

Logical Essence

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Abstract

An increasingly popular view at the intersection of logic and metaphysics is that logical necessities have their source in the essences of logical entities: metaphysical necessity has its source in the essences or natures of things, and logical necessity is a restriction of metaphysical necessity. But logical and metaphysical necessity are, nevertheless, importantly distinct: there are metaphysical necessities that are not logical necessities. I raise a serious problem for this essentialist view. It seems as though they must misclassify some merely metaphysical necessities as logical necessities. I argue that the essentialist can accommodate these cases only at the cost of sacrificing core features of the view: either that it is recognizably an account of logical necessity; or that it is given in terms of logical entities. I close by offering a brief diagnosis of the root of the problem.

Keywords: Essence, Logic, Logical necessity, Logical truth, Metaphysical necessity.

1. Introduction

An increasingly popular view at the intersection of logic and metaphysics is that logical necessities have their source in the essences of logical entities. On such a view, metaphysical necessity has its source in the essences or natures of things, and logical necessity is a restriction of metaphysical necessity. But logical and metaphysical necessity are, nevertheless, importantly distinct: there are metaphysical necessities that are not logical necessities. In this paper I raise a serious problem for this essentialist view: it seems as though they must misclassify some merely metaphysical necessities as logical necessities. I argue that the essentialist can accommodate these cases only at the cost of sacrificing core features of the view: either that it is recognizably an account of logical necessity; or that it is given in terms of logical entities. I close by offering a brief diagnosis of the root of the problem.¹

¹ One can read this paper as a partial record of a conversation with Bob Hale, beginning in Oxford in 2015, and including a memorably enjoyable afternoon in the summer of 2017 sitting outside the cafe at Southwark Cathedral. The suggested solutions of sections 5 and 6 were made by Bob in response to my proposed challenge to essentialism. I do not

2. The Essentialist View

Traditionally, essence was defined in terms of metaphysical necessity, i.e., a is essentially F if and only if it is metaphysically necessary that, if a exists, a is F .² More recently it has been argued that such a definition is inadequate, and that we should give an account of metaphysical necessity in terms of essence: it is metaphysically necessary that a is F if and only if it is true in virtue of the essence(s) of some thing(s) that a is F .³ More generally: it is metaphysically necessary that p if and only if it is true in virtue of the nature of all things that p (see Fine 1994a). Essence itself is understood either primitively, or in terms other than metaphysical necessity. One common approach is to gloss essence as the real definition of a thing.⁴

By the nature or identity of a thing, I mean what it is to be that thing—what makes it the thing it is, and distinguishes it from every other thing. We may think of the nature or identity of a thing as what is given by its definition—that is, the definition of the *thing*, and not that of some word for the thing or concept of the thing. I think that once it is granted (*vide infra*) that we can intelligibly speak of a thing's nature, or identity, it must be agreed that truths about it are necessary (Hale 2013: 132-33).⁵

Metaphysical necessity has its source in the natures of *all* things; further varieties of necessity are defined in terms of a more restricted class of things. Importantly for present purposes, logical necessity is defined as having its source in the essences or natures of logical things. So, it is logically necessary that p if and only if it is true in virtue of the nature of logical things that p .

The logical necessities can be taken to be the propositions which are true in virtue of the nature of all logical concepts (Fine 1994a: 10).

[Logical necessities] have their source ... in the nature of the functions of various kinds which are the semantic values of the logical constants. Where p is a logical truth, we can explain why it is necessary that p by citing some facts about the nature of the logical functions involved (Hale 2013: 145).

We have two examples, then, of the view that logical necessities are true in virtue of the natures of logical things: Fine's view, where those things are logical

know what his ultimate settled view on these matters was, although I suspect it would have been a version of that discussed in section 6.

² For alternative formulations see e.g. Fine 1994a: 3-4, and Fine 1994b.

³ Sometimes this is the essence of a itself, sometimes not. E.g., it is metaphysically necessary that Socrates is human because it is true in virtue of the nature of *Socrates* that *he* is human; but it is metaphysically necessary that Socrates is a member of $\{\textit{Socrates}\}$ because it is true in virtue of the nature of $\{\textit{Socrates}\}$ —not Socrates—that Socrates is a member of that set.

⁴ See also, e.g., Correia and Skiles 2019 who give an account of essentialist statements in terms of generalized identity. Rayo 2015 does something similar, offering an account of essence in terms of a “no-difference operator”.

⁵ I think there are reasons to doubt that this notion of real definition does imply necessity in the way suggested here. See Leech 2018, 2021.

concepts, and Hale's, where those things are logical functions. Broadly speaking, we might say that Fine takes the logical things to be the senses of the logical constants—what we mean by 'and', 'not', etc.—whereas Hale takes them to be the referents of the logical constants—what logical functions are referred to by 'and', 'not', etc.

In what follows, I raise a general problem for this variety of essentialism about logical necessity, one that genuinely takes the essences of entities to be the source of logical necessity. We might call this *objectual essentialism*. Later (section 7) I consider an alternative essentialist approach that we might call *generic essentialism*. My primary target here is the former view, but I also discuss some worries about the latter. There may be further varieties of essentialism, with potentially different ways in which the essentialist could respond. I do not pretend to argue against all possibility of an essentialist account of logical necessity here, although I do raise some general worries about this in my concluding remarks.

The views of Hale and Fine diverge, quite obviously, in the entities they take to provide the source of logical necessity, but there are other ways that essentialist accounts may differ. In particular, they may make different, or no, *reductive* claims. As Vetter puts things,

Modality comes in a package. There are, of course, the two familiar modalities of necessity and possibility. There are also such modal phenomena as ... laws of nature, essences, the counterfactual conditions, causation, and dispositions. A reductive approach to modality will try to describe all of these phenomena in a language that is taken from outside the modal package [...] A non-reductive account of modality [...] can impose a hierarchy on the package itself, understanding parts of the package in terms of other parts (Vetter 2015: 4-5).

It seems to me that Fine and Hale are engaged in non-reductive projects of different kinds. Fine proposes a reduction of necessity to essence, where essence is nevertheless understood as a broadly modal notion (see Fine 2007: 85). Hale denies any reduction of necessities to non-necessities, but imposes a hierarchy between fundamental and dependent necessities (see Hale 2013: 158-59). Whatever the merits of reductive or non-reductive approaches of various stripes, I want to stress that this does not bear on the present discussion. The question is whether certain necessities are correctly classified by the essentialist view as logical and/or metaphysical, regardless of whether that view is to be interpreted as making any kind of reductive claim.

In the course of my discussion, I will need to make some assumptions about the nature of purported logical entities. It would be beyond the scope of this paper to discuss these ontological issues in depth, but let me note a few points. First, I intend 'entity' to be permissive, applying to anything that exists, including, depending on one's proclivities, particulars, properties, relations and so on. I'll be assuming that functions are a particular species of relation, namely, many-one relations, which map a relatum or relata (the argument(s)) to a further, unique relatum (the value) (see Hale 2013: 170-71). Furthermore, I'll assume that concepts are mental entities, and functions abstract entities. One may disagree with these ontological assumptions, but the particular choices I've made here are (largely) incidental. As will become apparent, what does the work in generating problems for the essentialist is the assumption that there are logical entities that have some such nature or other.

