Hale on McFetridge's Thesis

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Introduction: McFetridge's thesis

Ian McFetridge (McFetridge,1990) argues that whatever notion of necessity is involved in adscriptions of validity to arguments, it must be the strongest one, and clearly logical necessity is the best candidate to be the strongest form of necessity. By this he means that if a proposition *p* is logically necessary, then *p* is necessary in any other sense of necessity, but the converse implication might not be the case. There may be some proposition *q* which is necessary in a non-logical sense, but *q* is not logically necessary. If logical necessity is the strongest form of necessity, then the corresponding notion of possibility must be the weakest form: if *p* is possible in a non-logical sense, then *p* is logically possible, but the converse implication is not the case. That is, if *q* is logically possible, it does not follow that *q* is possible in any other non-epistemic sense. (McFetridge, 1990, pp. 136-7) For example, if the proposition that everything is identical to itself is logically necessary, then it is necessary in every other sense: it is metaphysically necessary, physically necessary and so on. But the converse implication does not hold. Although it may be physically necessary that such and such is the case according to some law of nature, it may not be logically necessary. Alternatively, if it is physically possible for me to run one kilometre in ten minutes, then it is also logically possible. And, even if the proposition that a human being can have more than forty-six chromosomes is logically possible, it does not follow that it is, say, genetically possible.[1]

[1] We want to put aside epistemic possibility because it allows for a proposition to be epistemically possible without being logically possible. Consider an undecided mathematical proposition *p* which, for all the things we know now, could be true (in an epistemic sense). But, suppose that *p* is in fact false and, on some traditional

In a word, McFetridge's view is this: if logical necessity is the relevant notion in ascriptions of logical validity, then when an argument is deductively valid, then there is no alethic sense of 'possible', according to which, it is possible for the premises to be true, but the conclusion false. (McFetridge, 1990, p. 138) Also, if the corresponding conditional—whose antecedent comprises the premises and whose consequent is the conclusion—is logically necessary, then there is no sense of 'possible' in which the antecedent is true but the consequent is false. This is what we will call McFetridge's thesis. (Hale, 1996, p. 97) This view may strike us as intuitively true, but we would like to know why exactly it is true.

To date we have at least two different but related arguments in favour of the traditional view. One is due to Mcfetridge (McFetridge, 1990) and the other is due to Bob Hale (Hale, 1996). In this paper, we want to focus only on Hale's version of the argument.[2] The main aim is to defend it from several objections put forward by Dorothy Edgington (Edgington, 2004). The plan for the paper is this. In the first section, we present Hale's argument. In the second section, we identify three sources of difficulties for the argument, and focus on Edgington's criticism. In the third section, we show why we think that her objections fail.

1. Hale's argument

Let us start by presenting Hale's argument. It has five assumptions. (Hale, 1996, pp. 96-7) '$\Box_L$' denotes logical necessity and '$\Diamond$' denotes any intuitive operator of alethic (non-epistemic) possibility:

(A1) If $\Box_L(A \rightarrow B)$ then $\Box_L((A \,\&\, C) \rightarrow B)$

(A2) $\Box_L(A \rightarrow A)$

(A3) If $\Box_L(A \rightarrow B)$ and $\Box_L(A \rightarrow C)$ then $\Box_L(A \rightarrow (B \,\&\, C))$

(A4) If $\Diamond A$ and $\Box_L(A \rightarrow B)$ then $\Diamond B$

(A5) $\neg\Diamond(A \,\&\, \neg A)$

(A1)-(A3) express some traditional and familiar principles of entailment, which some philosophers think are non-controversial. (A1) is the plausible principle that if an argument is logically necessary, then its validity is not undermined by adding extra premises. (A2) expresses the intuitive idea that every proposition necessarily implies itself. (A3) expresses the principle that we may conjoin conclusions which follow separately from the same premise. (A4) is also, on some views, a non-controversial assumption, as it makes explicit that every reasonable notion of possibility must sustain transmission across entailment. Finally, (A5) formalises the claim that contradictions are not possible. Now, the argument assumes that the conditional '$(A \rightarrow B)$' is logically necessary and the hypothetical possibility that A is true but B false. From these assumptions, the aim is to get a contradiction, which shows that there is no such a possibility. The argument is a *reductio* and runs as follows:

assumptions, is logically necessarily false. *p* is epistemically possible but not logically possible. In what follows, I will not consider this notion of epistemic possibility. However, this may cause trouble. Edgingont's central claim is that logical necessity is an epistemic modality. So, in putting aside epistemic modality we would beg the question against her view. In order to address this difficulty, I plan to describe Hale's argument as he presents in his (Hale 1996), and then discuss whether logical necessity is really an epistemic form of modality.

[2] Both arguments share a common structure. In both, it is assumed that certain conditional, corresponding to a logically valid argument, is logically necessary and that there is a sense of possibility in which the premises are true but the conclusion is false. The goal of both arguments is to derive a contradiction from these assumptions. In doing so, the arguments show that there is no such a possibility.

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Argument 1:

(1) $\Box_L(A \rightarrow B)$	Assumption
(2) $\Diamond(A \,\&\, \neg B)$	Assumption
(3) $\Box_L((A \,\&\, \neg B) \rightarrow B)$	from (1), by (A1)
(4) $\Box_L(\neg B \rightarrow \neg B)$	by (A2)
(5) $\Box_L((A \,\&\, \neg B) \rightarrow \neg B)$	from (4), by (A1)
(6) $\Box_L((A \,\&\, \neg B) \rightarrow (B \,\&\, \neg B)$	from (3) and (5), by (A3)
(7) $\Diamond(B \,\&\, \neg B)$	from (2) and (6), by (A4)
(8) $\neg\Diamond(B \,\&\, \neg B)$	by (A5)
(9) $\neg\Diamond(A \,\&\, \neg B)$	by (2), (7) and (8), *reductio*

This argument, if correct, shows that there is no sense in which a logically necessary conditional might be false, that is, it is not possible for its antecedent to be true, but the consequent false. If the conditional is logically necessary, it is necessary in every other non-epistemic sense. Therefore, McFetridge's thesis is true.[3]

Now, the pressing question is whether Hale's argument is correct. Let us now consider some difficulties for the argument.

2. Difficulties

a) Is logical necessity merely absolute?

Even if the argument is valid, it can be disputed that it establishes what McFetridge wants it to. He thinks that the claim that logical necessity is the strongest form of necessity amounts to the claim that there is no sense of possibility in which a logically necessary proposition could be false. But maybe this is not a sufficient condition for logical necessity to be the strongest form of necessity. This is Hale's point. He argues that for a form of necessity *X* to be the strongest form of necessity, at least two conditions must be met:
(1) For every proposition *p*, *X*-necessary *p* implies that *p* is necessary in any other sense of necessity (or that there is no other sense of possibility such that not-*p*).
(2) For any other form of necessity *Y* different from *X*, it may be the case that it is *Y*-necessary *p*, but *X*-possible not-*p* (or that it may be the case that *Y*-impossible *p*, but *X*-possible *p*). (Hale, 1996, p. 114, n. 4)

Hale's argument, if sound, only shows that the condition (1) is met. It only shows that there is no way in which a logical necessity could be false, that is, that logical necessity is *absolute*: logical necessity is at least as strong as any other form of necessity. The argument leaves open the possibility that other form of necessity is also absolute. (Hale, 1996, p. 24) This is what some philosophers think of metaphysical necessity. The argument does not rule out the possibility that what is metaphysically necessary is also necessary in every other non-epistemic sense. According to the friends of metaphysical necessity, there is no sense of possibility in which a metaphysical necessity could be false. Or equivalently, it is not possible in any sense that a metaphysical impossibility may be true, not even logically possible. The supporter of metaphysical necessity may argue that if it is metaphysically necessary that water

[3] This argument deals only with conditionals which are logically necessary. However, we might expect to generalise the result in order to cover logical truths of any logical form. Hale's offers a way to do it. (Hale, 1996, pp. 97-98) For our purposes, we do not need to get into the details of the generalisation.

is H_2O, then there is no way that water can be other than H_2O. Also, if it is metaphysically impossible that water is, say, XYZ, then it is not possible in any other sense. It is not even logically possible.

If one wants to show that logical necessity is the strongest one, Hale argues, one still needs to show that no other form of necessity is absolute. And given that metaphysical necessity is the only other serious candidate, one needs to show that it is not absolute. In order to do so, one can show that there is some proposition *p* which is metaphysically necessary, but it is perfectly reasonable to say that it is logically possible that not-p. For example, one has to show that, for example, even if it is metaphysically necessary that water is H_2O, it is still logically possible that water is not H_2O or that it is logically possible that Hesperus is not Phosphorus, which is metaphysically impossible.

However, we think that this underestimates the power of the argument above. If the argument is sound, it shows that logical necessity implies any other form of alethic necessity. Now, suppose that there is some other form of absolute necessity, say, metaphysical necessity. Then, we get this:

(3) If logical necessity is absolute, then for any *p*, if *p* is logically necessary, then *p* is metaphysically necessary.

(4) If metaphysically necessity is absolute, then for any *p*, if *p* is metaphysically necessary, then *p* is logically necessary.

(3) and (4) imply that logical and metaphysical necessity are extensionally equivalent: what is logically necessary is metaphysically necessary, and what is metaphysically necessary is logically necessary:

(5) *p* is logically necessary if and only if *p* is metaphysically necessary.

This means that it is a consequence of the argument that even if there is some other absolute notion of necessity intensionally distinct from logical necessity, it must be co-extensive with logical necessity. So that effectively, there is only one kind of absolute necessity. If so, the thesis that logical necessity is absolute is not really weaker that the original claim that logical necessity is the strongest form of necessity.

Of course, we still need to show that the argument is sound. But, for the moment, by McFetridge's thesis we will mean this: if the conditional corresponding to a valid inference is logically necessary, then there is no sense of possibility in which it is possible that its antecedent be true but its consequent false. And, this thesis is not weaker that McFetridge's original claim that logical necessity is the strongest form of necessity.[4]

b) Are there contingent logical truths?

Edgington, among other things, claims that there are logically valid arguments in which it is not metaphysically necessary that the conclusion follow from the premises. The corresponding validating conditionals are logically necessary, but it is metaphysically possible that they could have been false. (Edgington, 2004, p. 9) Her view clearly poses a problem for McFetridge's thesis. If there is a sense of non-epistemic possibility in which a logical

[4] This is not an innocuous claim, and it may be the source of more difficulties for the traditional view. If one argues that, apart from logical necessity, metaphysical necessity is also absolute, then we have the consequence that logical and metaphysical necessity are extensionally equivalent. And this is perhaps a consequence we should avoid, for it is hard to see in what sense a supposed metaphysical necessity like that I was born to my parents—if we believe in the essentiality of origin—is logically necessary. The question is whether metaphysical necessity is absolute. For our purposes, I will put this question aside.

necessity could be false, then logical necessity cannot be absolute. The existence of these supposed examples further leads her to think that logical necessity is an epistemic notion, and it is better understood in terms of the *a priori*. We think that her putative examples of contingent logical necessities do not undermine McFetridge's thesis.

Edgington argues that the following argument is logically valid:

Argument N:

Neptune exists.

Therefore Neptune is the cause of perturbations in the orbit of Uranus.

