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THE METAPHYSICAL FOUNDATION OF LOGIC

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1. The Metaphysical Foundation of Logic

In the philosophy of modality there are three positions concerning the relation between the set of metaphysically necessary truths and the set of logically necessary truths. *Modal Monism* (MM), states that the set of metaphysically necessary truths is identical to the set of logically necessary truths. (MM) has been advocated by Chalmers (1999). *Modal Pluralism* (MP), states that the set of metaphysically necessary truths is a proper subset of the set of logically necessary truths. (MP) has been advocated by Salmon (1989). *Metaphysical Determinism* (MD), states that the set of logically necessary truths is in part determined by metaphysical truths and necessities.[1] (MD) has recently been gestured at by Lowe (1998), and Shalkowski (2004).

In what follows, I want to offer an argument and some considerations in favor of the conclusion that logically necessity is in part determined by metaphysical truths and necessities.[2] The argument below concerns what can be appealed to in judging or choosing which formalization of logic is correct.

1. P is logically necessary only if P is either an axiom or deductive consequence of the axioms of the correct logical system.
2. There are multiple formalizations of logic that are plausible (i.e., classical first-order systems, paraconsistent systems, many-valued systems, etc.).
3. There are three plausible domains one can appeal to in order to determine which formal system correctly captures logic: logic, metaphysics, or physical theory.
4. Appealing to different formalizations of logic to determine which formal system is correct is *circular*. Moreover, one cannot appeal to facts about a first-order classical system to argue that a paraconsistent system is not adequate. The facts appealed to must be external to the formalization.
5. Appealing to physical theory to determine which formal system is correct would commit the *naturalistic fallacy*.

6. Consequently, the domain one must appeal to in determining which formalization of logic is correct is metaphysics.
7. Therefore, some metaphysical truths about the scope and nature of logic determine whether P is logically necessary.

One consequence of the argument above is that if one conceives of possible worlds as maximal sets of propositions, sentences, or thoughts, then the set of logically possible worlds one admits is determined by the logical system one adopts. If one adopts a paraconsistent system, then there will be logically possible worlds in which both P and ∼P are true. If one adopts a classical first-order system, then there will be no possible world in which both P and ∼P are true. But, the choice of which logical system is the correct system cannot be settled on logical grounds alone without being circular. By contrast, appealing to physical facts (i.e., physical theory broadly construed—physics thru psychology) would not be circular, but would run afoul of Frege's Maxim. Those familiar with the debates between Frege and Husserl will recall Frege's remark, "Like ethics, logic can also be called a normative science (Frege, 1997)." Consequently, appealing to how we in fact *do* reason (i.e., the inferences we actually make), and arguing that the most common inferences we do make are the *good* inferences would be to give a descriptive account of logic, not a normative account. So, for those that want to preserve logic as a normative science appealing to physical theory to determine which formalization of logic is correct would be inappropriate. If these two considerations are correct, then the metaphysics of logic is all one can appeal to in determining what the correct logical system is.

In addition – and independently of how we do or should make choices about which system is the correct logical system – one must notice that logical necessity is metaphysically determined by the logical constants. Modality is a property of truth, and so necessity is a property of truth. Truth is a property of propositions. So, which propositions are logically necessary is determined by which propositions are logically true. A proposition P is a logical truth just in case P is true under every replacement of constituents of P that are not logical constants.[3] Consequently, the logical truths are determined by what the logical constants are.

One more consideration that shows how logical necessity rests on the metaphysics of logic comes from a well-known principle of metaphysics. One distinctively metaphysical principle is the essentiality of fundamental kind.[4] In general, the fundamental kind of thing x is, is a property x cannot fail to have. The properties that individuate an entity at its most fundamental level are essential to the entity. These properties speak to the issue of *what kind* of thing x is.[5] The suggestion here is that *being a*

logical constant is a fundamental kind property. If *c* is a logical constant, then *c could not have* been a non-logical constant. Just as the Statue of David is essentially an artifact, and Nixon is essentially a human, the entities that are logical constants are *essentially* logical constants. What things are taken to be logical constants can vary across various formalizations of logic. However, for a system *L* to be the correct logical system is for it to capture the *essential* nature of the logical constants. Consequently, there is a *metaphysical* foundation to logic.

Finally, a clarification should be noted. The argument and considerations in favor of (MD) do not settle the debate between (MM) and (MP), nor do they prove that the set of logically necessary truths is a proper subset of the set of metaphysically necessary truths. The argument merely suggests that logical necessity and logical truth are in part *determined* by metaphysical truths about the scope and nature of the logical constants. Some of these metaphysical truths in turn will be metaphysically necessary. So, if P is logically necessary, it is metaphysically necessary that P is logically necessary.

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NOTES

[1] It is important to note that (MD) is not equivalent to (ML) the claim that the set of logical necessities is a proper subset of the set of metaphysical necessities. (ML), properly speaking, is actually the third relation logical necessity can bear to metaphysical necessity. However, to my knowledge no one has yet endorsed (ML).

[2] The argument below does not imply (ML). It is still possible that the set of metaphysically necessary truths is the same set as the logically necessary truths because it couldn't have been the case that there are any other worlds.

[3] It is far more common to talk of logical truth as a property of sentences, rather than as a property of propositions. In addition, it is far more common to talk of a sentence being logical true because it is true under every interpretation of non-logical terms. Moreover, some would deny that propositions could be logically true, and that talk of a proposition being logically true is a category mistake. Nevertheless, the formulation of logical truth I have presented above is one that applies directly to propositions, and not derivatively. I offer this account because if the bearers of truth are propositions, then if there is a coherent notion of a *logical* truth it should apply to propositions. Furthermore, one can adjust the standard notion of logical truth as applied to sentences to apply to propositions. A propositions *P* is a logical truth just in case *P* is true under every *replacement* of non-logical *constituents*. The standard notion of true under every

interpretation requires that we hold fixed some terms of a language (i.e., the logical vocabulary captured by the logical constants). We cannot talk of a proposition being true under every interpretation because sentences, and not propositions, get interpreted. Propositions do not have linguistic objects as constituents. However, we can talk of a proposition being true under ever replacement of non-logical constituents. Propositions have constituents, and some of these are logical. Hold fixed the logical constituents (i.e., the logical constants – whatever they are), and vary the other elements of the propositions. If the proposition remains true under every replacement, then the proposition is a logical truth. Moreover, what is needed is a conception of a model that applies not to sentences but to propositions. A sentence is a logical truth when it is true in all models, holding fixed the logical constants. A proposition is a logical truth when it is true in all models, holding fixed the logical constituents. If a model is fundamentally a function, then the notion of a model should be extendable so as to apply to propositions and their elements. If so, we can talk coherently of a proposition being a logical truth.

[4] See Christopher Peacocke's *Being Known* (Oxford University Press; 1999: ch.4) for an excellent discussion of the principle of fundamental kind.

[5] See Kit Fine's "Essence and Modality," *Philosophical Perspectives* 8for discussion of the notion of an essence of a thing that is tied to discussion of *what kind of thing x* is.

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