

Counterfactuals and Modal Epistemology

TUOMAS E. TAHKO (www.ttahko.net)

ABSTRACT

What is our epistemic access to metaphysical modality? Timothy Williamson claims that the epistemology of counterfactuals will provide the answer. This paper challenges Williamson's account and argues that certain elements of the epistemology of counterfactuals that he sketches, namely so called background knowledge and constitutive facts, are already saturated with modal content which his account fails to explain. Williamson's account will first be sketched and the role of background knowledge and constitutive facts analysed. Their key role is to restrict our imagination to rule out irrelevant counterfactual suppositions. However, background knowledge is based on the actual laws of physics and does not help in cases where we are dealing with metaphysically possible counterfactual suppositions that violate these laws of physics. As we will see, unless Williamson assumes that the actual laws of physics are metaphysically necessary, he will have to address this problem. Furthermore, Williamson's account is unable to accommodate the distinction between conceivable yet metaphysically impossible scenarios, and conceivable and metaphysically possible scenarios. This problem emerges because background knowledge and constitutive facts are based strictly on our knowledge of the actual world. Williamson does attempt to address this concern with regard to metaphysical necessities – as they hold across all possible worlds – but we will see that even in this case the explanation is questionable. These problems, it will be suggested, cannot be addressed in a counterfactual account of the epistemology of modality.

1. Introduction

Timothy Williamson (2005, 2007a, 2007b) has recently suggested that the epistemology of metaphysical modality is a special case of the epistemology of counterfactuals. His account has already received a substantial amount of attention.¹ However, one aspect of Williamson's account deserves further attention, namely the status of what he calls 'background knowledge' and 'constitutive facts'. This will be the focus of our discussion. Firstly, Williamson's account will be sketched, with special attention to the role of background knowledge and constitutive facts. Secondly, it will be argued that unaccounted modal knowledge is present in background knowledge and constitutive facts, and that this conflicts with Williamson's assimilation of modal knowledge to counterfactual knowledge. Hence, Williamson's account of modal epistemology faces a serious problem. This will be the subject of the second section. Further, it will be argued that counterfactuals cannot serve the role in modal epistemology that Williamson postulates for them due to problems concerning the distinction between conceivable & metaphysically possible scenarios, and conceivable but metaphysically *impossible* scenarios. These problems will be discussed in the third section. In the fourth section we will analyse the role of physical possibility with regard to constitutive facts and finally in the fifth section we will consider Williamson's reply to an objection which is related to the ones raised here.

It should be noted that although we might have some reservations about the formal aspects of Williamson's account, i.e., the manner in which he derives metaphysical modality from the logic of counterfactuals, these will not be discussed here. If our analysis of the nature of background knowledge and constitutive facts is correct, then it makes little difference whether Williamson's formal presentation of counterfactuals and metaphysical modality is correct, as the modal content of the scenarios that Williamson discusses as well as our

¹ See for instance Jenkins (2008) and Roca-Royes (Forthcoming).

epistemic access to it precedes the counterfactual analysis. That is, we must already have epistemic access to metaphysical modality before we can even formulate a counterfactual account of it.

2. Summary of Williamson's account

It is perhaps best to illustrate Williamson's account with the help of one of his examples:

You are in the mountains. As the sun melts the ice, rocks embedded in it are loosened and crash down the slope. You notice one rock slide into a bush. You wonder where it would have ended if the bush had not been there. A natural way to answer the question is by visualizing the rock sliding without the bush there, then bouncing down the slope. You thereby come to know this counterfactual:

[CF] If the bush had not been there, the rock would have ended in the lake. (Williamson 2007b: 142.)

According to Williamson we come to know counterfactuals like (CF) with the help of our imagination. This is something that we do constantly in our everyday lives: we come up with counterfactual suppositions which accurately predict the behaviour of the physical world. However, we are immediately faced with a problem: how are we able to choose the correct scenario – that is, the scenario which most accurately reflects the behaviour of the rock in the absence of the bush – given that our imagination can come up with the wildest of scenarios, such as ‘the rock rising vertically into the air, or looping the loop, or sticking like a limpet to the slope’ (ibid., 143).

Indeed, our imagination² appears to be unrestricted: everything from Disney fairy tales to

2 Williamson (2007b: 163) mainly talks about imaginability as a tool for assessing counterfactuals, but he

philosophical zombies is supposedly imaginable, but whether there is any kind of helpful overlap between what is imaginable (or conceivable) and what is metaphysically possible is another question. There will of course be *some* overlap between them, as everything that is metaphysically possible is presumably also imaginable, at least in principle or by an ideal conceiver, but the range of imagination is so vast that something more is needed. Accordingly, Williamson needs to explain how we restrict our imagination so that irrelevant scenarios can be ruled out. Here is what he suggests:

You do not imagine it those other [irrelevant] ways because your imaginative exercise is radically informed and disciplined by your perception of the rock and the slope and your sense of how nature works. The default for the imagination may be to proceed as ‘realistically’ as it can, subject to whatever deviations the thinker imposes by brute force: here, the absence of the bush. Thus the imagination can in principle exploit all our background knowledge in evaluating counterfactuals. (Williamson 2007b: 143.).

Williamson uses the term ‘background knowledge’ here for the first time, and immediately notes the difficulty in separating between background knowledge and what has to be removed with the help of imagination for one to be able to imagine the antecedent, i.e., the problem of cotenability. This is indeed an important point, but unfortunately Williamson does not discuss it in any detail, he simply states that ‘Difficult though the problem is, it should not make us lose sight of our considerable knowledge of counterfactuals: our procedures for evaluating them cannot be too wildly misleading’ (ibid.). An in-depth discussion about this problem would clearly be needed though and, as we will see, it appears

seems to think that conceivability and imaginability are both aspects of the same cognitive ability. I will use these terms more or less interchangeably, although strictly speaking they are not exactly the same. For our purposes this will not make a difference.

that omitting it has led Williamson to overlook the modal content of background knowledge.

Let us consider the example at hand in more detail. Williamson suggests that our imagination is somehow restricted by our perception of the situation and our ‘sense’ of how nature works. From this starting point, our imagination proceeds as ‘realistically’ as it can. The idea is presumably that our imagination will be restricted by our knowledge of the laws of nature so that we will omit scenarios that are physically impossible. Why omit scenarios that are physically impossible? Well, we are interested in how the rock might behave in the actual world, and the behaviour of the rock in this world is restricted by the (actual) laws of physics. Hence, the reading of ‘physically possible’ that we are using here refers to possibility in virtue of the actual laws of physics. There are of course complications here concerning the metaphysical status of the laws of physics, namely, whether or not the actual laws of physics are metaphysically necessary. For instance, we may have a counterfactual with an antecedent which violates the actual laws of physics, but whether such an antecedent is *metaphysically* impossible depends on whether alternative laws of physics are metaphysically possible. In any case, in the context of Williamson’s example (CF), it is clear that we want to rule out scenarios which violate the *actual* laws of physics, as they would be irrelevant for the behaviour of the rock in this world. It seems that Williamson is most interested in counterfactual suppositions of this type. The purpose of the counterfactual analysis in this case was to determine whether the rock would end up in the lake if the bush had not been there, all other things being equal.

This looks like a simple enough picture: we come up with metaphysically possible scenarios with the help of our imagination. Then our empirical knowledge, that is, our knowledge of physics, restricts our imagination in such a way that we can pick out the scenarios which are compatible with our background knowledge of physics. However, there

are problems with this picture.

Firstly, no explanation is offered as to how we are supposed to be able to pick out scenarios which indeed are metaphysically possible. Our imagination may easily produce scenarios that are not only physically impossible, but also *metaphysically* impossible. The reason why this is problematic is that in the context of Williamson's example (CF), we wish to restrict our imagination so that it proceeds as 'realistically' as possible, and cases where the antecedent of the counterfactual is metaphysically impossible would violate this condition. Perhaps the idea is that our background knowledge of physics will help in this regard as well, as surely anything that is physically possible is also metaphysically possible. But if this is indeed the idea, then it is not quite clear what the role of imagination is in this picture. If we start with background knowledge of the laws of physics, then surely the knowledge of these laws by itself is quite enough to determine the mechanics of a rock sliding down a slope. Admittedly, Williamson thinks that the background knowledge needed here is merely 'folk' physics, but 'folk' physics as well is based on the actual laws of physics. The modal content of the scenario though, or our epistemic access to it, is supposed to be grounded in our imagination, our ability to think counterfactually; but now it looks as if we might be able to analyse the scenario without relying on our imagination at all, simply in terms of our background knowledge concerning physics. At the very least, this means that the role of background knowledge is more important than Williamson initially acknowledges.

In fact, I am inclined to think that imagination does not have any bearing on modal epistemology – the overlap between scenarios that are imaginable and scenarios that are metaphysically possible is too weak to be of any help in determining what is genuinely possible. This suggests that our epistemic access to the modal content of the scenario must somehow be grounded in the background knowledge, for it is with the help of our background

knowledge that we pick the relevant scenarios. Accordingly, it appears that background knowledge is not modally innocent.

There are some further points that need to be taken into account here. In the scenario at hand, we are interested in physical possibility, because this subspecies of metaphysical possibility is what is relevant for the behaviour of the rock in the actual world. We wish to rule out cases where the antecedent of (CF) is physically impossible because the purpose of the counterfactual is to predict how the sliding rock would actually behave in an alternative scenario – we are not generally interested in scenarios which are physically impossible, even though philosophers sometimes do talk about such scenarios. As was suggested above, it seems that our background knowledge of physics may be sufficient for the purposes of determining what is physically possible, at least if we assume that the laws of physics are metaphysically necessary. This can be determined by checking whether a given antecedent violates the laws of physics.

3. The role of imaginability/conceivability

A question remains though: what about scenarios that are physically impossible but metaphysically possible? Is Williamson's account able to distinguish between these scenarios and metaphysically impossible scenarios which are nevertheless conceivable? Williamson's account is able to accommodate physically possible scenarios in virtue of our background knowledge of physics, but what could serve a role similar to background knowledge in scenarios which are merely metaphysically possible? More generally, if our background knowledge concerns the actual world, how can we restrict our imagination regarding scenarios that do not concern the actual world? It seems that Williamson does not even consider cases like this, but unless he implicitly assumes that the laws of physics are

metaphysically necessary, then he must somehow be able to distinguish between physical possibilities and physical impossibilities which are metaphysically possible.

One way to go here would be to argue that conceivability (or imaginability) entails metaphysical possibility (cf. Chalmers 2002), and then proceed to restrict metaphysical possibility in terms of background knowledge, as we saw above. However, further problems emerge if this route is taken, for it seems that conceivability does not provide us with sufficient tools to distinguish between metaphysical possibilities and metaphysical impossibilities.³ Chalmers and others have attempted to address this problem, but Williamson himself does not explicitly refer to any of the offered solutions, and it may be the case that his account is not even compatible with these solutions. In any case, this is something that he should address. Background knowledge is of course of no help here, as the metaphysical possibilities we are now considering are the ones which are inconsistent with the actual laws of physics and hence physically impossible, whereas background knowledge concerns the *actual* laws of physics. So, how do we distinguish between physically impossible scenarios which are metaphysically possible and physically impossible scenarios which are metaphysically impossible?

A visual illustration might help to clarify the situation (cf. *Figure 1*). We are interested in the distinction between the left and the right half of the circle, i.e., between what is

³ Furthermore, I do not think that two-dimensional modal semantics solves the problem, as the two-dimensional framework fails to distinguish between trivial a priori truths such as ‘All water is water’ and substantial modal truths such as ‘Water has its actual molecular structure in all possible worlds’; both sentences appear to necessarily have the same primary and secondary intension. This is not the place to discuss the two-dimensional approach in more detail though, the goal here is to demonstrate that Williamson’s use of conceivability is unsatisfactory, and he is no two-dimensionalist. For some discussion on the differences between Chalmers’ and Williamson’s accounts of conceivability, see Roca-Royes (Forthcoming).

conceivable & metaphysically impossible and what is conceivable & metaphysically possible. The latter includes both physically possible and physically impossible scenarios. An example of the first could be that water is XYZ (if water has its actual molecular structure by necessity), an example of the latter could be a rock floating above a lake, which would fall into the category of the physically impossible. Some further qualifications are needed though: there is of course no overlap between what is conceivable & metaphysically impossible and what is conceivable & metaphysically possible – the two are mutually exclusive – but the set of what is conceivable & physically possible is a proper subset of what is conceivable & metaphysically possible, as everything that is physically possible is also metaphysically possible.

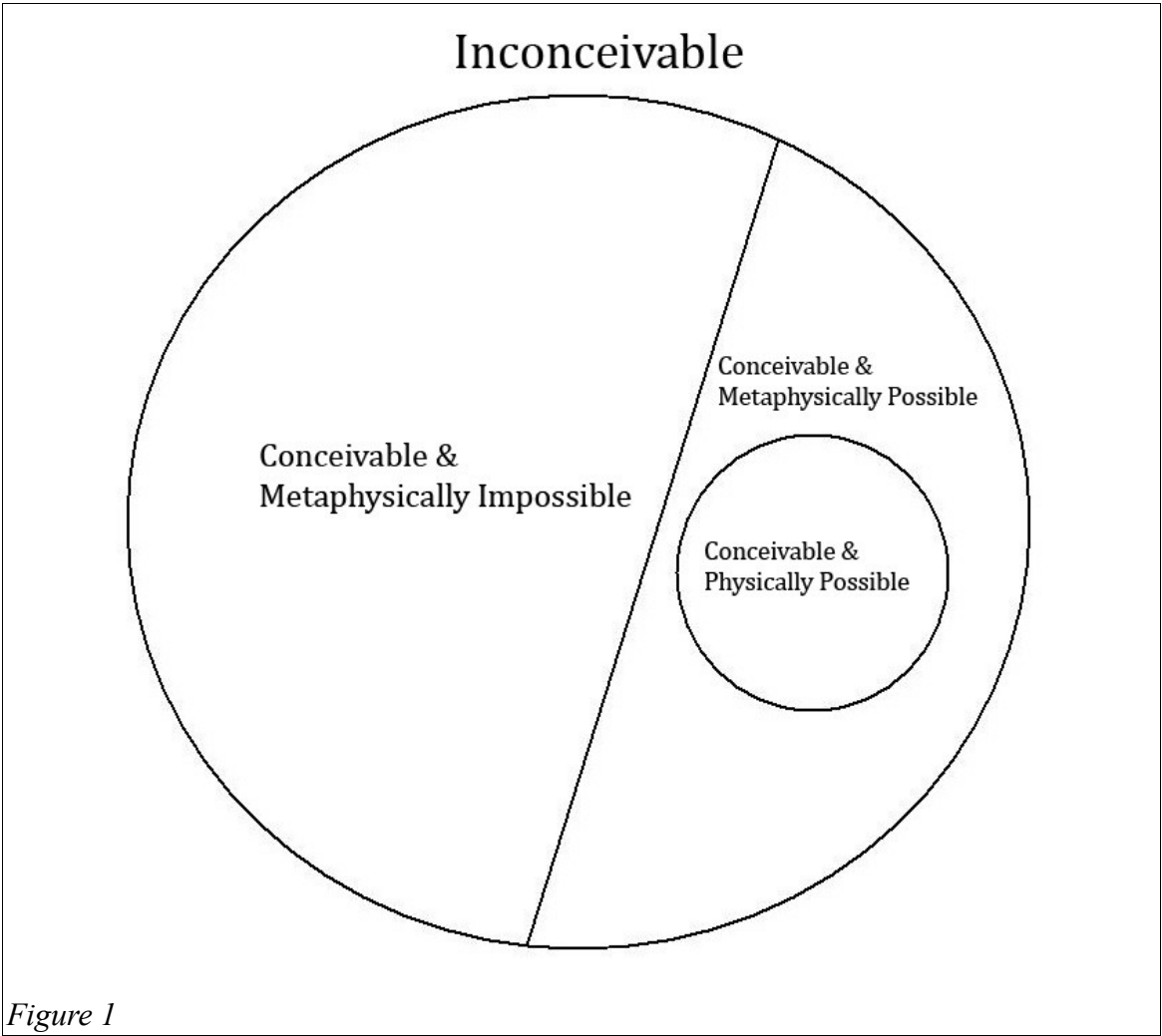


Figure 1

Obviously, there is an overlap between what is conceivable and what is metaphysically possible, but given that there is also an overlap between what is conceivable and what is metaphysically impossible, the previous overlap does not entail a reliable epistemic link between conceivability and metaphysical possibility. In fact, it seems clear that there will be a *greater* overlap between conceivability and metaphysical impossibility, due to the virtually infinite range of scenarios that we can imagine. Thus, when we compare the space of conceivable & metaphysically impossible scenarios to the space of conceivable & metaphysically possible scenarios, the previous will certainly dominate. If we hope to use conceivability as a reliable guide to metaphysical possibility, we should somehow be able to distinguish between the two.