3. A Problem

Consider the truth function *conjunction*, a paradigm case of a logical entity.⁶ Consider also a version of essentialism according to which logical necessities are true in virtue of the natures of logical entities. Then, the essentialist proposal includes the claim that some logical necessities have their source in the nature of *conjunction*. For example, it is logically necessary that $A \wedge B$ is true if and only if A is true and B is true, because it is true in virtue of the nature of *conjunction* that $A \wedge B$ is true if and only if A is true and B is true (Hale 2013: 134). Hence, we have a case of logical essence giving rise to a recognizable logical necessity.

However, there is a problem for this view, raised by Correia (2012). We begin with the following observation.

Logical concepts, being objects of their own (I am here following Fine), plausibly have basic essential properties which have nothing to do with their proper logical nature. For instance, the concept of disjunction may plausibly be said to be basically essentially a concept (Correia 2012: 646).

In other words, there is more to the nature of a logical entity than that in virtue of which certain logical rules hold.

I will consider two kinds of case: *essentiality of kind* and *essentiality of category*. First, some philosophers have found the essentiality of kind to be a plausible metaphysical principle: if a thing is of a particular kind, then that is part of what it is to be that thing, and so the thing is essentially, and necessarily, of that kind. So, if *conjunction* is a function, then it is essentially a function. But *conjunction* is a logical entity, so it follows, given the essentialist account, that it is logically necessary that *conjunction* is a function. Similarly, if we take the logical entities to be concepts: if CONJUNCTION is a concept, then by the essentiality of kind, it is essentially a concept. But if CONJUNCTION is a logical entity, then it follows, given the essentialist account, that it is logically necessary that CONJUNCTION is a concept. But this seems wrong: what kind of thing something is, is a matter of metaphysics, not logic.⁷ These may be metaphysical necessities, but it is hard to swallow that they are logical necessities.

⁶ Throughout the paper I shall use italicization to indicate a name of a function (e.g. '*conjunction*') and small caps to indicate a name of a concept (e.g. 'CONJUNCTION').

⁷ One might respond, suggests an anonymous referee, that a neo-Fregean approach to ontology, as is adopted by Hale (2013) (see especially Chapter 1), takes logic to determine the ontological categories. For example, 'objects can be defined as those things which can *only* be referred to by singular terms, properties as those things which can be referred to by predicates, relations those things which can be referred to by relational expressions, and so on' (Hale 2013: 31). The logical categories of singular term, predicate, relational expression etc. are in turn determined logically, not with reference to their possible referents, on pain of circularity. However, it is important to note that, at least in Hale's case, the intention is not to replace metaphysical considerations with logical ones: "It would be a gross misrepresentation of the Fregean approach to claim that it makes the answers to questions about what kinds of things there are *wholly* a matter of the analysis of language. To think it does so is to overlook the crucial point that, on the Fregean approach, whether or not there exist, say, objects of some specified kind [...] turns upon whether there are *true statements* of an appropriate sort, viz. true statements featuring expressions functioning as singular terms which, if they stand for anything at all, stand for objects of that

Note: one need not take the essentiality of kind to hold in full generality. If the essentialist simply agrees that it is metaphysically necessary that *conjunction* is a function, and/or that it is metaphysically necessary that CONJUNCTION is a concept, then they are committed to giving an essentialist account of this, which most plausibly will be that it is true in virtue of the nature of *conjunction* (CONJUNCTION) that *conjunction* is a function (CONJUNCTION is a concept). But then, given that these entities are logical entities, this renders the metaphysical necessities also logical necessities, according to the essentialist account. The problem remains.⁸

Second, entities of various kinds, such as functions, or concepts, or objects, are often classified into various ontological divisions or categories. For example, one might think that functions, relations, properties, and numbers, are *abstract* entities, that thoughts and concepts are *mental* entities, and that tables, chairs, rocks, and human beings are *concrete* entities. So perhaps the function *conjunction* is abstract, and the concept CONJUNCTION is mental. It is also tempting to think that ontological categories are essential to things: Socrates couldn't have been a number because it is part of what it is to be Socrates, at the very least, that he is concrete; or *conjunction* couldn't have been a rock because it is part of what it is to be *conjunction* that it is abstract. Even those who reject other essentialist theses, such as essentialism of origin and kind, are more sympathetic to this. As a case in point, Mackie (2006: 151-52) comes close to endorsing an "extreme haecceitism", according to which there are no "qualitative constraints on the ways that individuals could have been different", but even she concedes that "there may be some essential kinds or categories, exemplified, perhaps, by such broad categories as *event* and *abstract object*" (166).

One might think, then, that *conjunction* is essentially abstract.⁹ As with any essential property, this gives rise, according to the essentialist, to necessity: it is true in virtue of the nature of *conjunction* that *conjunction* is abstract, so it is necessary that *conjunction* is abstract. What kind of necessity is this? *Conjunction* is a logical function, so it is true in virtue of the nature of some logical entity that *conjunction* is abstract. Therefore, by the essentialist definition of logical necessity, it is logically necessary that *conjunction* is abstract. But surely this is wrong. It is a matter of metaphysics, not logic, that things are abstract or concrete (or otherwise). So it should be at most *metaphysically* necessary, not logically necessary, that *conjunction* is abstract.

Of course, the abstract/concrete distinction is notoriously difficult to pin down. There is disagreement over how to characterize the distinction.¹⁰ It is also

kind" (Hale 2013: 19). The linguistic or logical notion of a singular term may, for example, contribute to an account of what an object is, but it is still how things are independently of our language that determines what statements containing singular terms *are true*, and *of what* they are true. I take it that on such a view, even if logical considerations tell us what a truth-functional expression is, it is still the entity and its nature that determines that such a kind of expression can refer to *conjunction*, and hence that *conjunction* itself is a truth function.

⁸ Thank you to an anonymous referee for raising this point.

⁹ Again, this might be a consequence of a general commitment to the essentiality of category, or a more specific commitment to its being metaphysically necessary that *conjunction* is abstract. As before, the same problem arises.

¹⁰ See Rosen (2017) for an instructive overview, or Lewis (1983: 82-86). Hale—one of our representative essentialists—can be understood as favouring an approach according to

open to question whether, even if we can make good on the distinction, it is exhaustive. And one may also dispute the essentiality of abstractness/concreteness. For example, Williamson not only argues that an entity could be neither abstract nor concrete, but also that we should understand the purported *contingent existence* of an entity in terms of the *contingent concreteness* of an otherwise necessarily existing being.

If my parents had never met, I would have been something neither abstract nor concrete, but something that could have been concrete. I would have been a possible concrete object. I would not have been a physical object, but I would have been a possible physical object (Williamson 2002: 246).

To properly address these issues would take me beyond the scope of the present paper. In any case, if any other cases of essentiality of category—broader than essentiality of kind—turn out to be plausible and defensible, whether they concern abstractness or something else, then I maintain that the following problems will arise, *mutatis mutandis*. I take the abstractness of a function as an instructive example here, without intending to commit myself to a particular view about the abstract nature of functions.

The problem, in sum, is this. It is only *part* of the essence of a logical entity that is relevant to logical necessity. There are extraneous elements of these essences that pertain, for want of a better phrase, to the *being* of the logical entity, rather than to its logical behaviour. There are different candidates for the kinds and categories to which the logical entities belong, such as *function*, *concept*, *abstract*, *mental*. But in all cases, the fact that a logical entity is a function rather than a concept, or is abstract rather than mental, is a matter of metaphysics, not logic. Any necessities arising from these essential kinds should be merely metaphysical, not logical. But the essentialist account of logical necessity, as it stands, counts these necessities as logical. To put the point another way: we typically think of logical necessity as being closely allied with logical truth. Whilst it may seem reasonable to take it to be a logical truth that a proposition of the form $A \wedge B$ is true if and only if A is true and B is true, the thought that it might be a logical truth that *conjunction* is abstract seems absurd.¹¹

We should, therefore, reject the version of the essentialist account of logical necessity presented thus far, because it yields the result that cases of metaphysical but not logical necessity are systematically misclassified as logical necessities. Can we repair the essentialist account? This question will inform the rest of this paper.

To summarize, I will consider the following cases as examples.

1. *Conjunction* is a logical function, and is abstract.
2. CONJUNCTION is a logical concept, and is mental.

The following are the necessities at issue.

Function version: it is true in virtue of the nature of *conjunction* that:

which abstract entities can be introduced via *abstraction principles*. This is related to Hale and Wright's Neo-Fregean philosophy of mathematics, e.g. Hale and Wright 2001. See also Hale 2013: 173-75.

¹¹ I say more about logical truth and logical necessity in section 6.

- (i) $A \wedge B$ is true if and only if A is true and B is true.
- (ii) *Conjunction* is a function.
- (iii) *Conjunction* is a logical function.
- (iv) *Conjunction* is abstract.

Concept version: it is true in virtue of the nature of CONJUNCTION that:

- (v) $A \wedge B$ is true if and only if A is true and B is true.¹²
- (vi) CONJUNCTION is a concept.
- (vii) CONJUNCTION is a logical concept.
- (viii) CONJUNCTION is mental.

According to the simple version of the essentialist account, (i)-(viii) are all logically necessary. Whilst this seems correct for (i) and (v), the other cases appear to be misclassified.

Note: depending on how one interprets the structure of ‘logical function’ and ‘logical concept’, it may be that (ii) follows from (iii), and (vi) follows from (vii).¹³ If ‘logical function’ works like ‘red ball’, then a logical function is logical and is a function (as a red ball is red and is a ball). However, one might have reasons to interpret this structure differently (compare: a toy gun is not both a toy and a gun). One might read the relevant cases such that, for example, ‘ x is a logical function’ has ‘ x is a function’ as merely an analytic or *a priori* consequence (similar to ‘ x is red’ and ‘ x is coloured’). I leave this open for now, and will note when it becomes relevant in due course. Note also: for present purposes, I am taking it for granted that one can give an account of what it is for a function to be a logical function, or what it is for a concept to be a logical concept. But this may pose an additional challenge to the essentialist about logical necessity (see Keefe and Leech 2018).¹⁴

4. Properly Logical Features and a Modified Problem

Let us first consider the proposal briefly offered by Correia (2012).

It makes very good sense indeed to distinguish, amongst the basic essential features of the logical concepts, those features from the properly logical features, be they thought to be propositional or inferential in character (Correia 2012: 646).

Correia is here distinguishing between *basic essential facts* and *derivative essential facts*. Roughly: the basic essential facts cannot be explained in further essentialist terms (e.g. <Socrates is distinct from the Eiffel Tower>), whereas the derivative

¹² (i) and (v) appear to be the same. The difference is that they belong to different versions of the essentialist account, i.e. one in terms of functions and one in terms of concepts. As such, I’ll keep the cases separate to keep these two claims apart.

¹³ Thank you to Nathan Wildman for raising this point.

¹⁴ The problem raised here may extend to any essentialist account of a kind of necessity as a restriction of metaphysical necessity. For example, if conceptual necessity is understood in terms of truth in virtue of the nature of concepts, then there will be cases of apparently mere metaphysical necessity that are counted as conceptually necessary, such as *CONJUNCTION is a concept*. I shall not pursue these extensions of the problem in this paper.

essential facts *can* be (e.g. <(Socrates is human if he exists) and (the Eiffel Tower is a non-living, concrete thing if it exists)> (Correia 2012: 642-43).¹⁵

What is a properly logical feature? According to Correia, 'the *properly logical* features basically essential to logical concepts are inferential in character' (Correia 2012: 646). Such features are not given by *propositions*, but by *rules of inference*.

[T]he essence of a logical concept [...] is given, not by certain propositions, but rather by certain rules of inference. On such a view, for instance, it will be taken to be part of the nature of conjunction that from a conjunctive proposition one can infer each of its conjuncts (Correia 2012: 646).

[T]o each logical concept is associated some fixed and well-defined collection of rules of inference which characterize its basic logical nature (Correia 2012: 646).¹⁶

With these ideas in hand, we can thus formulate an amended essentialist view:

It is logically necessary that *p* if and only if it is true in virtue of the properly logical features essential to logical entities that *p*.¹⁷

A feature is properly logical if and only if it is given by a rule of inference.

This is a promising proposal. It seems plausible to suppose that (i) and (v) are true in virtue of features given by rules of inference, since they themselves seem to state something close to a rule of inference, whilst the other cases are not, since they do not.

There are of course questions concerning which concepts or functions are the logical ones, and which rules of inference one takes to be the correct ones.¹⁸ Setting such questions to one side, I believe there is still reason for dissatisfaction with the proposal. In short, the account is too narrow; there are logical necessities that it fails to account for. But the reason for this is rather interesting, because it brings out an additional commitment of the essentialist.

Consider again what the essentialist claims about logical necessity: it is logically necessary that *p* if and only if it is true in virtue of the natures of logical

¹⁵ This aligns approximately with Fine's constitutive/consequential essence distinction (Fine 1994b): approximately, because Correia's aim in this paper is to provide an account of derivative essence, where consequence is one option for giving that account.

¹⁶ One might ask (as has Bob Hale in conversation) whether this favours a proof-theoretic approach to logic which would be unable to accommodate model-theoretic logical notions such as validity. I will set this concern to one side here.

¹⁷ For Fine, the expression 'it is true in virtue of the identity of *x*' is not to be understood as a compound expression, but rather as an unanalyzed primitive: 'The notation should be taken to indicate an unanalyzed relation between an object and a proposition' (Fine 1995: 273). This might seem to preclude our being able to talk of elements or parts of the essence (identity) of a thing or meaningfully inserting additional content into the expression, as in 'it is true in virtue of *the properly logical features of the nature of x that p*'. I do not take this to be an insurmountable problem for the essentialist: they can either give up the unanalyzability claim, or multiply the number of *true-in-virtue-of...* primitives they admit. Thank you to Alex Skiles for discussion of this point.

¹⁸ See Correia 2012: 645. See also Keefe and Leech 2018.

entities that p : $\Box p \equiv \exists x(\Box_x p \wedge Lx)$,¹⁹ where ‘ \Box ’ signifies logical necessity, ‘ \Box_x ’ signifies ‘it is true in virtue of the nature of x that...’, and ‘ Lx ’ signifies ‘ x is a logical function’ (or ‘ x is a logical concept’). One doesn’t usually see the ‘ Lx ’ clause included explicitly in such a formulation, but it seems to be crucial to capture, not just that it is *necessary* that p , but that it is *logically* necessary that p . It is the fact that the thing whose nature in virtue of which it is true that p is a logical entity that makes the ensuing necessity logical, rather than merely metaphysical.

The following argument relies on the assumption that an S4 axiom is valid for the essentialist analogue of logical necessity, i.e., if it is true in virtue of the nature of logical entities that p , then it is true in virtue of the nature of logical entities that it is true in virtue of the nature of logical entities that p . There are two routes to this assumption. First, and straightforwardly, it is plausible that the logic of logical necessity validates (at least) the S4 axiom: that whatever is logically necessary is logically necessarily logically necessary: $\Box p \rightarrow \Box \Box p$.²⁰ But if logical necessity *just is* truth in virtue of the nature of logical things, then one should expect S4 also to hold of this latter: that if it is true in virtue of the nature of logical entities that p , then it is true in virtue of the nature of logical entities that it is true in virtue of the nature of logical entities that p . This is a sufficient basis for the argument that follows, but I shall briefly consider a second route to S4, because it is put forth by one of our card-carrying essentialists.

Second, one might hold that the correct logic of *truth-in-virtue-of-the-nature-of* validates the S4 axiom. Hale (2020) writes,

Suppose it is true in virtue of the nature of x that p , briefly $\Box_x p$. We may ask: what makes *that* true? That is, what makes it true in virtue of the nature of x that p ? Given that it is true in virtue of the nature of x that p , x must exist, and given that it is true that p in virtue of what it is to be x , it cannot but be that p (i.e. $\Box p$). But further, it cannot but be that it is true in virtue of the nature of x that p . For x could not have had a different nature. So *necessarily*, it is true in virtue of the nature of x that p . So if the essentialist theory is correct, it must be true in virtue of something’s nature that it is true in virtue of the nature of x that p . But what could this be, if not x itself? For it is hardly going to be true in virtue of the nature of anything else. We are thus driven to the conclusion that if it is true in virtue of the nature of x that p , then it is true in virtue of the nature of x that it is true in virtue of the nature of x that p . That is: $\Box_x p \rightarrow \Box_x \Box_x p$. Thus \Box_x validates the S4 law (Hale 2020: 147).

¹⁹ Note: it would be better to use plural quantification, or quantification over a list of variables, to allow that it may be true in virtue of the nature of some entities together that p . I use singular quantification here to keep the argument simple, as my key example is singular (being true in virtue of the nature of *conjunction*).

²⁰ It is beyond the scope of this paper to defend S4 for logical necessity, but others have paved the way. For example, Rumfitt (2015: 76) presents an argument, drawing on Carnap 1946 and Parsons 2008, that the logic of logical necessity—as associated with the consequence relation of classical first-order logic—is S5. From which it follows that it also validates the S4 axiom. Hale (2013: 128-31) argues that the logic of absolute necessity validates S4 and S5 principles. He argues elsewhere, in 2013 and 1996, that logical necessity is absolute.

Hale's argument concerns any kind of entity; the formulation for logical necessity specified logical entities. We can thus modify the argument:

Suppose it is true in virtue of the nature of logical entity x that p [$\Box_x p \wedge Lx$]. We may ask: what makes *that* true? Given that it is true in virtue of the nature of *logical entity* x that p [$\Box_x p \wedge Lx$], x must exist, and given that it is true that p in virtue of what it is to be x , it cannot but be that p (i.e. $\Box p$). But further, it cannot but be that it is true in virtue of the nature of *logical entity* x that p . For x could not have had a different nature. So *necessarily*, it is true in virtue of the nature of logical entity x that p [$\Box(\Box_x p \wedge Lx)$].²¹ So if the essentialist theory is correct, it must be true in virtue of something's nature that it is true in virtue of the nature of *logical entity* x that p [$\exists y \Box_y (\Box_x p \wedge Lx)$].

So far, this yields: if $\Box_x p \wedge Lx$ then $\exists y \Box_y (\Box_x p \wedge Lx)$.²² However, this lacks the final conjunct ' Ly ' which would ensure the *logical* necessity of the logical necessity. Continuing with a version of the second half of Hale's argument: if it is true in virtue of something's nature that it is true in virtue of the nature of logical entity x that p , it is plausibly x itself that is this something. x could not have had a different nature, and x is by nature a logical entity. So, it is true in virtue of the nature of a logical entity (x) that it is true in virtue of the nature of logical entity x that p : $\Box_x (\Box_x p \wedge Lx) \wedge Lx$.

With a version of S4 in place, one way or another, we can now move on to the modified problem for the essentialist. Take an uncontroversial claim of logical necessity, $\Box p$, where $p = (i) (A \wedge B$ is true if and only A is true and B is true). We can take two lines of argument, depending on whether we assume which entity is doing the work (along with Hale) or not.

General Argument

1. $\Box p$

Applying the essentialist account, we have

2. $\Box_c p \wedge Lc$

where ' c ' stands for *conjunction*. Applying S4,²³ we have: it is true in virtue of the nature of logical entities that $\Box_c p \wedge Lc$:

- 3a. $\exists x \Box_x (\Box_c p \wedge Lc) \wedge Lx$

Therefore, it is logically necessary that *conjunction* is a logical function. For it follows that it is true in virtue of the nature of some logical entity that *conjunction* is a logical function.²⁴

²¹ In other words, suppose that x could not have had a different nature. Then, no matter what, it would still have been a logical entity, and it would still have been true in virtue of its nature that p . In which case, no matter what, it would have been true in virtue of the nature of logical entity x that p .

²² ' x ' here is a constant rather than a variable, in line with the Hale passage. This should not be confused with my use of ' x ' as a variable elsewhere.

²³ The general version: if it is true in virtue of the nature of logical entities that p , then it is true in virtue of the nature of logical entities that it is true in virtue of the nature of logical entities that p .

²⁴ This step assumes that truth-in-virtue-of-the-nature-of distributes over conjunction, i.e., if $\Box_x (A \wedge B)$ then $\Box_x A$ and $\Box_x B$. This seems plausible in the case where \Box_x is taken to capture a notion of derivative or consequential essence. What about in the case of basic or constitutive essence? Details aside, the basic/constitutive notion would tend to rule

$$4a. \exists x \Box_x Lc \wedge Lx$$

This is just what the essentialist account requires for logical necessity.

$$5. \Box Lc$$

Particular Argument

$$1. \Box p$$

Applying the essentialist account, we have

$$2. \Box_c p \wedge Lc$$

This time we apply the S4 principle we derived by following Hale, where we already assume which logical entity is doing the work:

$$3b. \Box_c (\Box_c p \wedge Lc) \wedge Lc$$

Therefore it is logically necessary that *conjunction* is a logical function. For it follows that it is true in virtue of the nature of *conjunction* that *conjunction* is a logical function.²⁵

$$4b. \Box_c Lc \wedge Lc$$

This is just what the essentialist account requires for logical necessity.

$$5. \Box Lc$$

If one takes the claim that it is logically necessary that *conjunction* is a logical function to be obviously false, then this argument may be viewed as an objection to the essentialist: their account of the nature of logical necessity, along with a commitment to at least S4 for logical necessity (and/or \Box_x), generates an unacceptable conclusion. However, being more charitable, one might think that such a conclusion should not be unwelcome to the essentialist after all. For suppose x is a logical function. It is plausible that it is essentially so. So as well as it being true in virtue of the nature of x that various logical principles hold, it is also true in virtue of the nature of x that x is a logical function. And this is precisely the result we expect: it is true in virtue of the nature of some logical function that x is a logical function. The essentialist should be happy to accept that it is logically necessary that, say, *conjunction* is a logical function. For this provides a quintessentially essentialist explanation of why the logic of logical necessity validates at least the S4 axiom.²⁶

Returning to Correia's proposal: can we account for this case of logical necessity by appeal to only those essential features that are given by rules of inference? The case at issue concerns what *kind of thing* something is; a logical, rather than a non-logical, function, say. But it seems that these inferential features con-

out the other direction, i.e. if Socrates is (basically) essentially human, and Socrates is (basically) essentially descended from gametes g_1 and g_2 , then it may follow that it is true that Socrates is essentially *human and descended from gametes g_1 and g_2* , but only derivatively, and not basically, so. However, the step in question moves the other way: from a conjunction to its conjuncts. Again, the move seems plausible for derivative essence. And in this case, it is harder to see a problem if we are considering basic essence. For example, if Socrates is basically essentially a rational animal, (assuming that if x is a rational animal, then x is rational and x is an animal), it would seem to follow that Socrates is essentially rational, and essentially an animal. And, plausibly, basically so. For removing either of these properties would remove part of Socrates's basic essence. Thank you to an anonymous referee for raising this point.

