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### What is Logical Monism?<sup>1</sup>

Logical monism is the view that there is ‘One True Logic’. This is the default position in philosophy, against which pluralists react. If there were not ‘One True Logic’, it is hard to see how there could be one true theory of *anything*. A theory is closed under a logic! But what *is* logical monism? In this article, I consider semantic, logical, modal, scientific, and metaphysical proposals. I argue that, on no ‘factualist’ analysis (according to which ‘there is One True Logic’ expresses a factual claim, rather than an attitude like approval), does the doctrine have both metaphysical and methodological import. Metaphysically, logics abound. Methodologically, what to infer from what is not settled by the facts, even the normative ones. I conclude that the only interesting sense in which there could be One True Logic is noncognitive. The same may be true of monism about normative areas, like moral, epistemic, and prudential ones, generally.

#### I. Logic and Metalogic

What is logical monism? Estrada-González provides a typical gloss.

Logical monism is the view that there is only one correct logic or, alternatively, the view that there is only one genuine consequence relation, only one right answer to the question

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on whether and why a given argument is valid, only one collection of valid inferences (or of logical truths), or only one right way of reasoning (2011, 111).

Logic in the relevant sense is really metalogic. As Estrada-González intimates, it concerns what is valid (that is, a logical truth), what follows from what, what is consistent, and so on. It does not directly concern what (non-meta-logical) claims are true. For example, it does not (directly) concern whether either every even natural number greater than 2 is equal to the sum of two prime numbers or it is not the case that every even natural number greater than 2 is equal to the sum of two prime numbers – what I will call the *Goldbach Disjunction*, as this is the disjunction of Goldbach’s Conjecture and its negation.<sup>2</sup> Why care about ‘logic’, thus construed? Because disagreements about what follows from what, what is valid, what is consistent, and so on are thought to *translate* into disagreements over the likes of the Goldbach Disjunction. They *license different inferences*. The classicist, but not the intuitionist, says that this disjunction follows from anything. Hence, we ought to infer it – or, at least, ought to infer it, *ceteris paribus*.<sup>3</sup>

Note that this argument assumes that logic is normative. The concept of validity is like the concept of generosity. The claim that an argument is valid does not just have descriptive content, such as that the conclusion has a designated value under every interpretation under which the premises do. It also says that one *ought* not disbelieve the conclusion if one fully believes the premises, or some such. As Glymour (2015, 6) puts it, ‘Valid deductive arguments guarantee that if their premises are true, their conclusions are true. So if one believes the premises of a

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<sup>2</sup> I appeal to the Goldbach Conjecture because of its simplicity and familiarity. But it is potentially distracting for the cognoscenti on account of its being  $\Pi_1$  (so, if it is consistent with  $PA$ , then it must be true). One is welcome to replace the ‘Goldbach Disjunction’ with ‘Collatz Disjunction’ in what follows. The Collatz Conjecture is not  $\Pi_1$ .

<sup>3</sup> If one has qualms about the idea of inferring something from the empty set: one ought to believe it, *ceteris paribus*. (Of course, no one claims, in general, that one should believe something only if one believes that it is valid.)

valid deductive argument, one *ought* to believe the conclusion as well (italics in original).’ The assumption that logic is normative has been influentially challenged by Harman (1986).

However, since the argument to follow would only be strengthened if it were false, I will grant it.

## II. The Semantic Answer

Logical monism is, thus, really the view that there is only one true metalogic. But what does *that* mean? If there is anything like a standard answer, it is semantic (Boghossian (2000), Dummett (1975), perhaps Haack (1978), Griffiths and Paseau (2022), Peacocke (2004), Read (2006), Williamson (2013)). Zach writes, ‘The question of whether [some] logic is the correct logic is the question of whether the implication relation so defined agrees with the pre-theoretic notion of implication between statements (2018, 2080).’ And Quine (in)famously complains that ‘when [the paraconsistent logician] tries to deny [the law of noncontradiction] he only changes the subject (1970, 81).’<sup>4</sup> The logical pluralist position, advanced in, for example, Beall and Restall (2006) and Shapiro (2014), is, accordingly, that ‘natural language expressions like ‘follows from’ are unsettled, vague, or ambiguous, and may be settled, made more precise, or disambiguated, in more than one way (Russell, 2021).’<sup>5</sup>

Note that the dispute between pluralists and monists, thus conceived, is independent of the debate about logical *realism* – as the debate between pluralists and monists about set theory is independent of the debate over set-theoretic realism (Clarke-Doane, 2020, Sec. 1.6). The truth-value of ‘the Goldbach Disjunction is a logical truth’ may be independent of us, once we fix what we mean by ‘logical truth’, even if there are different legitimate presificiations of the

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<sup>4</sup> ‘Infamously’ because this complaint does not square with Quine’s (1951) critique of analyticity.

<sup>5</sup> See Carnap (1950) for a precursor.

term. Conversely, the term may be determinate and unambiguous, although the truth-value of ‘the Goldbach Disjunction is a logical truth’ depends in an important sense on us (Resnik 1999).

What is wrong with the standard answer? Even if ‘the Goldbach Disjunction is a logical truth’ is determinately and unambiguously true out of our mouths, it is not true out of another possible community’s mouth.<sup>6</sup> They may use ‘logical truth’ to mean, say, intuitionistic validity.

Goldbach’s Disjunction is not an intuitionistic validity. So, there are two relations:  $\text{validity}_{\text{Us}}$  and  $\text{validity}_{\text{Intuitionistic}}$ . There is no dispute that both relations ‘exist’ if either does.<sup>7</sup> The only dispute is about which of these we happen to pick out with ‘logical truth’ (or about what is packed into the concept of logical truth that we happen to employ). The monist and the pluralist, understood in the standard way, agree on the non-semantic world. (Indeed, one could make classical logic the One True Logic, in the standard sense, by indoctrinating children with the classical truth tables!)<sup>8</sup>

Of course, it is often of metaphysical and methodological import what a sentence is about. The fact that another possible community means either by ‘dark matter’ hardly undercuts the interest of the debate over dark matter. But the logical case is not like this. It is more like the case of pure (rather than applied) geometry. Hyperbolic lines exist if Euclidean lines do, qua pure mathematical entities. So, all we would learn in deciding ‘whether the...relation[s] so defined agree...with the pre-theoretic notion[s]’ would be something about ourselves. We would just learn which line-like things we happened to refer to with ‘line’. This is why, in practice, we just

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<sup>6</sup> See Eklund (2020) for a cognate argument, with special reference to rival resolutions of the Liar Paradox.

<sup>7</sup> I put ‘exist’ in quotes because if the nominalism about properties of Quine (1948) is true, then no relations literally exist. What is true is that both predicates are satisfied. See Section VI. I will not continue to add this qualification.

<sup>8</sup> Recall that one can make any verbal dispute, including a dispute about what relation ‘validity’ picks out, sound metaphysical by semantically descending. For instance, the question of whether ‘bank’ (out of our mouths) refers to a monetary institution or a land mass bordering a body of water may be rephrased: are banks *really* monetary institutions or land masses bordering bodies of water? Either way, all that is at issue is what we mean by ‘bank’.

stipulate that we will mean, say, hyperbolic line by ‘line’, and proceed to draw conclusions. (It is also why the search for the truth-value of the Continuum Hypothesis (*CH*) is supposed to be misconceived if set-theoretic pluralism is true (Balaguer 1995, Hamkins 2012, Clarke-Doane 2020, Ch. 6). Even if we all pick out the same thing with ‘set’, there is another universe of set-like things satisfying different sentences.) In a similar way, intuitionistic validity ‘exists’ if classical validity does. The only factual question at stake is what we happen to mean by ‘valid’. *If there were a (meta)logical analog to the question of which geometry is true of physical spacetime*, then the logical case might be like the dark matter case. But we will see in Section IV that there is not.<sup>9</sup>

It might be thought that the monist and the pluralist, understood standardly, at least disagree about method. The monist asserts, while the pluralist denies, that ‘the Goldbach Disjunction is valid’ is determinately and unambiguously true (assuming, for simplicity, that they believe that classical logic is the One True Logic). So, the parties disagree about whether we *ought* to infer (or believe) the Goldbach Disjunction, other things being equal.<sup>10</sup> But disagreement about what we ought to do is not yet disagreement about method. Just as Hume pointed out that there is a gap between knowledge of what is *F*, for descriptive predicates, *F*, and knowledge of what we ought to do, there is a gap between knowledge of what we ought to do (factually construed), and knowledge of what *to* do, in any sense of ‘ought’ you like.<sup>11</sup> Maybe we ought to infer the Goldbach Disjunction, because we happen to mean classically valid by ‘valid’, and the Goldbach

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<sup>9</sup> I assume here, contra radical conventionalists like Poincaré (1902) and Reichenbach (1928), that spacetime has a unique geometry.

<sup>10</sup> Again, this assumes, what some deny, that (meta)logical concepts are normative, like that of generosity. If they are not, then this objection even more clearly does not get off the ground. I will not continue to add this qualification.

<sup>11</sup> See Clarke-Doane (2015, 2020b), and, especially, (2020a, Sec. 6.5) for a fuller argument, but with a focus on moral, epistemic, and ‘all-things-considered’ norms.

Disjunction is classically valid. Similarly, maybe we ought to retribute against the responsible because the concept of responsibility that we happen to have inherited entails retribution. That does not settle whether to retribute (even if it does settle whether we *ought* to)! Whether to retribute depends on whether to defer to the concepts that we actually find ourselves with (not to be confused with the question of whether we *ought* to defer to them – since, cheaply, we ought to defer to ‘ought’, ‘good’, ‘reasonable’, ‘rational’, ‘logical’ and so forth).<sup>12</sup> One can be ‘against’ retribution in the sense that matters while conceding that ‘we ought to retribute’ is true out of our mouths (cf. Eklund 2017, Ch. 7). One can advocate doing what we ought<sub>Them</sub> to do. (One might express their method using an imperative. ‘Do not retribute (even if you ought to)!’) Disagreement over facts is one thing, and disagreement over method another, *even when the facts are normative*. What to infer – and, quite generally, what to do – is not settled by semantics!<sup>13</sup>

### III. The Logical Answer (Collapse)

Perhaps a logical account of monism would vindicate its metaphysical and methodological interest. Frege, following Kant, argues that ‘the basic propositions [of logic]...extend to everything that can be thought’ (1884, 112).<sup>14</sup> On one reading, this requires that there be a maximal kind of consistency. One obtains it by amalgamating the pluralist’s. This is like the set-theoretic monist’s ‘one true  $V'$ , to which I alluded (Gödel 1947, Woodin 2010). It is the final

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<sup>12</sup> Compare: quantum logicians (to be discussed in Section V) are not speculating about our actual concept of disjunction (or the corresponding concepts of following from, rationality, and so forth). They are advocating a different concept, at least for purposes of fundamental physics.

<sup>13</sup> This is why remarks like the following are misleading. ‘If someone...just says, ‘*Hmm*, your argument is perfectly correct, but the issue is whether perfectly correct arguments should be accepted’, then one does not know what to do (Kripke Forthcoming, 8).’ The issue is not whether such arguments *should* be accepted (they should!). The issue is *whether to* accept what we should accept. After all, we also should\* accept correct\* arguments, for some should-like and correct-like concepts, should\* and correct\*. So the question arises: whether to do what we should or should\* do (where this is *not* the presumably empty question of whether we should do what we should or should\* do)? Of course, one can always express one’s conclusion in the form of a declarative sentence *a la* Gibbard (2003).

<sup>14</sup> Carroll (1895) and Quine (1936) make related arguments. See also Kripke (Forthcoming) who concludes that ‘logic...cannot just be like geometry because one cannot adopt the logical laws as hypotheses and draw consequences. You need logic in order to draw consequences (20).’

court of appeals for logical questions. The monist asserts, while the pluralist denies, its existence. Priest writes,

Even if modes of legitimate inference do vary from domain to domain, there must be a common core determined by the syntactic intersection of all these.... Despite the fact that there are relatively independent domains about which we reason, given any two domains, it is always possible that we may be required to reason across domains (2006, 174f).

An obscurity infecting this argument is what counts as a kind of consistency. Does Mortensen's (1989) trivial logic afford one? If so, and if monism is true, then everything is really consistent with everything, and nothing really follows from anything.<sup>15</sup> Alternatively, if we draw the line before the trivial logic, then indefinite extensibility threatens. Beginning with any non-trivial logic, we would seem to be able to intelligibly weaken it by considering what would have been the case had some validity in the logic failed. The concept of a weakest, but non-trivial, logic would, therefore, appear to be indeterminate in something like the sense of 'all ordinals' or 'all subsets' (Clarke-Doane 2019, Sec. 8-9). "[I]f we can form a definite conception of a totality all of whose members fall under the concept [of maximal consistency], we can, by reference to that totality, characterize a larger totality all of whose members fall under it [Dummett 1993, 441]."<sup>16</sup>

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<sup>15</sup> As far as I can tell, this is the same as saying that 'logical nihilism', in the sense of Russell (2018)s, is true. Beall and Restall likewise claim, 'we see no place to *stop* the process of generalisation and broadening of [the generic notion of 'case'] (2006, 92, italics in original).' (Cotnoir distinguishes another kind of logical nihilism that is instead related to the semantic analysis of logical monism. According to this view, 'There are no logical constraints on natural language inference; there are always counterexamples to any purportedly valid forms (2018, 303).')

<sup>16</sup> Unlike the case of mathematical objects, which is Dummett's concern, one cannot explain the indefinite extensibility of consistency modally, if consistency itself is understood modally, as it commonly is (Sec. IV & Field 1989, Introduction). That would be too close to circular. So, if we are looking for a uniform account of indefinite extensibility, and agree that logical consistency is indefinitely extensible, then we must reject what are perhaps the most salient accounts of the phenomenon in terms of modal language like Dummett's: 'can...characterize'.

One way to avoid this problem is to identify the correct logic, not with the weakest (or most inclusive) logic, but with the *strongest*. This has also been done. Read writes,

[S]uppose there really are two equally good accounts of deductive validity,  $K_1$  and  $K_2$ , that  $\beta$  follows from  $\alpha$  according to  $K_1$  but not  $K_2$ , and we know that  $\alpha$  is true.... It follows  $K_1$ -ly that  $\beta$  is true, but not  $K_2$ -ly. Should we, or should we not conclude that  $\beta$  is true? The answer seems clear:  $K_1$  trumps  $K_2$ . After all,  $K_2$  does not tell us that  $\beta$  is false; it simply fails to tell us whether it is true....  $K_1$  and  $K_2$  are not equally good.  $K_1$  answers a crucial question which  $K_2$  does not. [This] question is the central question of logic (2006, 194–195).<sup>17</sup>

However, this approach just invites a different kind of indefinite extensibility. Consider the ‘Spinoza logic’ according to which something is valid just in case it is (actually) true. So, every truth follows from every other truth, because it follows from anything. This would trump all other logics, by Read’s criterion. Of course, the Spinoza logic conflates the theory of ‘necessary truth-preservation as a matter of form’ (Pietroski 2021) with that of mere truth preservation. But, notoriously, a principled conception of logical form presupposes a principled criterion for being a logical constant (McFarlane 2009, Tarski 1986, Varzi 2002). Does identity count? Does ‘there are  $\omega$ -many’? The more that counts, the stronger the strongest logic. (The monist could retreat to the view that the sense in which there is One True Logic is merely that, fixing on a class of logical constants (the choice of which is a matter of expediency), there is One True Logic. But

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<sup>17</sup> Read’s position is consonant with Priest’s insofar as a True Logic must be necessarily truth-preserving. But note that this assumes that there is One True theory of necessity, i.e., how the world could have been, a view that is hardly more transparent than logical monism. See Section IV. and, for details, Clarke-Doane (2019, 2022, Ch. 4).



this would leave ‘One True Logic’ unanalyzed. The next objection applies even to this revised position.)

Let us suppose that there is a principled place to draw the line between the trivial and Spinoza logics. The arguments above still fail to secure a useful conception of logical monism. The problem is that the strength of a logic is *perspectival*, like the breadth of a concept of set. Consider the latter. Martin complains, ‘[t]he models postulated by [the set-theoretic pluralist] determine a canonical maximal set-theoretic structure, the amalgamation. If one takes those models seriously, then one should regard this canonical structure as the true universe of sets’ (2001, 14). The difficulty with this argument is that it assumes that we can stably compare competing set concepts. In order to make the comparison, we need a metatheory, which will itself use a concept of set. So, the only real lesson is that ‘within any fixed set-theoretic background (Hamkins 2012, 427)’ there is a broadest concept of set. It is not that there is a broadest concept of set *period*. In a similar way, contra Priest and Read, what follows from what, what is consistent, and what is a logical truth even *in a logic* depend on the logic one uses to check (Shapiro 2014, Ch. 7). So long as the standard candidates count, a logic,  $L$ , may fail to be weakest (strongest), relative to another,  $L^*$ , even if relative to yet another logic,  $L^{**}$ , it is.<sup>18</sup>

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<sup>18</sup> Compare Clarke-Doane (2022, 4.4 & 4.5). Is there any way to ‘operationalize’ debates about what follows from what in a fixed logic? One should at least be able to convince Priest (1987) that his inconsistent arithmetic is wrong of the actual world in the following sense. It says of infinitely-many  $\Delta_0$  sentences that they are both true and false. But many  $\Delta_0$  problems, like checking whether an alleged proof in classical logic is a proof in classical logic, can be carried out by ordinary computers, i.e., concrete Turing machines (with finite memory). So, suppose that a concrete string is confirmed in *Lean* to be a proof in classical logic (we could cross cross-check this output against any number of other proof checkers, like *Cog*). In infinitely-many such cases, an advocate of the view that Priest’s inconsistent arithmetic is true of our world would have to deny that a concrete specifiable physical process has occurred (while also affirming that it has). This would seem to refute their position. (An example along these lines is due to Will Cavendish in conversation.)

The upshot is that absent *another* reason to privilege a *metalogic*, logical monism qua the hypothesis that there is a weakest, or strongest, logic is monism in name only. What logic qualifies as the weakest, or strongest, depends on the (meta)logic we use to decide! Of course, we might advocate evaluating the strength of a logic relative to our favorite – maybe even the logic we happen to pick out with the word ‘logic’. But, as it stands, this is merely an admonition. It is advice that one can take or leave independent of the arguments above.

#### IV. The Modal Answer (Collapse Continued)

A valid argument is one whose conclusion *must* be true (or have a designated value) if its premises are true (have one too). This suggests a different kind of collapse argument. Perhaps the claim that some logic,  $L$ , is correct really means that, for any non-modal proposition,  $P$ , if  $P$  could have been the case, then it could have been as a matter of  $L$ -possibility. So,  $L$  is the correct logic if, for any proposition,  $P$ , and for any other kind of possibility,  $\langle \rangle$ ,  $\langle \rangle P \rightarrow \langle L \rangle P$ , but perhaps not conversely. That is,  $\langle L \rangle$  is a most inclusive kind of counterfactual possibility.

An immediate problem with this proposal is that logical possibility, unlike, say, physical possibility, is commonly taken to concern sentences, not propositions (what sentences express). What does  $\langle L \rangle P$  mean when  $P$  is a proposition? As Quine (1953) noted, there is no problem introducing an operator,  $\langle L_S \rangle$ , that applies to non-modal sentences. The expression,  $\langle L_S \rangle Q$ , for instance, can mean that the finite conjunction of the axioms of Robinson Arithmetic is consistent (or, by the Completeness Theorem, has a model). But what could it mean to say that *what that conjunction expresses* is consistent? Is  $Q + \sim \text{Con}(Q)$  thus consistent? How do we decide? One

cannot just defer to a theory of propositions.<sup>19</sup> A pluralist about propositional consistency may also be a pluralist about kinds of proposition (McCarthy & Clarke-Doane Forthcoming)!

Let us suppose that this problem can be solved. How could one argue that a kind of logical possibility is at least as inclusive as any other kind of possibility? Hale (1996), following McFetridge (1990), argues thus. Let  $[\ ]$  and  $\langle \rangle$  represent any kinds of counterfactual necessity and possibility, and let  $[*]$  and  $\langle * \rangle$  represent logical necessity and possibility. Then Hale assumes:

1. If  $[*](A \rightarrow B)$  then  $[*][(A \ \& \ C) \rightarrow B]$
2.  $[*](A \rightarrow A)$
3. If  $[*](A \rightarrow B)$  and  $[*](A \rightarrow C)$  then  $[*][A \rightarrow (B \ \& \ C)]$
4. If  $\langle \rangle A$  and  $[*](A \rightarrow B)$  then  $\langle \rangle B$
5.  $\sim \langle \rangle (A \ \& \ \sim A)$

Hale argues that nothing is possible that is logically impossible,  $\sim \langle * \rangle$ , as follows.

- A.  $[*](A \rightarrow B)$  (assume for reductio)
- B.  $\langle \rangle (A \ \& \ \sim B)$  (assume for reductio)
- C.  $[*][(A \ \& \ \sim B) \rightarrow B]$
- D.  $[*](\sim B \rightarrow \sim B)$
- E.  $[*][(A \ \& \ \sim B) \rightarrow \sim B]$
- F.  $[*][(A \ \& \ \sim B) \rightarrow (B \ \& \ \sim B)]$

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<sup>19</sup> For a recent work on the idea of logical possibility, *qua* an operator on propositions, see Bacon (2020).

G.  $\diamond(B \ \& \ \sim B)$

H.  $\sim \diamond(B \ \& \ \sim B)$

I.  $\sim \diamond(A \ \& \ \sim B)$

If successful, this argument would seem to show that a fragment of intuitionistic logical possibility is the One True Logic. But assumptions 4 and 5 are problematic. With respect to 5, Hale claims that ‘there is no reasonable sense of ‘possible’ in which it is possible for a contradiction to be true (1996, 97).’ But this just transposes the semantic answer of Section II to the key of modality. What is a *reasonable* sense of ‘possible’? Although modal notions have been liberally exploited at least since Kripke (1980), the claim that there is One True Theory of how the world could have been is hardly clearer than the claim that there is One True Logic. There are a plethora of cross-cutting senses of ‘could have been’ such that, e.g., you could have had different parents in some of these senses, but you could not have in another. (These are already studied under the misleading heading ‘impossible worlds’ (Berto 2009).) The question of which such sense is the true one looks worryingly like the question of which logic is true.

Perhaps assumption 5 would be defensible if we really had no idea how to reason with contradictions. But paraconsistent logic is a going concern. Even a classical logician can reason about a situation in which *Basic Law V* is true, using, say, Priest’s system, *LP* (the Logic of Paradox), just as they can reason about an intuitionistically possible, but classically impossible, one.<sup>20</sup> Paraconsistent consequence may diverge from the ordinary meaning of ‘consequence’.

But, again, that does not settle whether to use it – much less whether we are capable of using it.

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<sup>20</sup> Do not confuse Priest’s *LP*, and the claim that it might, as a matter of *LP*-possibility have been the case that *Basic Law V* was true, with the position criticized in an earlier footnote that inconsistent arithmetic (closed under *LP*) is actually true.

Even if assumption 5 were credible, why accept 4? Hale claims ‘[i]f the logical consequences of  $\diamond$ -possibilities need not...be  $\diamond$ -possible...we would...be deprived of any...way to test...claims about  $\diamond$ -possibility (2013, 108).’ But this is simply false. To deny 4 is to deny that there is a *single* logic that one can use to reason about possibilities of *every* kind. It is not to deny that, for every kind of possibility, there is some logic that one can use to reason about it.

The upshot is that the modal answer just trades the claim (of Section III) that the One True Logic is the weakest one for the claim that logical possibility is the most inclusive kind of counterfactual possibility. The latter claim is just as much in need of clarification and defense. The Hale-McFetridge defense is not compelling. What else could logical monism be?<sup>21</sup>

## V. The Scientific Answer

Maybe a scientific answer would be more promising. Before losing his nerve, Quine compared logical laws to physical ones. ‘Revision even of the logical law[s]...has been proposed as a means of simplifying quantum mechanics; and what difference is there in principle between such a shift and the shift whereby Kepler superseded Ptolemy, or Einstein Newton, or Darwin Aristotle (Quine 1951, 41-2)?’ Putnam went further, writing, ‘It makes as much sense to speak of ‘physical logic’ as of ‘physical geometry’. We live in a world with a non-classical [quantum] logic... (1968, 226).’ The geometry of the world is at least of metaphysical interest!

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<sup>21</sup> There are conceptions of validity according to which judgments of validity have no modal, much less normative, force. The view that a sentence form is valid just in case it is actually true under every substitution instance is such a conception (Russell 1908). But as Williamson (2005) stresses, not only do we regard valid reasoning as good, we expect to be able to rely on logic under counterfactual suppositions. (The substitutional view also suffers from the problem of logical constants mentioned above.)

Unfortunately, Putnam never tells us what this means. In the geometric case, it means that initially parallel geodesics (e.g., light rays) do not stay the same distance apart. But what is the physical content of the key claim of quantum logic, that the *Distributive Law*,  $P \& (Q \vee R) \longleftrightarrow [(P \& Q) \vee (P \& R)]$ , is invalid? Let  $S_i$  and  $T_i$  be eigenstates of position and momentum, respectively. Then, according to quantum logic:  $(S_1 \vee S_2 \vee \dots \vee S_j) = (T_1 \vee T_2 \vee \dots \vee T_k) = \text{span of spaces} = \top$ , while  $(S_l \& T_m) = \text{intersection of spaces} = \perp$ , for all  $l$  and  $m$ . So, indeed,  $S_i \& (T_1 \vee T_2 \vee \dots \vee T_k) = S_i \neq (S_i \& T_1) \vee (S_i \& T_2) \vee \dots = \perp \vee \perp \dots = \perp$ . Still, classical consequence (respecting the distributive law) ‘exists’ if quantum consequence does!<sup>22</sup> It is just a truth-function. So, there is no metaphysical question at stake (bracketing questions of so-called ‘metaphysical privilege’ to be discussed). The only sensible view is that quantum consequence is more useful for modeling Yes/No questions in quantum mechanics. This is like the (standard) view that while Euclidean, hyperbolic, etc. spaces exist, if any do, *as pure mathematical structures*, a certain (pseudo-)Riemannian manifold is most useful for modeling spacetime.<sup>23</sup> Unlike the geometric case, however, there is no metaphysical remainder in the logical case, no physical analog to lines.

It would not suffice to vindicate the ‘physical correctness’ of quantum logic to show that  $P \& (Q \vee R)$  is (actually) true while  $[(P \& Q) \vee (P \& R)]$  is false – where, say,  $P$  is that we observe the double-slit experiment without observing which slit the particle went through,  $Q$  is that we

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<sup>22</sup> Notwithstanding Putnam’s remark that ‘There are operations approximately answering to the classical logical operations, vis. the  $\vee$ ,  $\&$ , and  $\sim$  of quantum logic’ [*sic*]. If these are not the operations of disjunction, conjunction, and negation, then no operations are (1968, 235).’ (Putnam also claims that ‘all so-called ‘anomalies’ in quantum mechanics come down to the *non-standardness of the logic* (1968, 222, italics in original).’ With quantum logic ‘every single anomaly vanishes (1968, 226)).’ But this is incorrect. The most serious anomaly, the Measurement Problem, could just be rephrased. Why does measuring an *indeterminate determinable* result in a *determinate*?)

<sup>23</sup> Since we are never going to know the exact distribution of mass-energy, the more careful claim is that a class of such spaces is most useful (this one for modeling the spacetime surrounding a spherically symmetric non-rotating black hole, that one for modeling the global structure of spacetime, etc.).

observe the particle pass through the left slit, and  $R$  is that we observe the particle pass through the right slit (even if this did suffice to show that any logic according to which the *Distributive Law* was *valid* was wrong). Again, (meta)logic is about what is *valid*, consistent, follows from what, and so on, not (merely) about what is true. If the notion of a correct logic makes sense, then one can hold that the Goldbach Disjunction is neither true nor false while denying that some particular paracomplete logic is correct. The most that one can conclude from the indeterminacy of the Goldbach Disjunction is that any logic that *fails* to be paracomplete is *not* correct. But that is like the conclusion that Euclidean geometry is not correct. It wildly underdetermines which theory *is* correct. In the geometric case, we have some sense of what it means for the physical world to transcend our theories. But what could it mean for some particular paracomplete logic, among all of those that get the actual (non-metalogical) truths right, to be *physically* correct?

It might be thought, following Sider (2011), that it means that the best summary of the physical facts includes, e.g., intuitionistic facts but not *FDE* (First-Degree Entailment) ones. But this is hard to understand. The physical facts (on any ordinary construal) do not include validity facts. Their best summary will be a statement of non-meta-logical facts. For instance, if we ignore gravity and dark matter and energy, then it might be the Lagrangian (density) of the Standard Model. Of course, any physical theory is *closed under a logic* (even if that closure does not contain any statements about what follows from what, what is consistent, and so on). But the choice of (meta)logic under which to close cannot itself be made on the basis of the physical facts. We need a metalogic to state them in the first place! For instance, do they include that either there are gravitons or that it is not the case that there are gravitons (or the denial of the

claim that there both are gravitons and are not gravitons)? It depends on whether the Law of the Excluded Middle (or *Noncontradiction*) is valid – or, at least, lacks an actual counterexample.

Even if it made sense to say that validity-in- $L$  facts, for some logic,  $L$ , figured into the best summary of the physical facts (perhaps because we had to use  $L$  to decide what the Lagrangian of the Standard Model implied), that would not show that other consequence relations do not ‘exist’. Euclidean lines ‘exist’ if pseudo-Riemannian geodesics do, even though the former are not used to describe the paths of freely-falling test particles. Similarly, *FDE* consequence exists, even if classical validity facts are the ones to which we appeal in meta-reasoning about physical theories. To be sure, the test particle paths *themselves* are unique (bracketing open questions of quantum gravity and multiverse scenarios). There are not Euclidean test-particle-paths, hyperbolic test-particle-paths, and so on. The point is that there is no analog to those in logic.

This difference is all the more apparent if logic is the science of ‘good reasoning’. Priest writes,

It is now an uncontentious fact that there are many pure geometries: Euclidean, Riemannian, spherical, etc....The question of rivalry occurs when one applies geometries for some purpose....[T]he canonical application [of logic is in] the analysis of reasoning....The central purpose of an analysis of reasoning is to determine what follows from what — what premises support what conclusions — and why (2006, 196-197).



This just returns us to the semantic answer of Section II.<sup>24</sup> There are all the different consequence relations ‘out there’, as there are the different *pure* geometries. The only factual question is to which of them terms like ‘follows from’ happen to correspond.<sup>25</sup> This is *not* like the scientific case. One cannot discover the properties of spacetime geodesics by analyzing one’s concept of line. One needs to check whether the world contains anything to which our concept corresponds. Often in science, it turns out not to. For example, whatever exactly we meant by ‘phlogiston’, the world did not cooperate. One might argue that the same is true of our concept of particle, given that in non-relativistic quantum mechanics particles cannot be assigned trajectories, and that in quantum field theory there is not even a position operator for photons.

There remains the methodological question of which consequence relation to use for a purpose – including the ‘canonical’ purpose of ‘determin[ing] what follows from what’. But that is no more a *factual* question than the question of what instrument to use for studying Sagittarius A\*.

## VI. The Metaphysical Answer

I have argued that the claim that there is One True Logic does not admit of a satisfying semantic, logical, modal, or even scientific analysis – contrary to what is widely assumed. Is there any other analysis of the doctrine that might vindicate its metaphysical and methodological import?

There is one. Instead of appealing to physics, it appeals to metaphysics. Lewis (1983) argues that the epistemic good requires having beliefs which ascribe *metaphysically privileged*

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<sup>24</sup> Priest seems to concede as much when he writes, ‘In virtue of the tradition of logic as being domain-neutral, [the weakest logic] has good reason to be called the correct logic (2006, 174f).’

<sup>25</sup> Of course, there is a unique set of actual reasoners and belief-transitions. But *those* could not fix the One True Logic. One cannot rebut quantum logicians with studies that ordinary reasoners use the Distributive Law (notwithstanding Ripley (2016)).

properties. Although he takes privilege to secure referential determinacy, the metasemantic component of his view can be set aside for reasons discussed in Section II. The metaphysical point is that, while a plurality of logics may ‘exist’ if any does (as in the case of pure geometry), one of them carves at the joints. Reality ‘favors’ one of them in something like the sense that it favors blue over bleen (in the sense of (Goodman 1955)). McSweeney writes, ‘the One True Logic is made true by the mind-and-language-independent world...[which]...makes it the case that the One True Logic is better than any other logic at capturing the structure of reality (2018, Abstract).’

One may have doubts about metaphysical privilege, certainly as applied to metalogical relations. For comparison, consider the conjecture that, say, elliptic geometry is metaphysically privileged over Euclidean, hyperbolic, or variably-curved geometries – where this does *not* mean that only one of these is true of spacetime. Even if this proposal is intelligible, no one, to my knowledge, has ever actually espoused it. What is the pertinent difference between geometry and metalogic (given that there is no useful sense in which some one logic is strongest or weakest, that one is true of the physical world, that the corresponding sense of ‘possible’ is broadest, and so forth)?

Let us suppose that this question has an answer. The metaphysical account of logical monism still fails to vindicate the metaphysical and methodological import of the doctrine. Consider method. Either metaphysical privilege is a normative property, with ramifications for which logic we *ought* to use, or not. Suppose that it is not. In that case, Hume’s is/ought gap kicks in. Knowledge that a metalogic is privileged is like knowledge that it is brown. It is neither here nor there from the standpoint of which we ought to use. On the other hand, if metaphysical privilege

is normative, then the further gap between what we ought to do and what *to* do, mentioned in Section II, arises. Suppose that classical logic is privileged. There is a privileged-like property,  $\text{privileged}_{\text{Intuitionistic}}$ , according to which it is not  $\text{privileged}_{\text{Intuitionistic}}$ .<sup>26</sup> The question of whether to infer according to classical or intuitionistic logic becomes whether to infer according to privileged or  $\text{privileged}_{\text{Intuitionistic}}$  properties. Even if one advocates bowing to the contingencies of natural language – ‘following’ the property that we happen to refer to with ‘privileged’ – this is a separate conclusion, not one that is out there in the normative pluriverse.<sup>27</sup> An omniscient semanticist could not resolve the question of whether to infer the Goldbach Disjunction (other things being equal) just by confirming that we refer to  $\text{privileged}_{\text{classical}}$  with ‘privileged’!

Nor does the metaphysical answer seem to fare better with respect to metaphysical import. All the different privileged-like properties presumably ‘exist’, just as all the different metalogical consequence relations do. The question of which of being  $\text{privileged}_{\text{intuitionistic}}$ ,  $\text{privileged}_{\text{paraconsistent}}$ , and so on is *real* privilege is just the question of what ‘privilege’ happens to mean out of our mouths. It is analogous to the question of which of  $\text{lines}_{\text{Euclidean}}$ ,  $\text{lines}_{\text{hyperbolic}}$ ,  $\text{lines}_{\text{elliptic}}$ , are real lines. All we learn by answering such questions is something about ourselves. We just learn which such entities we happen to refer to, rather than learning which entities there are.

It might be objected that this argument assumes that properties, including normative ones, are plentiful. Otherwise, being  $\text{privileged}_{\text{Classical}}$  might exist to the exclusion of being  $\text{privileged}_{\text{Intuitionistic}}$ . But a plenitude of properties is a consequence of both natural forms of both platonism and (Quinean) nominalism (Balaguer (2016), Loux (2017, Ch. 1), Quine (1948)).

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<sup>26</sup> The problem is similar to that of Dasgupta (2018) in connection with inductive methodology.

<sup>27</sup> