi-cal justification of these epistemologies. This is especially the case as we hold that one of the main motivations for modal inquiry typically arises in cases of imperfect information and limited cognitive resources. We close by providing a partial remedy to the situation by suggesting an overall framework of relative modality (RM) that can be used to both unify some existing modal epistemologies and, at the same time, make them more metaphysically modest.

1. Introduction

In this paper, we review and criticize some popular ap-proaches to the epistemology of modality. These include es-sentialism (e.g., Lowe 2012; Hale 2013), conceivability-based accounts (e.g., Yablo 1993; Chalmers 2002; 2010), and certain

philosophical uses of the framework of possible worlds (e.g., Lewis 1986; Nozick 1981, 128–137). Our treatment is by no means complete; there are also epistemological accounts of modality that fall outside the scope of our discussion, including, but not limited to, variations and combinations of the aforementioned positions. However, our purpose is to highlight what we see as a general trend amongst the standard philosophical answers to the epistemological challenge of modalities. We think that the approaches are far too often driven by background assumptions that lack adequate epistemic justification. As a result, instead of giving us tools to tackle puzzling cases of modalities in science, philosophy or ordinary life, these theories rather lead to further philosophical problems. In a nutshell, they tend to either explain our modal access by positing explanantia that are themselves epistemically highly problematic or, failing to or not attempting to explain our modal access, they lead to forms of modal skepticism.

We think this situation is problematic for many reasons, chief among them the fact that modalities are an integral part of our scientific and everyday reasoning. Ideally, we would like to see an epistemological theory of modalities that is at once without obvious philosophical problems and can do justice to our actual epistemic practices. Indeed, the existing accounts of modality seem to be in stark tension with the pragmatic rationale behind modal reasoning. Moreover, since modal language is often invoked in the context of limited knowledge (e.g., Dray 1957, 165; Wimsatt 2007, 130–131), it would be good if our epistemological theory could also say something about these situations. That is, something other than that they are *all* unjustified. Surely some of these modal claims are still epistemically more (or less) warranted than others?

After reviewing the standard answers in the epistemology of modality, we close with a short account of our own that should provide a partial remedy to the situation. More precisely, we sketch an overall framework of relative modality (RM) that can be used to unify some existing modal epistemologies and, at the same time, make them more metaphysi-

cally modest.[1] RM is concerned about what is kept fixed in publicly evaluable systems, scenarios, models, theories, and other vehicles of inference-making (for a precursor of this kind of view, see Quine 1982). The epistemology of modal statements thus becomes an internal question of the features and boundary conditions imposed by the system in question. These system features are then typically justified externally through experiments, manipulations, and so on. In certain contexts, they may even be simply stipulated. Our picture complements a parallel line of argumentation developed recently by Fischer (see Fischer 2016; 2017). However, contrary to Fischer's Theory-Based Epistemology of Modality (TEM), our view does not impose strong veridicality conditions or elements of accompanying mental models in modal justification. RM is also very flexible because its basic principles can be applied without much modification to science, philosophy and ordinary cases of modal reasoning.

The structure of the paper is as follows. In the next section, we introduce the problem of epistemic modal access. The following three sections then review and criticize the standard answers to this challenge. Section 3 focuses on essentialism, while Section 4 investigates conceivability-based accounts. In Section 5, we discuss some basic features of the framework of possible worlds and argue that they are often misapplied to give a false sense of epistemic justification for modal claims. Building on these criticisms, we then discuss the overall situation and provide our partial answer by introducing the relative modality (RM) framework in Section 6. Finally, Section 7 concludes the paper.

2. Epistemologies of Modality: Gaining Access

Central among the questions about modal statements are the following: (i) are there modal facts or truths?, and (ii) if there are, how do we come to know, or gain access, to them? The second of these questions will be our primary concern here – the epistemology of modality. But we will also say something about (i), since if there are no modal facts, the epistemology of modality will be rather useless.

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[1] For a more comprehensive account of the proposed epistemology of modality, see Hirvonen, Koskinen and Pättiniemi (forthcoming).