²⁵ The assumption of distribution over conjunction is made again.

²⁶ I was persuaded that the essentialist may well look kindly on this line of thought by Bob Hale in conversation.

cern something else to do with the entity; its behaviour, or its relation to proof and/or truth, etc. However, one might contend that having essential features that are inferential in character is *itself* a mark of being a logical entity, hence these features *do* give rise to the logical necessity: it is true in virtue of the properly logical—inferential—features of *conjunction* that *conjunction* is a logical function.

Still, things get more difficult when we consider the S4 claim cashed out in this way, namely, that if it is logically necessary that p , then there is some logical entity such that it is true in virtue of its properly logical nature that there is some logical entity such that it is true in virtue of *its* properly logical nature that p . Applying this to our example, and noting that it is permissible, and indeed in some cases plausible (as Hale argued) that the two mentions of a logical entity might refer to the same, we have: if it is logically necessary that *conjunction* is a logical function, then there is a logical function (plausibly, *conjunction* itself) such that it is true in virtue of the properly logical nature of *conjunction* that there is a logical function (*conjunction*) such that it is true in virtue of the properly logical nature of *conjunction* that *conjunction* is a logical function. The problem here is this: suppose the properly logical nature of *conjunction* is just its characteristic introduction and elimination rules. Then, I do not see how it is true in virtue of these rules that [there is a logical function (*conjunction*) such that it is true in virtue of the properly logical nature of *conjunction* that *conjunction* is a logical function]. The problem is not that this seems to imply the existence of *conjunction*. (In fact, Hale (2013: 170-75) argues for the necessary existence of pure functions.) The problem is that the rules of inference characteristic of *conjunction* do not themselves seem to make true, in the sense required, the contents of the square brackets. The rules concern permissible steps in an inference, not anything about the existence or nature of certain entities.

One might respond: the properly logical essential features of a logical entity are those that can be expressed by a rule of inference. But Hale (2013) offers an argument for the necessary existence of pure functions—including logical functions such as *conjunction*—on the premise that a function exists just when it is possibly expressed by functional expressions (that do not include singular terms). Hence, there is a candidate argument to show that those features given by rules of inference *do*, in fact, entail that there exist certain functions with certain features, as required.

[Let p abbreviate ' P exists', and q abbreviate 'there is a predicate having P as semantic value.] By the abundant conception [of properties, relations, and functions], $\Box(p \leftrightarrow \Diamond q)$. But from this it follows both that $\Diamond p \leftrightarrow \Diamond \Diamond q$ and $p \leftrightarrow \Diamond q$. But in S5, $\Diamond \Diamond q \leftrightarrow \Diamond q$. Whence, by the transitivity of the bi-conditional again, $p \leftrightarrow \Diamond p$. That is, any pure property which *could* exist *does* exist—there are no 'merely possible' properties (Hale 2013: 167).

However, such an argument crucially draws on a particular account of the existence conditions of functions, according to which a pure function exists just when it is possibly the semantic value of a functional expression (captured by $\Box(p \leftrightarrow \Diamond q)$). Hence, it is not true in virtue of just the properly logical features of, say, *conjunction* that there is a logical function of a certain kind; by this line of thought, the existence conditions of properties, relations and functions are also relevant.

To summarize: a problem arises for the essentialist account if it is restricted, as proposed, to concern only those essential features given by a rule of inference. If the essentialist is to account for logical necessity validating at least the S4 axiom, then they must be able to account for its being logically necessary, e.g., that *conjunction* is a logical function. However, it is not plausible that it is true in virtue of the inference rules for *conjunction*, that *conjunction* is a logical function. Even if this concern can be overcome, the problem remains that it is even less plausible that it is true in virtue of the inference rules for *conjunction*, that [there is a logical function (*conjunction*) such that it is true in virtue of the properly logical nature of *conjunction* that *conjunction* is a logical function].

I contend, then, that the essentialist needs a better way to distinguish between those features of a logical entity that are, and are not, relevant for grounding logical necessity.

We have also established a modified version of the main problem posed, namely, that the essentialist needs to distinguish between (i), (iii), (v) and (vii) as logically necessary, and (ii), (iv), (vi), and (viii) as at most metaphysically necessary, if the logic of logical necessity is to validate S4.²⁷

5. Distinctively Logical Features

A different approach is to take the properly logical features of logical entities to be those features that only logical entities have, the properties *distinctive* of logical entities.²⁸ More generally, the essential properties relevant for *X*-necessity, where *X*-necessity is a restriction of metaphysical necessity, are those essential properties only had by *X*-entities. So it is *X*-necessary that *p* if and only if it is true in virtue of the distinctively *X* features in the natures of *X*-things that *p*. Note: different logical entities will have some different properties. The suggestion is not that logically relevant features must be shared by all logical entities, rather that they must be had *only* by logical entities.

Suppose, for example, that the logical entities are logical functions, and that logical functions are abstract. There are lots of other kinds of abstract entity, one might suppose—numbers, non-logical functions, universals—and so being abstract is not distinctive of the logical entities. As such, it isn't relevant for logical necessity. By contrast, it seems plausible that only the logical functions are given by rules of inference. For example, it doesn't seem plausible that a number has such a rule as part of its nature. Extending this line of thought to other examples: *being a function* wouldn't count as relevant, because there are non-logical functions. And *being a concept* wouldn't count, because there are non-logical concepts. Hence, it looks as though this proposal correctly counts (i) and (v) as logically necessary, and (ii), (iv), (vi) and (viii) as not.

²⁷ Alternatively, depending on the logical relationship between (ii) and (iii), and (vi) and (vii), as discussed earlier: if one takes '*conjunction* is a function' to follow logically from '*conjunction* is a logical function', and accepts that it is logically necessary that *conjunction* is a logical function, one will have to conclude also that it is logically necessary that *conjunction* is a function. It seems to me that the essentialist will be less sanguine about this conclusion, which may give them good reason to resist the claim that (iii) follows logically from (ii).

²⁸ This suggestion was made by Bob Hale in conversation.

Moreover, the proposal counts (iii) and (vii) as logically necessary, as required by the modified problem. The features of *being a logical function* and *being a logical concept* count as properly logical according to the proposal: they are had only by logical entities. Hence, they ground logical necessities: it is logically necessary that *conjunction* is a logical function, or it is logically necessary that CONJUNCTION is a logical concept.

However, the proposal threatens to make what counts as a properly logical feature—and hence what is logically necessary—depend upon the existence of non-logical entities. The proposal defines the essential properties of *X*-entities that are relevant for *X*-necessity, where *X*-necessity is a restriction of metaphysical necessity, as those essential properties only had by *X*-entities. Whether or not a property is *only* had by *X*-entities, however, depends not just on the *X*-entities, but also on all of the non-*X*-entities, and whether or not they share essential properties with the *X*-entities.

Compare: what it is for something, say *t*, to be the tallest tree is not just for *t* to be a tree of a certain height, but also that *there are no other trees with a greater (or equal) height*. As such, *being the tallest tree* is a common example of an extrinsic property. If we wanted to suppose that *t* was necessarily the tallest tree, and also to explain this in essentialist terms, it would not be enough to appeal to the nature of *t itself*; we'd also need to appeal to the natures of other things, to ensure that, no matter what, *t*'s height is the greatest of the trees. *t*'s nature alone is not enough to ensure that no other tree is taller. In sum, something's having a property like *being the tallest tree* would seem to essentially or constitutively depend upon how other things are: *what it is to be* the tallest tree involves the properties of other things.

Similarly, and generally, what it is for something *a* to be *distinctively F* is not just for *a* to be *F*, but also that *nothing else is F*. And, for present purposes, what it is for *X* to be distinctive of logical functions is not just for some logical function(s) to be *X*, but also that *there is nothing that is not a logical function and is X*. As with the tallest tree, then, for *X* to be a distinctive feature of logical functions essentially depends upon how other things are: *what it is to be* distinctively *X* involves the properties of other things.

According to the present proposal, it is logically necessary that *p* just when it is true in virtue of the distinctively logical features in the natures of logical things that *p*. However, what the distinctively logical features in the natures of logical things are, I have argued, essentially depends upon non-logical things as well. We might here read "true in virtue of the nature of the distinctively logical features in the natures of logical things" as shorthand for "true in virtue of (the differences between) the nature of logical things and non-logical things." But then the logical necessity of *p* in turn depends upon not just the logical entities and their features, but *also* on the non-logical entities and their features as well. This now goes against the essentialist proposal, that logical necessity has its source in the essences of *logical* things, *not all* things. In fact, it has its source in the natures of non-logical things as well.²⁹ I therefore take the option of restrict-

²⁹ Another option, rather than taking into account the natures of all things, would be to introduce a special Totalizer fact, along the lines of a fact that *nothing else (nothing other than the logical functions) is X*, or that *X-necessity depends on the X-entities and nothing else*,

ing the account to distinctively logical features to undermine the essentialist view.

6. Logical Necessity and Logical Truth

The options for solving the problem considered so far have proved unsatisfactory. I have been assuming that biting the bullet is an option that would be unattractive to the essentialist, but this is too hasty. Let us reconsider.

The essentialist, first and foremost, takes metaphysical necessity to have its source in the natures of things. Logical necessity is classed as a species of metaphysical necessity—those metaphysical necessities that have their source in the natures of *logical* things. No wonder, the essentialist may then retort, that some logical necessities seem distinctively metaphysical. All logical necessities are metaphysical necessities! So it should be no surprise—and *no problem*—to find out that some logical necessities appear to be metaphysical necessities. Any discomfort with cases can be diagnosed as arising from a confusion of *logical necessity* and *logical truth*.³⁰ A logical necessity, for the essentialist, is anything that is true in virtue of the nature of logical entities. A logical *truth*, by contrast, can be defined as “a statement which is [necessarily] true [...] and essentially involves only logical vocabulary” (Hale 2013: 163). It is uncontroversial, for example, that it is not a logical truth that *conjunction* is abstract. But the essentialist never said it was. If one conflates logical necessity with logical truth, then one will find cases such as (ii), (iii) and (iv) troubling. But with this distinction in place, we can explain these as cases of logical necessity that are not also logical truths.

However, even if one is happy with a distinction between the way in which a proposition is true (logically necessarily) and the kind of truth it (or the statement of it) is (logical truth), one may nevertheless deny that they come apart in the way the essentialist requires. One kind of case that seems *prima facie* reasonable is that of instances of logical truths. Take the necessity of identity: $\forall x\forall y(x = y \rightarrow \Box(x = y))$. It seems plausible to take particular identity statements, such as *Hesperus = Phosphorus*, or *Cicero = Tully*, to be logically necessary.³¹ But they are not logical truths, containing as they do non-logical vocabu-

grounded not in the natures of all things, but in something else: some kind of “Totalizer” entity or similar. Aside from incurring a commitment to explain the nature of such a weird entity, and defending its existence, this move will only help the essentialist if the Totalizer is a logical entity. Otherwise, the same line of objection holds: that the logical necessities depend not only on the natures of logical things, but also (at least one) non-logical thing. Is the Totalizer a logical entity? I’m not sure how to answer such a question without understanding what such a thing could be more clearly. This, then, is perhaps still a live option for the essentialist. Although I’m not sure how attractive it is. Thank you to an anonymous referee for the suggestion.

³⁰ Thank you to Bob Hale for pressing this option.

³¹ The whole formula “ $\forall x\forall y(x = y \rightarrow \Box(x = y))$ ” has a proof, and so is logically necessary (Barcan 1947). So the instances should count as logically necessary, e.g. “if *Hesperus = Phosphorus*, then it is logically necessary that *Hesperus = Phosphorus*”. Such an instance, however, does not seem to contain any non-logical vocabulary essentially, if we allow that ‘it is logically necessary that’ is logical vocabulary. However, given that it is indeed the case that *Hesperus = Phosphorus*, it follows that it is logically necessary that *Hesperus = Phosphorus*. And this latter statement—“it is logically necessary that *Hesperus = Phosphorus*”—does contain non-logical vocabulary essentially.

lary essentially. Hale offers analytic truths as another kind of case where logical necessity and truth plausibly come apart: “the proposition expressed by ‘Vixens are female’ is logically necessary, but the statement is no truth of logic” (Hale 2013: 163). But Hale also notes what is common to the cases so far considered, that “there will always be a corresponding logical truth nearby—in this case, the statement: ‘Female foxes are female’” (ibid.). In the previous case, the nearby logical truth is the general statement of the necessity of identity. So, there do seem to be relatively uncontroversial cases where logical truth and logical necessity come apart, namely, cases where there is a corresponding logical truth nearby. Our problem now, though, is that the crucial problem cases at issue do not seem to be of that kind. There is, so far as I can see, no corresponding logical truth in the vicinity of ‘*conjunction* is abstract’ or ‘CONJUNCTION is a concept’. Hence, the essentialist requires a stronger distinction than that sketched so far.

There is a distinctively essentialist motivation for this stronger distinction. We saw above that if the logic of logical necessity is to validate the S4 axiom then it must be the case, for the essentialist, that it is logically necessary that, say, *conjunction* is a logical function. But, if we are to accommodate such a case, we need a distinction between logical necessity and logical truth that goes beyond the relatively uncontroversial cases just surveyed. A non-essentialist is not subject to the same motivation. Absent a commitment to the essentialist account of logical necessity, they also lack a commitment to the logical necessity of something like ‘*conjunction* is a logical function’, and hence have no case they need to accommodate in their distinction between logical necessity and logical truth.

Where does this leave us? We started with a problem that it looked like the essentialist needed to solve. Now, by contrast, it looks as though there is no problem at all. Rather, perhaps, we have simply made the commitments of the essentialist about logical necessity more perspicuous. (1) Some cases are not merely by-products of the essentialist account, but in fact seem to be required by the account (as, e.g., *conjunction* is a logical function). So the essentialist must find a way to rule in these latter cases as logical necessities. (2) A distinction between logical truth and logical necessity would seem to allow the essentialist to bear all of the commitments they need to, but that distinction is much more substantive than a comparable distinction motivated by considerations outside of the essentialist account itself. Our puzzle has thus generated, not a knock-down argument against the essentialist, but a clearer picture of the *package* of views required by the essentialist. As such, we can see more clearly how we might compare the essentialist account to rivals. We must not simply compare accounts of logical necessity, but also what different accounts have to say about the relation between logical truth and logical necessity.

That said, I have some residual discomfort with the stronger distinction between logical necessity and logical truth that I think gives us reason to look elsewhere for a resolution of the present issues. If there is anything like a pre-theoretical or familiar notion of logical necessity, then it is one that is closely re-

The necessity of such an identity claim also raises questions of necessitism—if it’s true in all worlds that *Hesperus* = *Phosphorus* then it would seem to follow, absent further assumptions about the behaviour of singular terms etc., that *Hesperus* exists necessarily. I here leave questions of contingentism and necessitism to one side.

lated to logical consequence.³² The bullet-biting essentialist, however, is trading on a notion of logical necessity that has travelled far beyond this: there are logical necessities that are not instances of or otherwise related to nearby logical truths, because what it is to be a logical necessity is to be true in virtue of the nature of logical entities. But then, the justification for calling these *logical* necessities lies in the specifics of the essentialist account. From the inside, this is perfectly consistent. From the outside, one could reasonably accuse the essentialist of having given a consistent account of *something*, but not of our familiar notion of logical necessity.

7. Generic Essence

Thus far, I have treated claims about the essences of logical entities as being on a par with comparable claims about the essences of ordinary objects such as, for example, that Socrates is essentially human. Perhaps this is a mistake. It may be that once this is corrected, the problem no longer arises.

A distinction between objectual and generic statements of essence is made by Correia (2006).³³

The concept of essence is traditionally associated with questions of the form ‘What is *a*?’ where ‘*a*’ is a singular term like ‘Socrates’ or ‘the Moon’. [...] The concept of essence is also traditionally associated with questions of the form ‘What is it to *F*?’ where ‘*F*’ is a predicate expression like ‘be a human being’, ‘be wise’, ‘think’, or ‘be related as father to son’. [...] Let me sort the essentialist statements into the objectual and the generic. An objectual statement is one which states that a given object is by its very nature so and so, and a generic statement is one which states that to be thus and thus is essentially to be so and so. An objectual statement is simply an answer to an essentialist question of the first kind, and a generic statement an answer to one of the second kind (Correia 2006: 753-54).

Correia argues that we should not attempt to give an account of generic essence statements in terms of objectual essence. For example, we cannot give an account of a generic essence claim of the form ‘It is true in virtue of what it is to be an *F* that *p*’ in terms of an objectual essence claim of the form ‘It is true in virtue of the nature of the property *F*-ness that *p*’.³⁴

Would an appeal to generic, rather than objectual, essence claims, solve the present problem? There are two ways this might pan out. First, some of the problematic properties might be said to be generic consequences of properties had by the logical entities quite innocently. Second, we might treat the essentialist claims themselves generically.

First, let us grant that ‘*conjunction* is a logical function’ is, for the essentialist, logically necessary, but that ‘*conjunction* is abstract’ is not. *Conjunction* is es-

³² See, for example, McFetridge 1990, Rumfitt 2010.

³³ In more recent work, Correia further develops an account of essentialist statements in terms of generalized identity and metaphysical dependence (Correia 2017). See also Correia and Skiles 2019.

³⁴ I have re-formulated the phrasing of these statements slightly to fit in with my discussion so far.

essentially a logical function. What is the link to being abstract? Let us suppose: *It is true in virtue of what it is to be a logical function that logical functions are abstract*. So, on this view, the necessity of ‘*conjunction* is abstract’ has its source not only in the objectual essence of *conjunction*, but also in the *generic essence* of what it is to be a logical function. It is not straightforwardly true in virtue of the nature of *conjunction* that *conjunction* is abstract. And so the original route to the logical necessity of *conjunction*’s being abstract is blocked.

This option would, however, collapse if we allow that from the objectual essence claim that *a* is essentially *F*, and the generic essence claim that *F*s as such essentially *G*, it follows that *a* is essentially *G*. For if that were the case, it would follow from the proposal above that *conjunction* is essentially abstract after all. Such an issue would have to be settled by a more extended discussion of the logic of essence. Whatever the outcome, it is worth pointing out why, even if this entailment is blocked, further trouble lies in wait.

Logical necessity is supposed to be truth in virtue of the natures of logical entities. If we allow that both objectual and generic essences of logical entities count, then it isn’t at all clear that it doesn’t turn out to be logically necessary that *conjunction* is abstract after all. For whilst it may no longer be true in virtue of the nature of *conjunction* alone, it does seem to be true in virtue of the nature of *conjunction* and the generic essence of being a logical function, and being a logical function—even if generically understood—would seem to be in some sense logical in nature. So, even if the original route to the logical necessity of *conjunction*’s being abstract is blocked, the alternative takes us to the same destination.

Let us turn to the second option. Perhaps we can treat the essences of the logical entities themselves generically. So far I have perhaps treated the logical function *conjunction* as if it were an exotic object. But I noted above a working assumption to treat logical functions as a species of relation. Rather than claims of the form

It is true in virtue of the nature of *conjunction* that *p*,

let us consider generic essence claims. The form suggested for relational generic essence is

Being *F*-related (in a given order) essentially involves being *G*-related (in the same order) (Correia 2006: 756).

So in the case of *conjunction* we have cases such as,

Being conjoined essentially involves being related such that both conjuncts are true if and only if the conjunction is true.³⁵

The essentialist view would become: logical necessity has its source in the *generic essence* of logical functions.

Let us return to cases (i)-(iv). Plausibly, (i) can be accommodated as logically necessary, as required.

It is true in virtue of the nature of being conjoined that $A \wedge B$ is true if and only if *A* is true and *B* is true.

³⁵ I have omitted “in a given order”, as conjunction commutes.

(ii) and (iv) fail to be logically necessary, as required. What it takes, essentially, to be conjoined, does not in and of itself—absent further metaphysical commitments—require anything about the nature of any entity that might be called ‘conjunction’, and indeed, on the face of it, it doesn’t require there to be any such entity at all.

For the same reasons, one might also say that (iii) is not logically necessary. However, if I am right that the essentialist is committed to the logical necessity of *conjunction* being a logical function (or something similar), then this may raise a problem. Let us revisit the worry in terms of generic essence.

Correia (2006) introduces some notation that will help here.

‘ \Box ’ for the necessity operator.

‘ $\Box_{F,G,\dots}$ ’ for the generic operator ‘it is true in virtue of what it is to F , what it is to G,\dots that’ (collectively understood) (Correia 2006: 765).³⁶

The revised essentialist view is: it is logically necessary that p if and only if it is true in virtue of what it is to be related by logical functions that p .³⁷

$$\Box p \equiv \exists f (\Box_f p \wedge Lf)$$

Let us again take the case where p =(i), and it is true in virtue of the nature of being conjoined.

$$\Box_c p \wedge LC$$

As it stands, it’s not clear that ‘ LC ’ is well-formed, but I leave this as a placeholder for the time being: being conjoined is logical, in some sense to be made clear.

Consider next an application of the S4 axiom

$$\exists f \Box_f (\Box_c p \wedge LC) \wedge Lf$$

There is some logical function f such that it is true in virtue of what it is to be f -related that it is true in virtue of what it is to be conjoined, which is logical, that p . Again, if logical necessity validates the S4 axiom, then it is true in virtue of the generic essence of being f -related, where being f -related is logical, that being conjoined is logical. That is, according to the essentialist account, it is logically necessary that being conjoined is logical.

I have deliberately left ‘being f -related is logical’ and ‘being conjoined is logical’ in imprecise terms. The task now is to make that more precise. This might be understood objectually, as ‘ f [being conjoined] is a logical function’ or ‘ f [*conjunction*] is a logical entity’. However, this rests on treating an essentialist claim objectually, and on taking this to be sufficient to yield a logical necessity. But if this is allowed in this case, it seems that we can no longer block the essences of logical entities, objectually understood, from yielding the problematic cases again, such as its being logically necessary that *conjunction* is a function. We are back to the (slightly modified) original view, that logical necessity has its source in the essences (*generic or objectual*) of logical entities.

We might then read this generically as ‘being f -related [being conjoined] essentially involves being logically related’. But what does it mean to be logical-

³⁶ There are also objectual and hybrid operators, but we won’t need these here.

³⁷ I use quantification here to mirror the argument above, but of course, if one wishes to avoid commitment to the existence of functions as entities one will need to read the quantifier here, and in what follows, non-objectually.

ly related? Perhaps that there is another relation, L , *being logically related*. But surely we wanted to say that things might be related by *conjunction* (or *disjunction*, or *negation*, etc.), and that to be so related is to be related in a logical way, not to say that in addition to being so related, things would then also be logically related.

The problem common to both these attempts to resolve this problem is that they appeal to further entities—functions or relations—taken objectually. However, part of the motivation offered by Correia for an irreducibly *generic* reading of some essence claims is precisely that they are not (or do not have to be) committed to the existence of such entities (Correia 2006: 761). If we give up the idea that there really are logical entities doing the work, with natures of their own, and endorse only generic essence claims, then it seems that all the problems go away. We can simply say, for example, that it is true in virtue of the nature of being conjoined that $A \wedge B$ is true if and only if A is true and B is true, and that being conjoined essentially involves being logically related, where no explanation in terms of, for example, a logical relation or entity is required. What is striking about this proposal, however, is that it appears to give up on what was distinctive about the essentialist view, at least as presented and developed by Fine (1994a) and Hale (2013): a commitment to the idea that the source of logical necessity is to be found in the natures of logical *entities* (logical concepts or logical functions).³⁸ It is still a substantive claim to say that we can give an account of logical necessity in terms of generic statements of essence. But if this is essentialism about logical necessity, it seems to me to be of an importantly different kind to that introduced at the beginning of this paper, and to bear importantly different metaphysical commitments.

8. Pessimism for Logical Essence

At the beginning of this paper, I raised a problem for the essentialist account of logical necessity, namely, that logical entities ground necessities that we want to class as non-logical and metaphysical but which, on the standard versions of the account, are counted as logical. I have surveyed some responses to this problem. The first options I found lacking. Two further options seem more promising but each, in its own way, could be accused of abandoning the original essentialist project: drawing a strong distinction between logical necessity and logical truth,

³⁸ What is an entity? One might think that falling into the range of any existential quantifier of any order is the mark of entity-hood. In which case, even forcing a generic reading of a proposition such as $\exists f \Box_f (\Box_c p \wedge LC) \wedge Lf$ would involve commitment to (higher-order) logical entities, the essences of which could then be said to ground the logical necessities. Even in this case, this would at least mark a significant commitment for the essentialist, i.e., to higher-order entities. However, my own preference is to follow Prior (1971) in taking quantification into non-nominal positions to inherit the role of those non-nominal positions, and *not* automatically to involve denotation of entities, in which case, the kind of quantification at issue here would not commit one to logical entities. It is also noteworthy that, as noted in the main text, part of Correia's argument for generic readings of essentialist claims is to avoid ontological commitment to entities such as properties (Correia 2006: 761). So it is also not clear that those who develop the notion of generic essence themselves would think of this as existentially committing them to higher-order entities. Thank you to an anonymous referee for raising this point.

in no longer giving an account of a generally recognizable *logical necessity*; and the generic essence option, in no longer giving an account in terms of *logical entities*.³⁹ A straightforward and unproblematic account of logical necessity in terms of the essences of logical entities remains elusive. To close, I offer some remarks on why I would expect the truth about logical necessity to lie elsewhere, and hence why I think such an account has eluded us.

I can see why one might find the view that *metaphysical* necessities are grounded in the natures of things attractive. The very idea of metaphysical necessity seems to be tied tightly to the idea of things in the world, or the notion of being, and what the most general constraints on being are. As such, it seems natural to find the source of this kind of modality in things themselves, rather than anywhere else. But what about logic? Logic has typically been understood precisely as something *disconnected* from things and the world. This idea surfaces in different ways: we might say logic is topic neutral, or formal, or general, or that it bears no ontological commitment.⁴⁰ These are all getting at the same core conception of logic as not concerned with things in the world at all. What is logic concerned with? It seems to me, with how we think or reason. Logic is a regimentation of ways to move from one thought to another. Logical necessity, in turn, might plausibly be thought of as the necessity distinctive of logic, in particular, the necessity implicated in the idea that logical laws are necessarily true, and the idea that rules of inference are necessarily truth-preserving. If these claims are broadly correct, then they suggest that we should not hold out much hope for an account of logic—and its associated kind of necessity—that has at its heart *kinds of entities* rather than *ways of thinking* or kinds of reasoning.⁴¹

Essentialism about logical necessity doesn't count what we might expect to be mere metaphysical necessities as logical necessities just because we haven't yet found the right logical entities, or the right features of the logical entities, but rather because it is metaphysical necessity, and not logical necessity, that can appropriately be understood to be grounded in entities. An approach considered above characterized the properly logical features of things as being connected in an important way to rules of inference. I argued that this didn't work, but not

³⁹ It is of course open to a proponent of a generic essence essentialism to use this paper as support for their view over an objectual essence essentialism.

⁴⁰ See, e.g., Batchelor 2011, Dutilh Novaes 2011, MacFarlane 2002.

⁴¹ This suggestive line of thought is at odds more generally with Metaphysical Logical Realism (MLR), the view that the One True Logic (OTL) 'either directly correspond[s] to the structure of mind-and-language-independent reality or [is] located in mind-and-language-independent reality' (McSweeney 2019: 1). However, even if one was more sympathetic to MLR in general, that need not involve commitment to special kinds of entities. Indeed, McSweeney argues that many metaphysicians are committed to MLR, but her argument targets a commitment to what she calls *ideological realism*—according to which 'the OTL is the OTL in virtue of being a part of the language (ideology) that best captures the structure of reality' (2019: 4), rather than *ontological realism*—according to which 'the OTL is true in virtue of directly reflecting something about items in our ontology' (2019: 4). One way to frame the argument of the present paper would be as focusing on an essentialist version of ontological logical realism, perhaps as follows. I argue that there is a problem for essentialist ontological logical realism. Following the generic essence route might result in a version of essentialist ideological logical realism. My closing remarks suggest that the underlying problem is a commitment to MLR in general.

because rules of inference are not of central importance. We should indeed see a connection between rules of inference and logical necessity, but because the former concern how we think and reason, not because they are written into the natures of mysterious entities.⁴²

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⁴² Thank you to two anonymous referees for this journal, and to audiences in Tübingen, London, Cambridge, and Oxford, especially Tobias Wilsch, Alex Skiles, and Nathan Wildman, all of whom provided helpful feedback on various versions of this paper.

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