So, what would be needed for us to be able to distinguish between the left and the right half of the circle, between metaphysical possibilities and metaphysical impossibilities that are nevertheless conceivable? Williamson is not in the same boat with those who have developed sophisticated but controversial accounts to defend the connection between conceivability and possibility (e.g., Chalmers 2002). Chalmers for instance relies on two-dimensional modal semantics to salvage a sense of conceivability that has a bearing on metaphysical modality⁴, but Williamson does no such thing. Indeed, he seems to be wary of some of these accounts himself, although he does wish to underline the use of imagination in evaluating counterfactuals. At any rate, Williamson does acknowledge that there are scenarios which are conceivable & metaphysically impossible, such as water not containing oxygen:

Discussions of the epistemology of modality often focus on imaginability or conceivability as a test of possibility while ignoring the role of the imagination in the assessment of mundane

4 However, Chalmers seems to think that metaphysical and conceptual possibility are co-extensive, in which case the line dividing the left and the right halves of the circle in *Figure 1* could be removed altogether.

counterfactuals. In doing so, they omit the appropriate context for understanding the relation between modality and the imagination. For instance, scorn is easily poured on imagination as a test of possibility: it is imaginable but not possible that water does not contain oxygen, except in artificial senses of “imaginable” that come apart from possibility in other ways, and so on. Imagination can be made to look cognitively worthless. Once we recall its fallible but vital role in evaluating counterfactual conditionals, we should be more open to the idea that it plays such a role in evaluating claims of possibility and necessity. (Williamson 2007b: 163.)

Williamson appears to be using ‘imaginability’ and ‘conceivability’ interchangeably here; I have opted to use ‘conceivable’ above, but nothing crucial hangs on this choice of terminology. So, Williamson acknowledges the problems associated with conceivability and possibility, although he does not explicitly discuss the problem at hand, namely how to distinguish between the left and the right half of the circle in *Figure 1*. However, he does hint towards an answer, at least regarding cases such as ‘gold is the element with atomic number 79’. Once again he relies on background knowledge:

If we know enough chemistry, our counterfactual development of the supposition that gold is the element with atomic number 79 will generate a contradiction. The reason is not simply that we know that gold is the element with atomic number 79, for we can and must vary some items of our knowledge under counterfactual suppositions. Rather, part of the general way we develop counterfactual suppositions is to hold such constitutive facts fixed. (Williamson 2007b: 164.)

Williamson seems to provide a partial answer to the problem, for supposedly we can dismiss the conceivable but metaphysically impossible scenario of gold having some other atomic number than 79 with the help of ‘constitutive facts’, i.e., background knowledge that we do *not* vary when considering counterfactual scenarios. The manner in which the method reveals that we must hold constitutive facts fixed is that any counterfactual supposition which

fails to hold such a fact fixed will generate a contradiction. This enables us to distinguish between conceivable metaphysical impossibilities and metaphysical possibilities. However, this solution will not work in all cases: it only works in cases where we are dealing with metaphysical necessities, such as ‘gold is the element with atomic number 79’.⁵ This is because in cases where we are dealing with mere metaphysical possibilities we should be able to vary many more items of our knowledge under counterfactual suppositions: in cases such as the rock sliding down a slope the possibilities for variation are much greater – even the laws of physics may be varied unless it is assumed that they are metaphysically necessary, which is something that Williamson does not argue for. So, it appears that only metaphysically necessary constitutive facts could help in addressing this problem, but many counterfactual suppositions do not involve *any* metaphysically necessary constitutive facts – apart, perhaps, from the requirement of being non-contradictory. Indeed, even Williamson’s own example concerning the sliding rock (CF) seems to lack such constitutive facts.

4. Constitutive facts and physical possibility

The upshot of the previous section is that unless there are some metaphysically necessary conditions that serve as clear candidates for constitutive facts that should be held fixed, such as the fact that elements have their atomic number by necessity (if this is indeed the case), then there are no obvious criteria which would help us to decide which items of background knowledge should be held fixed. Thus, it is not clear how we can constrain our imagination so that metaphysically impossible variations are ruled out, except in cases where we are dealing

5 It should be noted here that although ‘gold is the element with atomic number 79’ is indeed generally considered to be a metaphysical necessity, this is by no means uncontroversial, at least unless the metaphysical necessity of the laws of physics is assumed. See Lowe (2007), Hendry (2006), and Tahko (2009) for further discussion; the problem has also been noted by Salmon (2005).

with metaphysical necessities. But even in cases such as ‘gold is the element with atomic number 79’ we ought to have some good reasons to think that the atomic number *is* a constitutive fact. It would be interesting to hear what Williamson has in mind in this particular case. He suggests that ‘if we know enough chemistry’, any counterfactual supposition which varies the constitutive fact that gold is the element with atomic number 79 will generate a contradiction. This claim could be unwarranted: there may very well be perfectly consistent, metaphysically possible accounts of elementhood which are based on something else than atomic number. For instance, Robin Hendry (2006) has recently suggested that rather than atomic weight, we should use nuclear charge as the defining characteristic of elementhood. Whether or not Hendry’s suggestion is correct, it is certainly not contradictory, and this by itself presents a counterexample to Williamson’s claim. Indeed, to determine that a certain fact is constitutive seems to require knowing that varying that fact in a counterfactual supposition would lead to a contradiction. How could we possibly know this except by trying to imagine every possible scenario? The only way out seems to be that we must have some modal knowledge of metaphysical necessities that precedes the counterfactual assessment.

These problems emerge because Williamson relies on our knowledge of the actual world to fix constitutive facts, but some metaphysically possible scenarios might not have any bearing on the actual world. What I mean is that ‘our sense of how nature works’ (2007b: 143), which is central for Williamson’s account of constitutive facts, is based on actual observations of how nature works rather than, say, conceivability.⁶ But metaphysical modality is surely not restricted by how nature works in the *actual* world: for instance, a different set of laws of physics may be possible. Hendry’s suggestion concerning elementhood is another good example: it is a consistent, apparently metaphysically possible scenario. Hendry’s suggestion and the conception of elementhood in terms of atomic weight cannot *both* ‘carve

⁶ This has also been noted by Roca-Royes (Forthcoming).

nature at its joints', but they both appear to be metaphysically possible, at least unless we assume that the actual laws of physics are metaphysically necessary. This means that once again we have two metaphysically possible scenarios, only one of which can be physically possible (where physical possibility is understood as possibility in virtue of the actual laws of physics), yet Williamson's method is unable to distinguish them because it completely omits metaphysically possible yet physically impossible scenarios.

The crucial shortcoming here is that insofar as our background knowledge is based on empirical information, it will be of no help in cashing out the full extent of metaphysical modality. It *will* of course help in determining what is *physically* possible, but this is merely a proper subset of metaphysical possibility. Examples such as 'gold is the element with atomic number 79' may create the illusion that we have a working theory because metaphysical necessities are an obvious candidate for constitutive facts, but cases where no such constitutive facts are forthcoming will be more challenging, and we have just seen that this is problematic even in the case of elementhood.

Williamson does attempt to address a related objection (2007b: 169 ff.), and we will consider his reply shortly. However, it would be unfair to Williamson to dwell on this point for too long: the literature concerning supposed metaphysical necessities such as 'gold is the element with atomic number 79' or 'Water = H₂O' is well established. Nevertheless, legitimate concerns about these supposed metaphysical necessities can be raised. We already saw this in the case of elementhood, but let us also briefly consider how the necessity of 'Water = H₂O' is usually explained (e.g., Soames 2005). The modal content of the proposition is quite generally considered to be based on the assumption that substances, such as water, essentially have the molecular structure that they do and therefore water has the molecular structure H₂O in all possible worlds. But no amount of research into the chemistry of water

will support this assumption, because we can only study the *actual* molecular structure of water. The claim is, however, that the organisation of hydrogen and oxygen atoms in water is metaphysically *necessary*. We may have a strong intuition about the essentiality of composition for substances, but the typical Kripkean story about these matters takes this as given, when clearly the *source* of this intuition should be our primary interest. We do not need to get into the bottom of this problem here, but it is useful to keep in mind that there are further epistemic issues to be settled concerning metaphysical necessities as well.⁷

Furthermore, it seems that the only reason we hold constitutive facts fixed is because they are metaphysically necessary. As was noted above, this leaves entirely open how we are supposed to know which items of our background knowledge *are* metaphysically necessary and hence constitutive facts that should be held fixed. Surely our epistemic access to these modalities cannot be in terms of counterfactuals – that would render Williamson’s account irredeemably circular, as constitutive facts are supposed to help us to get the account started in the first place. Perhaps a full analysis of how counterfactual reasoning produces modal knowledge is too much to ask, but at the very least Williamson should, on pain of circularity, provide us with some reasons to think that constitutive facts can somehow be grounded independently.