In his book *Modality* (2003), Joseph Melia gives the following argument for the indispensability of modal facts. Let us assume that we have a theory of the world that contains only and all facts about the state of every object, past, present, and future (Melia 2003, 1). It might state, say, that the chair at the southwest corner of an attic weighs exactly 5.6735 kg, and that ten years hence it will be in the basement instead of the attic. Both these statements will be true. But does this theory contain all truths? Melia does not think so. It would encompass truths about epistemic modalities, but other kinds will be left out; namely, truths "that go beyond the merely actual and tell us something about how things might be, or must be, or would be had things been other than they actually are" (Melia 2003, 3). Indeed, the theory will not contain any informative facts about possibilities, necessities, counterfactuals, and so on. Here we are led to quite a strong version of modal skepticism. Nevertheless, it is worth asking: would there even be any need for modalities under Melia's scenario? We are not convinced that there would be. To see this, let us take a look at the indispensability of modal statements.

So, do we really need modal statements for anything? Indeed, we do. They allow for prediction and control and assignment of causes and culpability. What, after all, is prediction if not the determination of possible (or necessary, if we are lucky!) future states of a system? And control is just prediction combined with an intervention aiming at serving our goals. As an illustration, we will briefly consider a timely example from the science of climate models.

A climate model is basically a set of equations that characterize the dynamical and thermodynamical processes in the atmosphere and the oceans, with a set of initial conditions and parameters that characterize the state of the atmosphere and the oceans, and of differing 'drivers' of climate change, such as forcing caused by the increase of carbon dioxide in the atmosphere (Neelin 2011, chs. 3 & 7).[2] Such models are built to facilitate a better understanding of the Earth's climate

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[2] Also, many processes, such as cloud formation, will be added as parameters due to their complexity. The whole nature of climate models need not concern us here, but for those wishing to learn more, Houghton (2005), in addition to Neelin's book (2011), is a good starting point.

and of climate change. Climate models allow us to determine the causes of, say, past and present warming events and to compare the differences in the drivers of such events. This is accomplished through a counterfactual analysis; what would have had to have been different to cause a different outcome?[3] The models can also be used to predict, or make *projections*, of future climate, given differing interventions on factors such as greenhouse gas production. Indeed, the most interesting output from climate models is not what will happen if things stay as they are now, but how things *can* be if we change the current situation. That is, (1) what are the possible future states of the climate, and (2) how can we bring these about? (Meehl et al. 2007; Neelin 2011, ch. 7.) In other words, climate models tell us not just how things are, but *why* they are as they are (the causes of climate change) and, further, they allow us to predict and, hopefully, to control the climate. Therefore, climate models are *modal* in an interesting and indispensable way.

The example of climate models illustrates a more general pattern across science and in more ordinary matters: modal statements are indispensable. Their indispensability comes from the fact that we do not have Melia's grand theory; that is, we are not all-knowing. An all-knowing being would have no need to know whether something will happen out of necessity or only contingently: it simply will happen. The same holds for counterfactuals, causes, culpability, and so on. The theory will tell us what has happened, what is happening, and what will happen, even our (futile) attempts to change events. A world with such a theory will be a necessitarian one.[4] Because of this, Melia is wrong in thinking that such a theory would leave something out: it would not. However,

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[3] This is not to say that a counterfactual analysis of the *metaphysics* of causation is necessarily correct, but rather that we need it to pick out causes in our systems of interest.

[4] Is this saying too much since one cannot reason from actuality to necessity? The problem that omniscience brings is that if one *knows* the future state of a system, then that state will occur; otherwise, one would *not* have known it. Whether one chooses to call this "necessary" will be a matter of taste. Formally it seems to bear all the hallmarks of necessity. A world with Melia's grand theory will be practically indistinguishable from a necessitarian one.

we have good reasons to think that such a theory is not to be had. For us limited beings, modalities are not a thing to be excised from a mature science, but rather the very *point* of science. They are that which allows for explanation, understanding, control, and prediction. Scientific theories are modal to their *core*. Now we get to our main question: given that modal statements are needed, do we then know any modal facts? And even more importantly, how do we gain access to them?