It is valid because we can infer *a priori* the conclusion from the premise. However, the conclusion does not follow necessarily from the premise. There is the timeless metaphysical possibility that the antecedent should have been true, but the consequent false. Consider a possible world in which Neptune was knocked off course a million years ago and thereby rendered unable to alter the orbit of any other planet. The corresponding validating conditional

*N** If Neptune exists, then it is the cause of perturbations in the orbit of Uranus

is, according to her, logically necessary. But, again, its negation is metaphysically possible. If these two claims are correct, then McFetridge's thesis cannot be right, for if we apply it to the present case, we get the undesirable consequence of ruling out the legitimate possibility that Neptune exists, but it is not the cause of perturbations in the orbit of Uranus. Thus, there must be something wrong with the argument above.[5]

Edgington is right in saying that the argument *N* is trivially correct, even if there are circumstances in which the premises are true but the conclusion is false. She is also right in saying that the corresponding validating conditional *N** is *a priori*, but has a false necessitation. What is mistaken is to infer from these ideas the claim that the argument and its validating conditional represent a counterexample to McFetridge's thesis. An alternative account is available.

At this point, we can make use of Ian Rumfitt's distinction between deep and superficial necessity. (Rumfitt, 2010)[6] We can say that the premise of the argument N *deeply* necessitates its conclusion, for the conclusion is true in every possibility in which the premise is true, meaning what it actually means. Given that "Neptune", in the context in which Leverrier introduced the term, works as a descriptive name, the truth conditions for the premise to be true include the condition that "Neptune" designates something, and this is so if there is a planet causing certain perturbations in the orbit of Uranus. But this is precisely the condition for the argument's conclusion to be true (meaning what it actually means). Alternatively, the validating conditional *N** "if Neptune exists, then it is the cause of perturbations in the orbit of Uranus" is deeply necessary, for it is true in every possibility, meaning what it actually means. Given that the name "Neptune" was introduced to refer to whatever is the cause of the relevant perturbations, then in every possibility in which the antecedent "Neptune exists" is true, meaning what is actually means, the consequent "Neptune is the cause of perturbations in the orbit of Uranus" is also true. Clearly, this is perfectly compatible with McFetridge's

[5] She also has another objection that is specific to McFetridge's version of the argument. His version depends on the principle that if you have a way to deduce *q* from *p*, then you are in position to assert the subjunctive conditional 'were *p* he case, it would have been the case that *q*'. She claims that this principle is, in the present context, question begging. I will not say more about this problem, but see Rumfitt (Rumfitt, 2010) for a defence of this principle and McFetridge's argument.

[6] This distinction is inspired by Gareth Evans's distinction between *deep* and *superficial* contigencies (Evans, 1979), which has been in turn used by M. Davis & L. Humberstone (Davis & L. Humberstone ,1980).

thesis. It is logically and metaphysically necessary that whenever "Neptune exists" is true, meaning what it actually means, "Neptune is the cause of perturbations in the orbit of Uranus" is also true, meaning what it actually means. No counterexample to McFetridge's thesis has been provided.

Now, the premise of the argument *N* does not *superficially* necessitate its conclusion, for the premise is true with respect to possibilities with respect to which the conclusion is false. Consider a possibility *w* in which the planet Neptune exists but was knocked off its course a million years ago. *N*'s premise is true with respect to *w*, for had *w* obtained, it would be the case that the planet Neptune exists. But, A's conclusion is false with respect to *w*, for had *w* obtained, it would not have been the case that the planet Neptune causes those perturbations. The validating conditional "if Neptune exists, then it is the cause of the perturbations" has a false necessitation. The antecedent is true with respect to *w*, but the consequent is false with respect to *w*. Again, this is perfectly compatible with McFetridge's thesis, for it is logically and metaphysically possible that the planet Neptune exists, but it is not the cause of the relevant perturbations. Either way, the argument does not represent a counterexample to McFetridge's thesis.[7]

3. Are the principles A1-A5 true?

If the argument discussed so far is valid, then if one wants to reject it, one must do so by showing that at least one of the assumptions deployed in the arguments is false. Let us see then Hale's principles A1-A5.

The principle A1 is quite alright for classical and intuitionistic logicians. However, it is known that this principle has been disputed by relevance logicians. Several apparent counterexamples to the principle have been put forward in the literature to show that there are cases in which an argument stops being valid by adding extra premises. It is true that relevance logicians deny that it is sufficient for an argument to be valid that it be impossible for the conclusion to be false when the premises are true. But, they do not deny that it is a necessary condition for validity. So, it is relatively clear that the question whether relevant logicians should accept the principle or not depends upon what they require for relevance.

One formal condition relevant logicians sometimes mention is variable-sharing: one form of this constraint is that the conclusion of a valid inference must have at least one variable in common with the premises. But if this is the only constraint on relevance, they should not object to adding additional premises. For obviously if an argument "X; so A" is relevantly valid in this sense, so will an argument "Y; so A" for any Y of which X is a subset. So, it does not seem the case that we should abandon the principle for considerations of relevance.[8]

If we accept A1, it is not clear how A1-A3 can be rejected without abandoning any reasonable notion of entailment. The option of rejecting A5 can be equally unpalatable, for there is no clear sense of possibility in which is possible for a contradiction to be true. However, there may be a problem nearby. Certainly $\neg(p \wedge \neg p)$ is a law of the main

[7] Edgington's alleged examples of contingent logical truths involve descriptive names, but other apparent examples may involve rigidified descriptions like 'the actual F' or an 'actually' operator attached to sentences, 'actually p'. Edward Zalta offers some examples of what he thinks are contingent logical truths using these linguistic devices. (Zalta, 1988) However, the distinction we have just invoked can be used to show that those other examples do not pose any threat to McFetridge's thesis. William Hanson (Hanson, 2006) discusses Zalta's examples and offers his own version of the distinction between deep and superficial necessity to reject them.

[8] Unless some other explanation of what is required for relevance is forthcoming.

paraconsistent and dialethic logics. Assuming that they also accept the Rule of Necessitation (from ⊦ A infer ⊦ □A), it follows that □¬(p∧¬p) is a law. And assuming that '□' and '◇' are related as usual, this means that ¬◇(p∧¬p) is a law. So, the problem is not that A5 is unacceptable to paraconsistent and dialethic logicians. It is rather that they will also accept ◇(p∧¬p), so that they will not accept the final step of *reductio* in Hale's argument.

However, we do not think that there is any genuine sense of possibility on which "◇(p∧¬p)" could be true. And in the present context, Edgington would not accept it either.[9] A consequence of the present objection to Hale's argument is that we should abandon proofs by *reductio*. And this is a consequence hard to accept. Proofs by *reductio* are pretty much standard both in logic and mathematics, and we dare to say that arguing against *p* by showing that *p* leads to an absurd is an everyday practice.[10] We think we should accept the principle A5 and the last step in Hale's argument. If we do so, it seems that the only principle that might be seriously contested is A4.

Here we want to answer to Edgington's objection to A4. In order to strengthen our view, we wil say something more in favour of the principle A4. This principle, '◇A & (□(A → B) → ◇B', expresses the intuitive idea that any reasonable notion of non-epistemic possibility should be closed under logical consequence. But, Edgington argues that this principle is question-begging and gives an argument against it. If we assume the principle A4 and that logical necessities can be false in some other non-epistemic sense, then, she claims, it seems that these lead us to the conclusion that everything is possible in that sense. In particular, if the possibility involved is metaphysical possibility, it would follow from these assumptions that everything is metaphysically possible. Edgington's argument is this (Edgington, 2002, p. 14, n. 9):

Argument 2:

(1) $\Box_L(A \to B)$	Assumption
(2) $\Diamond_M(A \,\&\, \neg B)$	Assumption
(3) $(\Diamond_M P \,\&\, \Box_L(P \to Q)) \to \Diamond_M Q$	Assumption (A4)
(4) $\Box_L\ ((A \,\&\, \neg B) \to C)$	By (2) and by *ex falso quodlibet*
(5) $\Diamond_M C$	By (2), (4) and (3)

We assume that '(A → B)' is logically necessary, for example *N** 'if Neptune exists, then it is the cause of perturbations in the orbit of Uranus'. But we also assume that it is metaphysically possible that Neptune exists, but it is not the cause of perturbations in the orbit of Uranus. Assume A4. Now, given that 'Neptune exists, but it is not the cause of perturbations in the orbit of Uranus' is, for Edgington, logically contradictory, it logically necessarily implies any conclusion, in particular C: 'there are square circles'. But given that it is logically necessary that 'if Neptune exists but it is not the cause of perturbations in the orbit of Uranus, then there are square circles', then by A4, it is metaphysically possible that there are square circles. This is a bad result. Thus, Edgington argues we should drop Hale's A4 principle. Surely, if Hale's principle has the consequence that everything is metaphysically possible, we have a good reason to abandon it.

[9] Later on, Edgington gives an argument against Hale's principle A4, and the argument consists of a *reductio*: the principle, according to her, implies an absurd and, consequently, should be abandoned.

[10] Take an example. I argue against my mother's believe that my sister is right now in England by showing that it would imply that my sister is both in England and in Australia. I think this to be absurd, for I personally took her yesterday to the airport to catch a flight to Australia. This is a relatively common example of arguing in favour or against a certain claim by showing that it, or its negation, leads to an absurd. The prospects to abandon proof by *reductio* do not seem to be very promising.

However, her argument is not good. It depends on her putative examples of logical necessities which can be false. If our objection to her supposed examples of contingent logical truths is good, then we have good reason to reject her argument. Her examples do not constitute counterexamples to McFetridge's thesis. Consequently, her argument above does not work: there is no way that "A → B" is logically necessary but "A & ¬B" is metaphysically possible. In other words, her view that a logically necessary conditional may be metaphysically contingent is mistaken. Edgington's objection does not work.

A more pressing point is this. A4 strikes us as intuitively true. So, if Edgington's view go against it, this may be a reason against her position. And the source of the problem is not the A4 principle itself, but Edgington's idea that logical necessity is an epistemic notion, not different from the a priori. This claim is what leads her to think that the case of Neptune and Julius count as an example of logical necessities and logical arguments. So, what we need to dispel her objection is to reject that logical necessity is just the old epistemic notion of the a priori.

If we get Edgingont's view correctly, she seems to endorse the following bi-conditional:

I. A proposition *p* is broadly logically necessary if and only if *p* is knowable *a priori*.

According to I, being knowable *a priori* is both a necessary and a sufficient condition for *p* to be broadly logically necessary. For I to be true, the following conditionals should be true.

J. If a proposition *p* is *a priori*, then *p* is broadly logically necessary.

K. If a proposition p is broadly logically necessary, then p is *a priori*.

Let us now examine each of these theses.

The conditional J above says that being knowable *a priori* is a sufficient condition for being logically necessary. In other words, every sentence knowable *a priori* should be broadly logically necessary. But, if this is the case, then we get a controversial result. Some mathematical truths which are knowable *a priori* would be broadly logically necessary. In particular, some arithmetical truths would be logical truths. Although some philosophers have defended this view[11], it is highly controversial. There are certain mathematical theorems, for example Fermat's Last Theorem[12], that are known *a priori* (as far as one understands the proof), but it is not at all clear that they are logical truths. The series of ontological assumptions we need to adopt in order to prove them gives us good reasons to question they are logical truths in the broad sense. In any event, Edgington does not give additional reasons to think that mathematical truths are logical truths.

If logical truth is simply apriority, then if a truth is a logical truth, then it is necessary for that truth to be *a priori*. The question is whether there are logical truths which are not *a priori*. If the answer is positive, it is clear that apriority is not necessary for logical truth. Actually, there is an infinite number of conceptual truths that just now are not known and maybe will never been known. So, they are not known *a priori*. However, there is an obvious answer to this objection. Edgington might reply that even if there is an infinite number of unknown truths, they still are *knowable a priori*. But this takes me to an important issue with her view.