5. Williamson’s reply

We should finish by giving Williamson a chance to reply to these objections, because he is certainly not ignorant about the possibility of the sort of objections that I have raised. The objection that Williamson specifically replies to goes as follows:

⁷ These issues have previously been discussed in Bealer (1987), Salmon (2005), Lowe (2007) and Tahko (2009).

Knowledge of counterfactuals cannot explain modal knowledge, because the former depends on the latter. More specifically, in developing a counterfactual supposition, we make free use of what we take to be necessary truths, but not of what we take to be contingent truths. Thus we rely on prior or at least independent stock of modal knowledge or belief. (Williamson 2007b: 169–170.)

While this objection is not exactly the one that I have been developing, it nevertheless underlines an important point, namely the apparent need for modal knowledge which is prior to or independent of counterfactual knowledge. Williamson insists that the use of necessary truths in developing further counterfactual suppositions does not imply that we have some further cognitive ability to handle modality independently of counterfactuals (*ibid.*). As an example he mentions the case of the atomic number of gold and claims that the judgement that ‘gold is the element with atomic number 79’ is metaphysically necessary is not required before we can use the proposition for the purposes of developing a counterfactual supposition. According to Williamson, the metaphysical necessity of the proposition is revealed as the output of the method. However, it will not do to insist that metaphysical necessities are recognised as necessary because they are held fixed by the method and thus need no independent grounding. This only amounts to admitting that the method has no means to distinguish between *genuine* metaphysical necessities and mere metaphysical possibilities that are held fixed due to a flaw in the method, or a mistaken intuition – if Hendry is right, there may be such a flaw even in the case of elementhood.

At the very least, the method cannot be applied to cases where there are no metaphysical necessities at hand, such as the very first example we considered, a rock sliding down a slope (CF). Williamson’s method can address this scenario only by postulating that the laws of physics are metaphysically necessary. Indeed, perhaps we are supposed to recognise them as necessary because they are held fixed by the method – and it is plausible that *only* constitutive

facts are held fixed by the method.⁸ But if this is the case then Williamson's method is controversial indeed, as the modal status of the laws of physics is far from settled.

Williamson's reply to these worries would seem to suggest that constitutive facts are *not* modal knowledge, but rather something concerning the nature of the entity under investigation. For instance, he holds that atomic number is constitutive for elements and to rely on constitutive knowledge such as this is a natural part of our assessment of counterfactuals. This type of line might suggest itself to anyone who is sympathetic to Kit Fine's (1994) influential account of modality, according to which metaphysical modality is a special case of essence. Accordingly, metaphysical modality could be grounded in the essences of the entities it concerns. If Williamson does have something like this in mind, he certainly does not explicitly commit to anything of the sort. In fact, I am sympathetic to Fine's account myself, but that account is plausible independently of Williamson's analysis of counterfactuals. Indeed, it appears that in the case of constitutive facts we are dealing with exactly the sort of essentialist knowledge that grounds metaphysical modality. Take for instance 'gold is the element with atomic number 79'; one constitutive fact that is required for the necessity of this proposition is that elements have the very atomic number that they have

⁸ See Roca-Royes (Forthcoming) on this. If we held non-constitutive facts fixed, we would end up ruling out certain possibilities that we wish to include, say, if we hold it fixed that Earth is the third planet from the sun, we would end up ruling out the possibility that the planet Venus never formed, which is surely physically possible. On the other hand, if we fail to hold some constitutive fact as fixed, say that elements are defined by their atomic number (if that is indeed the case), then we would erroneously include metaphysical impossibilities, such as gold failing to be the element with atomic number 79. Note also that although it may appear that in (CF) we hold it fixed that there is a lake towards which the rock is sliding, this is not strictly correct: one metaphysically possible scenario is that the lake evaporates before the rock reaches it, although this may be physically impossible. Be that as it may, we are once again faced with the problem concerning the metaphysical status of the laws of physics that was discussed earlier.

by necessity, i.e., it is part of the essence of an element that it has 79 protons. Now, this is presumably an essential truth (but we could replace this story with Hendry's if we wish), and it seems that it is exactly the sort of essential truth that metaphysical modality is grounded in: 'gold is the element with atomic number 79' is a necessary truth in virtue of the essential truth that it is part of the essence of an element that it has a certain number of protons – that is what its necessity is grounded in.⁹

If Williamson is sympathetic to the Finean account, then it seems as if he has left the most crucial part of the story untold. It would appear that Williamson has two possible routes here. Firstly, if he is sympathetic to Fine's account, then the question of modal epistemology is a special case of the epistemology of essence, rather than counterfactuals, as according to this account metaphysical modality is grounded in essences. Alternatively, if Williamson has something else in mind, it would need to be made clear what the nature of constitutive facts is: especially, what is our epistemic access to them.

6. Conclusion

Like I mentioned above, I am sympathetic to Fine's account myself and I would think that the first option is much more promising for Williamson as well. However, even if he would take this line, the order of explanation in his account would have to be seriously revised, which would also undermine its originality somewhat. For if it is acknowledged that modal truths are grounded in essences, then the most important part of the story concerns the link between the two, and the nature of the epistemic problem becomes more complex due to the added requirement of explaining our knowledge of essences. This is where Williamson's account is at its weakest, as the only source for background knowledge that he discusses is 'folk' knowledge of physics. As I have argued above, this is not sufficient for the task of

⁹ See Tahko (2009) for more discussion about the modal content of a posteriori necessities.

determining which facts are constitutive, and further, since Williamson relies on conceivability to determine the space of possible scenarios, it is not at all clear as to how we can rule out metaphysically impossible scenarios.

Williamson would perhaps reply here that our capacity to handle metaphysical modality cannot be based on anything except our capacity to think about the physical world in general – including our capacity to handle counterfactuals – as postulating a further cognitive capacity which is responsible for our ability to handle modal knowledge would be rather uneconomical (Williamson 2007b: 162). However, these are certainly not the only options. In fact, given that Williamson’s own account clearly requires something further than counterfactual knowledge, namely knowledge of constitutive facts, or perhaps essences, it is plausible that a much more economical solution would be to treat *both* our ability to handle metaphysical modality *and* our ability to handle counterfactuals concerning the physical world as special cases of our cognitive capacity to handle essences. It is an open question what this cognitive capacity is, but since Williamson would have to say something about the source of essential knowledge in any case, this third option is at least as plausible as Williamson’s own suggestion.

It seems, then, that Williamson’s account of modal epistemology is sketchy at best. It may be that he is on the right lines regarding the need for something like knowledge of constitutive facts, or essences, to ground modal knowledge, but his account of the nature of these constitutive facts and our epistemic access to *them* is even less developed.¹⁰

References

Bealer, G. (1987) ‘The Philosophical Limits of Scientific Essentialism’, in *Philosophical Perspectives 1: Metaphysics*, ed. J. E. Tomberlin, pp. 289–365,

¹⁰ For an outline of an alternative approach to modal epistemology, see Tahko (2008, 2009).

(Atascadero, CA: Ridgeview).

Chalmers, D. (2002) 'Does Conceivability Entail Possibility?'. In Gendler, T. S. & Hawthorne J. (Eds.). *Conceivability and Possibility* (Oxford: Oxford University Press), pp. 145–200.

Hendry, R. F. (2006) 'Elements, Compounds, and Other Chemical Kinds', *Philosophy of Science* 73, 864–75.

Jenkins, C. S. (2008) 'Modal Knowledge, Counterfactual Knowledge and the Role of Experience', *Philosophical Quarterly* 58: 693–701.

Lowe, E. J. (2007) 'A problem for a posteriori essentialism concerning natural kinds', *Analysis* 67.4: 286–92.

Roca-Royes, S. (Forthcoming) 'Conceivability and *De Re* Modal Knowledge', *Noûs*.

Salmon, N. U. (2005) *Reference and Essence*, 2nd ed. (New York: Prometheus Books).

Soames, S. (2005) *Reference and Description: The Case against Two-Dimensionalism* (Princeton: Princeton University Press).

Tahko, T. E. (2008) 'A New Definition of A Priori Knowledge: In Search of a Modal Basis', *Metaphysica* 9: 57–68.

Tahko, T. E. (2009) 'On the Modal Content of A Posteriori Necessities', *Theoria: A Swedish Journal of Philosophy* 75: 344–57.

Williamson, T. (2005) 'Armchair Philosophy, Metaphysical Modality and Counterfactual Thinking', *Proceedings of the Aristotelian Society*, 105: 1–23.

Williamson, T. (2007a) 'Philosophical Knowledge and Knowledge of Counterfactuals'. In Beyer, C. and Burri, A. (Eds), *Philosophical Knowledge – Its Possibility and Scope* (Amsterdam: Rodopi), pp. 89–123.

Williamson, T. (2007b) *The Philosophy of Philosophy* (Oxford: Blackwell).