Current epistemologies of modality are often built up from metaphysical theories concerning modalities. They try to get from what modalities *are*, in some metaphysical sense, to how we come to have knowledge of them. We take this to be quite wrong-headed, especially given that we do not have an agreed-upon epistemology of metaphysics. Moreover, if we cannot know the correct metaphysics, we can hardly use it to find out about modalities. So, we take that an epistemology of modality has to start *epistemology first*.

There have, fortunately, been approaches that respect an epistemology first approach. Examples include Bob Fischer's (2016; 2017) Theory-Based Epistemology of Modality (TEM), and Sonia Roca-Royes' (2017) approach that reasons from actuality and similarity to possibility, at least in the case of *de re* possibilities. According to these approaches, one way of gaining (ampliative) modal knowledge is through what actually is the case, combined with manipulation and reasoning from similarity. A second way is based on what we call relative modality (RM): for any system, modal claims are evaluated *relative* to said system. The simplest case will be using classical logic. Simply put, if a claim leads to a contradiction, it will be impossible (relative to the system); if a claim does not lead to a contradiction, it will be possible; if the negation of a claim leads to a contradiction, the claim will be necessary.

If the kind of epistemology characterized above is viable, it goes a long way to show that in the context of science and everyday matters, a metaphysically based epistemology of modality is unnecessary. Further, it seems that many such metaphysical theories can be taken to be instances of relative modality, where the systems in question are not always well

justified. To show this, we will take a look at some contenders for an epistemology of modality.

3. Essentialism and Counterfactuals

The most well-known essentialist accounts of modal knowledge come from E.J. Lowe (2012) and Bob Hale (2013). According to Lowe, our knowledge of (metaphysical) modality is based on our ability to grasp the essences of entities. These essences can be expressed through real definitions, and essence is simply what the entity in question is. "Grasping" the essence of something is to *understand* what that thing's real definition is. (Lowe 2012.)

Hale's story of modal knowledge is quite similar to Lowe's. He also starts from the essences of entities and their real definitions (Hale 2013, 133n, 254). Some real definitions can be known a priori. Such cases include analytic truths, like "a cob is a male swan", and our explicit grasping of some relevant concept like "a natural number" or "a square". (id., 255–256.) This a priori way of knowing essences is familiar to us already from Lowe's view. Some essences, however, are not accessible to us a priori through mere conceptual reflection. In these situations, essences are known via empirical investigation together with general essentialist principles, such as "any object is essentially an object of a certain general kind" (id., 259–260, 270). Given our empirical knowledge and knowledge of the general principles, we can obtain knowledge of facts concerning essences covered by the general principles (id., 269). However, in a posteriori cases our knowledge of essences might remain incomplete: perhaps we have not yet been able to figure out all essential facts of an entity but only a subset of them (Vaidya 2018, 235).

The problem here is that the essentialist move merely changes the epistemology of modality to the epistemology of essences. This way of passing the buck does not appear to present a satisfactory answer to our conundrum, for there seems to be less agreement about what properties are essential compared to what sort of claims are necessary. Lowe (2012, 940) even explicitly admits that "philosophers can have honest disagreements about questions of essence." Moreover,

he also states that sometimes we do not fully adequately grasp the essences of things that we are thinking (ibid.).

However, it seems that we can know necessary modal truths without knowing their essences. Consider, for instance, the ellipse. According to Lowe, even though an ellipse can be defined as a type of conic section, such a definition would not capture its essential features. Among the reasons that Lowe offers for the conclusion is that cones cannot be essential for ellipses since ellipses can exist without cones. (Lowe 2012.) Irrespective of whether Lowe is right about this, there seems to be something wrong with his reasoning. After all, we can infer all of an ellipse's properties from the cone-section definition, even those that Lowe considers essential. Thus, if someone does not know the *real* definition of an ellipse, she can nevertheless deduce the same necessary truths from this non-essential definition as from the real one. To take stock, knowledge of essences is not required for inferring modal knowledge, and there are "honest disagreements" about which properties are essential. Thus, we can know necessary truths even if we do not know the essences of things.

Hale's situation is similar to Lowe's. Besides the fact that we might not need the real definitions of entities to have modal knowledge, Hale's account also requires knowledge of general essentialist principles for a posteriori knowledge of essences. It appears to be relatively safe to assume that at this point, there is no agreement about what those principles should be, since there is no agreement among philosophers whether essences exist in the first place. And still, we do seem to agree about modal claims and have modal knowledge.

The situation is similar in the case of Williamson's counterfactual account of modal knowledge. Williamson's conception of the epistemology of modality is founded on our ability to evaluate counterfactual conditionals in our imagination while keeping some "constitutive facts" fixed (Williamson 2007, 164, 170). Even though Williamson does not discuss essences but "constitutive facts", in practice, the constitutive facts play the same role as Lowe's or Hale's essences. In addition, Williamson does not give a detailed account of how we get to know which facts are constitutive (Roca-Royes 2011; Fischer 2016). Still, he does say something about which things should be kept fixed when we are talking about nomic mo-

dalities: what is necessary, possible, and so on, according to the laws of nature under specific circumstances (Williamson 2016).

In Williamson's view, nomic modality requires that the laws of nature – which are discovered abductively – are kept fixed along with "all true claims of identity and distinctness" and "true claims of kind membership and non-membership" (Williamson 2016, 463). But this, in his mind, would already force us to the domain of metaphysical modality. Claims like "Hesperus is Phosphorus" and "Hesperus is not a quark" are not something that natural laws can tell us (ibid.). Hence, Williamson claims, metaphysical modalities are needed to make nomic modalities consistent to avoid blatant inconsistencies like "Hesperus is *not* Phosphorus" or, by the same token, "Hesperus is *not* Hesperus" (ibid.).

The problem with Williamson's approach is that for nomic modality, the relevant claims of identity and kinds are either already fixed through similar scientific research as the laws of nature or it is not clear how the additional claims should be fixed. This presents us with two options. On the one hand, either nomic or natural modality does not require additional metaphysical information besides the ontological commitments that scientists have already made. On the other hand, we need a separate epistemology for the metaphysical claims, and there does not appear to be agreement about what that epistemology should be like. However, it seems evident that the first option is right: we have adequate ways of evaluating natural modalities based on scientific research. Indeed, Williamson's troubles look very similar to those that Lowe and Hale have to face.

4. Conceivability as the Modalist's Guide

Deriving metaphysical possibility from conceivability has an illustrious history. Among the famed defenders of this line of thinking is no lesser a figure than David Hume:

> 'Tis an establish'd maxim in metaphysics, that whatever the mind clearly conceives includes the idea of possible existence, or in other words, that nothing we imagine is absolutely impossible. We can form the idea of a golden mountain, and from thence conclude that such a mountain may actually exist. We

> can form no idea of a mountain without a valley, and therefore regard it as impossible. (*Treatise*, I, ii, 2)

However, we will concentrate on newer proponents of the "conceivability entails possibility" principle, namely Stephen Yablo (1993) and David Chalmers (2002; 2010). Still, the remarks made here will also apply to more classic defenders of the principle such as Hume and, arguably, Descartes.

According to Yablo (1993, 29), *p* is conceivable for a subject *S* if *S* can imagine a world that *S* takes to verify *p*. And, respectively, *p* is inconceivable to *S* if *S* cannot imagine any world that *S* does not take to falsify *p*. Chalmers' conception of conceivability shares much with Yablo's account, but he makes additional requirements on the capabilities of the subject *S*. Or more specifically on the *type* of conceivability, but it turns out that this, in turn, requires much from *S*, more indeed than can be expected from limited cognitive beings.

Like Yablo, Chalmers divides conceivability into several different types, two of which pretty much coincide with Yablo's conceptions and thus are amenable to the same treatment. Unfortunately, the rest are rather technical, and their full explication would take up more space than the present work allows for. What we can say, however, is that the remaining types of conceivability call for "ideal rational reflection" (Chalmers 2010, 143) and thus for ideal rational reflectors; these, in turn, seem to be in a rather short supply.

In Chalmers' parlance, positive conceivability means that a subject can imagine a situation where *p* would hold. On the other hand, negative conceivability means that a subject does not find a contradiction in a situation where *p* would hold. (Chalmers 2010, 144.) Chalmers also makes a distinction between prima facie and ideal conceivability. Roughly, prima facie conceivability is something that limited beings can conceive, whereas ideal conceivability requires ideal rational reflection. (Chalmers 2002, 147; 2010, 143.) As an example, squaring the circle was, at least, negatively prima facie conceivable because those who tried to achieve it did not see a contradiction in the endeavor. But it is not ideally conceivable because squaring the circle is impossible with a finite number of operations.

Last but not least, Chalmers separates primary conceivability from secondary conceivability (Chalmers 2002, 157; 2010,

146). This distinction is based on his version of two-dimensional semantics. Primary conceivability is connected to a proposition's primary intension and the secondary conceivability to its secondary intension. This is best illustrated with an example. Take the question: "Could it have turned out that water is not H_2O?" If one considers the primary intension of the question, then the answer is yes. One can imagine a scenario where it would have turned out that the "watery stuff" in the actual world was something other than H_2O, say, XYZ. However, from the perspective of the secondary intension this is impossible because the term 'water' refers to H_2O in all counterfactual situations, given that water is necessarily H_2O. Since we cannot know a priori that water is H_2O, it is in some sense – the primary sense – conceivable that water is not H_2O. Still, in another sense, due to Kripkean a posteriori necessities, it is inconceivable that water would not be H_2O. After all, if water is necessarily H_2O, then water is H_2O in all possible worlds. (Chalmers 1996, 57–59; 2002, 157; 2010, 146; Vaidya 2015; Feng 2017, 21–23.)

However, here the question arises of why we should use either Yablo's or Chalmers' approach. Presumably, one would not use either method to find out about, say, physical or mathematical possibilities. Let us return to squaring the circle as a simple example to illustrate this.

For centuries mathematicians tried to find a method for squaring the circle, that is, transforming a circle into a square of an equal area through finite steps using only a compass and a ruler. Clearly, these mathematicians did not *consider* their task impossible or *inconceivable*, for if they had, they doubtless would have discontinued their efforts.[5] But, as it turns out, squaring the circle *is* impossible. (Schubert 1891.) This seems to imply that all of those mathematicians who tried to accomplish it, and thought they had conceived of it, were mistaken. Hence, one can err in taking something to be

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[5] Descartes famously distinguished conceivability from imaginability when he pointed out that *imagining* the difference between a thousand-sided and a thousand-and-one-sided polygon would be quite difficult if not impossible. Still, as Descartes points out, it clearly is possible to make a conceptual distinction between the two, and thus, their difference is nevertheless *conceivable*. (Descartes 1984, 50–51.)

conceivable. Note that there are external, intersubjectively evaluable criteria for determining whether a circle can actually be squared. Now, we are left with two options: (1) Claim that the mathematicians who tried to square the circle had not, in fact, conceived of squaring the circle. They merely thought they had. So, then, the problem will be knowing when one has indeed conceived of something. If external, intersubjective criteria are lacking, this task seems impossible to undertake; there will be no intersubjective way of justifying whether one has indeed conceived of something or merely thinks that one has. (2) Claim that the mathematicians had conceived of squaring the circle, but the task just happens to be impossible. Then the link from conceivability to possibility will be severed. Therefore, the conceivability-to-possibility principle is either incorrect or limited in its scope because it requires less limited beings than mere humans.[6] If the principle is not reliable in mathematics, why would we take it to be reliable in a field where justification is even harder to come by, namely metaphysics?

Furthermore, Peter van Inwagen (1998) has argued that if conceivability is a guide to possibility, then we need to conceive all the required steps for really conceiving the thing. His examples are transparent iron and purple cows. If someone indeed claims that these things are (metaphysically) possible because they are conceivable, then they should actually con-

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[6] In an unpublished manuscript, "The Unsoundness of Arguments From Conceivability", Andrew Bailey has presented this very same argument, namely, that as cognitively limited creatures, we are unable to determine whether something is ideally conceivable or not. Chalmers has responded to him by citing instances of clearly prima facie conceivable or inconceivable things that are also ideally conceivable or inconceivable: "Although we are non-ideal, we can know that it is not ideally conceivable that 0=1 and that it is ideally conceivable that someone exists. We know that certain things about the world (say, that all philosophers are philosophers) are knowable a priori and that certain things about the world (say, that there is a table in this room) are not so knowable even by an ideal reasoner." (Chalmers 2010, 155.) However, even if we can know that 0=1 is not ideally conceivable, that does not yet, in itself, give us good reason to think that some metaphysical ideas (such as philosophical zombies) are ideally conceivable. Perhaps such ideas are more alike with squaring the circle: they seem conceivable even if they are not.

ceive the things in question on the physical and chemical levels. That is, what things in the DNA of the cow make its color possible, or what in the structure of the iron could make it transparent. Similarly, what steps are required in squaring the circle. If one really considers it conceivable, one should conceive *all* the appropriate steps needed for the squaring. But this would entail actually squaring the circle or giving a mathematical proof of its possibility. What role would be left for conceivability?

5. Possible Worlds

The last philosophical approach to the epistemology of modality that we examine concerns the logico-semantic framework of possible worlds. This is not so much a specific epistemic theory, but more of an amalgamation of approaches and strategies that refer to a common formalism. The most classical account of modality in terms of logic is through the idea of non-contradictoriness: possible propositions consist simply of all those things that can be asserted without contradiction. Necessities, in turn, are such that their denial would lead to a contradiction, and so on. However, this classical logical treatment of modality is ambiguous because it, in a crucial way, depends on the domain of investigation and how it is being represented. In order to apply classical logic to any material modalities, choices have to be made as to how to interpret and formalize them, what to include in the domain of the logical calculus, and so on.

In contemporary philosophy, modalities are typically investigated in specially devised modal logics of which there are many axiomatizations. The reigning semantics for these formal systems is provided by the framework of possible worlds (e.g., Kripke 1959; see also Hintikka 1957). Assessment of possibility and necessity is made based on a set of worlds (typically sets of propositions) and accessibility relations between the worlds. So, for example, if Tuomas happens to find himself in a situation where it is raining, the proposition that it is possible for Tuomas to be in a situation where it is not raining is dependent on a few things. Let us say that in our scenario, Tuomas is in a world w. Then, for the alternative possibility to hold, there needs to be another world, call it w',

in which (i) it is not raining and (ii) it is accessible from w. Furthermore, we would also like to know that the identity of Tuomas stays the same across these two worlds.

Possible world semantics provides a powerful tool to tackle modal scenarios of various kinds in philosophy and elsewhere. Some philosophers also use possible worlds as a metaphysical theory, the *locus classicus* being Lewis' theory of modal realism (Lewis 1986). However, what is noteworthy is that all the aforementioned basic facts that are required for the complete assessment of modal statements need to be stipulated on a case-by-case basis. Thus, even though it provides a richer representational framework for various purposes, possible worlds semantics does not really go any further than classical predicate logic to explain or ground modalities. All the epistemologically crucial steps happen when the particular stipulations are being made.

What does this mean in practice? Let us look at an example. Typically, possible worlds are evoked to explain why one alternative state of affairs is philosophically more plausible than others. This is manifested in the way philosophers speak about "close" or "nearby" possible worlds. Elaborate arguments are invoked in the context of the analysis of knowledge, for example, where various modal conditions are applied to determine what kind of changes to our actual circumstances we should regard as epistemically relevant (e.g., Nozick 1981, 172–178; Pritchard 2005, ch. 6). Using the framework of possible worlds, philosophers can thus sometimes rule out certain scenarios as far-fetched or irrelevant in the context of their argument. The basic idea here is often quite intuitive. For example, the scenario in which unicorns exist is closer to the actual world than the scenario where both unicorns *and* centaurs exist. This seems to be valid logical reasoning based on the properties of the conjunction connective. But what if we simply compared worlds in which unicorns exist and worlds in which centaurs exist. Which of these possible worlds is closer to the actual world? What is the metric used here, and how could it be justified?

The problem is, unfortunately, that it is precisely the questions of the metric that is often not explicated in philosophical arguments that refer to the closeness of possible worlds (e.g., Nozick 1981, 172–178; Pritchard 2005, ch. 6). Notice that we

are not implying that a sensible metric is not to be had in these kinds of situations, but instead that there are likely to be multiple (formally definable) metrics that could be used in the context of possible worlds semantics. Here, it is the very *choice* of the particular metric that is doing the heavy lifting, not the semantic framework of possible worlds itself. However, as in the case of sciences more generally, no model or representation can justify its utility in isolation from its purpose and application. Thus, possible worlds seem to face similar challenges as the two previous routes to modal knowledge.

6. Discussion

We have argued that all of the above theories face epistemological challenges individually. However, we have not yet considered whether they (and further variations based on them) can also conflict with each other. This is clearly a problem since they aim to describe the correct set of modal facts and our epistemic access to them. Interestingly, however, their possible agreement could also be seen as a problem. For then, the question arises concerning what makes any particular theory of modality special. If a conceivability-based theory of modality gives all the same answers as a counterfactual one, which of these is doing the grounding of our epistemic access? It is also considerations like this that urge us to move more towards the justification of these systems as a whole.

It behooves us now to give a more detailed account of relative modality (RM). Recall from section 2 that according to RM, modal claims are evaluated *relative* to a system. At its simplest, this will be done through classical logic, where statements are possible if they do not lead to a contradiction with the system, necessary if their negation leads to a contradiction, and so on. So, what RM allows for is good reasoning about modal claims *relative* to a given system. What it does *not* give are criteria for the *choice* of a system.

At first blush, relative modality would appear to offer a friendly ground for metaphysical modality. After all, we can evaluate the modal claims of any metaphysical system using RM. But here the modal knowledge gained is only knowledge about a system. If the goal of metaphysics is to say something

about the world, then such knowledge is otiose unless one can show that the system is a good match for reality. Of course, one can construct a system of rules as one sees fit. It is possible to build a system (or theory, model etc.) that does not correspond to reality. So a system can be based on, say, what kinds of rules individuals find amusing, as is the case with games like chess, or on the intuitions of individual thinkers.

Problems arise when one claims that their system describes how things are in the real world. How are we to evaluate whether such a system is any good as a description? One can do this in science by checking whether the predictions of the system match our empirical findings. But this only tells us about natural or empirical modalities. Insofar as empirical testing of certain claims is not possible, how can one check whether the system in question tells us anything about the real world? Hence, one faces the challenge of how to make modal claims non-arbitrary. We claim that one is not justified in accepting the claims until this challenge is met.

There is another problem if metaphysical modality is understood through relative modality. Which metaphysical claims should one fix? According to our relative modality account, metaphysical modalities are founded upon fixing certain claims – claims like Hesperus is Phosphorus, gold is the element with the atomic number 79, cats are animals, Elizabeth II is the daughter of George VI, water is H_2O, and so on. These claims, as themselves, are not yet modal claims. Nevertheless, their fixation as a part of a system is what makes them necessary. But why should these specific statements be fixed as axioms of our ontological system? Why can they not merely correspond to, say, a particular state of play in chess, a certain arrangement of pieces on the board? Why do they instead have to be analogical to the rules of chess?

Kripke, for instance, has argued that the special metaphysical status of these statements comes from the fact that their parts refer to the same entities or substances in all possible worlds. In other words, they are rigid designators. (Kripke 1980.) Indeed, they refer to the same target in the actual world, but to say that they refer to the same target in all possible worlds is to merely state – from the point of view of relative modality – that this is something we should keep fixed.

It does not tell us *why* we should do so. Now, Kripke offers several thought experiments to prove his point. This is all fine, but do not these thought experiments only tell us that we intuitively keep certain things fixed or that we keep them fixed for other than metaphysical reasons, like physical or historical reasons? Thus, the justification for their special metaphysical status remains still unclear.

Now, we are in a position to see that both Lowe's and Hale's essentialist accounts are based on RM. The basic idea behind them is that entities have essentialist properties that are kept fixed. Furthermore, from our knowledge of essences, we can deduce necessary truths. After all, as Lowe states, "any *essential* truth is *ipso facto* a *metaphysically necessary* truth" (Lowe 2012, 938 italics in original). So, here, (metaphysically) necessary truths are derived from the essential properties of our target of inquiry. From these necessary truths, further modal truths can be deduced. If *X* does not contradict any necessary statement, then *X* is possible. If *X* does contradict such statements, then it is impossible, and so on. But this is precisely the way RM deals with modal inferences, only here the system is fixed to be the essential features of the target, or domain, of inquiry. But, as stressed above, why choose either of these systems? The interesting epistemological question is not "what is possible/necessary given a system?" but rather "how to choose a system in which to evaluate modal claims?". Lowe and Hale do not answer this latter question. Thus, given that the machinery through which modal inferences are made is RM and that it is not clear which, if any, claims concerning essences are justified, this essentialist route to modal knowledge is questionable at best.

Similar reasoning holds for both Yablo's and Chalmers' use of the conceivability-to-possibility principle. That is, they are both based on relative modality. Again, possibility is relativized to an individual's ability either to imagine scenarios or infer contradictions. In either case, there is a system, although not one explicitly spelled out, in relation to which a proposition is considered to be possible. And again, Yablo and Chalmers seem to have very little in the way of justification for their preferred system. This, again, leaves Yablo's and Chalmers' approaches questionable.

The above was not an argument for the falsity of any or all metaphysical modal claims. So, we are not saying that metaphysicians advancing metaphysical claims are mistaken. We have merely argued that, at least thus far, they do not have a good justification for such claims.

As a final note, are we not guilty of moving the interesting epistemic questions from the modal claims onto the choice of a system? Indeed we are, but this does not have to be a bad thing. For, insofar as we can justify our choice of a system, we will at the same time gain a way of justifying modal claims. So, when is a choice of a system justified? In the case of, say, scientific models and theories, they are justified by empirical corroboration, consistency with other theories, and so on. In other cases, like the rules of chess, such external justification is not needed. But subjecting our justification of a system to ampliative reasoning will make claims based on RM *epistemic*, at least in some sense. Here lies a risk that we will end up having provided an epistemology only for *epistemic* – and thus subjective – modalities. First, imagining, conceiving and appeals to intuition are also subjective in nature. So, these ways of justifying a system or a claim will be subjective. Second, justification of scientific, mathematical and logical theories is done in an *intersubjective* way. Reasons, results, inferences, and so on, have to be presented in a way that is accessible to others for the scientific community at large to be able to evaluate them.

7. Conclusions

We have criticized some popular approaches to the problem of epistemic access to modal knowledge. These included essentialism, conceivability-based accounts, counterfactual reasoning, and the use of possible worlds as an epistemic grounding of modal claims. We argued that all of these epistemologies seem to work only when we have access to the kind of knowledge that considerably surpasses what can be expected from our scientific, yet piecemeal and cognitively limited, accounts of the world. They then solve this situation through strong metaphysical assumptions or succumb to modal skepticism. Thus, instead of guiding our modal access,

they lead us astray or function as overly officious gatekeepers. This, to us, is untenable.

We argued that some of these worries could be eased if we adopt the framework of relative modality (RM). RM is concerned with what is kept fixed in publicly-evaluable systems of modal inquiry. The epistemology of modal statements thus becomes an internal question of the features and boundary conditions imposed by the system in question. These system features are then typically justified externally through experiments, manipulations, theoretical derivations, or they may even be stipulated. The primary motivation behind this move is not to rule out any particular theory of modalities but rather to make the epistemology of modality methodologically honest.

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