Apriority, in the usual way we understand the notion, has to do with the way we can come to know the truth of some claim. If it turns out that we are able to know certain proposition without appealing to the experience, then it is *a priori*. If not, then it is not *a priori*. But, the fact that we can know that proposition *a priori* or not is only, maybe, a contingent fact about

[11] For example, Bob Hale and Crispin Wright are well known defenders of this view nowadays. (Hale & Wright, 2001)

[12] Fermat's Last Theorem states that no three positive integers *a*, *b*, and *c* can satisfy the equation $a^n+b^n=c^n$ for any integer value of *n* greater than two.

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us. It is not strictly speaking a property that the claim itself has. And, in particular, the truth of such proposition surely is independent from the way we come to know it. So, the truth and modal profile of a proposition is independent of its epistemic features. The fact that water is H_2O or that bachelors are unmarried male are knowable *a posteriori* and *a priori* respectively does not seem to influence the fact that both claims are not only true but also necessarily true. The point is that this epistemic feature, being known or knowable *a priori*, is independent of the modal profile of some truths.

To finish our assessment of Edgington's view, we need to say something about her claim that Hale's argument begs the question, we want to show that this is not necessarily so. We can show that no matter which kinds of modalities are involved—as long as each of them is of an alethic kind—the principle A4 works just fine. Of course, it may not work in some cases when we put into the mix both alethic and non-alethic notions of necessity. Take the following instances of the principle (where the subscripts "M" and "E" stand for "metaphysically" and "epistemically" respectively):

A4* $(\Diamond_M P \,\&\, \Box_E(P \rightarrow Q)) \rightarrow \Diamond_M Q)$

A4** $(\Diamond_E P \,\&\, \Box_M(P \rightarrow Q)) \rightarrow \Diamond_E Q)$

A4* has no problem: if it is metaphysically possible that a cat is sleeping in my bed, and we know a priori that if a cat is sleeping in my bed, then something is sleeping in my bed, then we can correctly infer that it is metaphysically possible that something is sleeping in my bed. In contrast, A4** seems to fail in some cases: even if it is epistemically possible that certain axioms are true, and it is metaphysically necessary that if those axioms are true, so are some theorems, it does not necessarily follow that those theorems are epistemically possible, as the occurrence of certain inconsistencies show. Besides, in some other cases, it looks like that the interaction of modalities of the same kind, but with different strength, do not seem to be problematic. Take this case (where "M" and "P" stand for "metaphysically" and "physically" respectively):

$A4^{+}(\Diamond_F P \,\&\, \Box_M(P \rightarrow Q)) \rightarrow \Diamond_F Q)$

$A4^{++}$ $(\Diamond_M P \,\&\, \Box_F(P \rightarrow Q)) \rightarrow \Diamond_M Q)$

Presumably, metaphysical modality is stronger than physical modality. However, in spite of the difference in strength, it does not seem to pose any problem for A4 the interaction of these modalities. In $A4^{+}$, it is all right to say: if it is physically possible that a cat is sleeping in my bed, and it is metaphysically necessary that if a cat is sleeping in my bed, something is sleeping in my bed, then it is physically possible that something is sleeping in my bed. In $A4^{++}$, we can say: if it is metaphysically necessary that I was born to my parents, and it is physically necessary that if I was born to my parents, I was born somewhere, then it is metaphysically necessary that I was born somewhere. Neither the combination of modalities of different kind (alethic with epistemic) nor the combination of modalities with different strength show a problem for A4.

Conclusion

In this paper we have defended Hale's argument in favour of McFetridge's thesis against three difficulties. First, we addressed Hale's claim that his argument only shows the weaker thesis that logical necessity is at least as strong as any other form of necessity, but not the stronger thesis that logical necessity is the strongest one. we have shown that this underestimates the force of the argument. McFetridge's thesis is not as weak as Hale seems to think. Second, we showed that Edgington's supposed counterexamples to McFetridge thesis—

logical necessities which are metaphysically contingent—are not really counterexamples. Finally, we considered objections to Hale's principles A1, A5 and A4, and showed that they are not decisive against those principles. If there are no further problems with the principles A1-A5, we can say that Hale's argument is sound and that McFetridge's thesis is true.

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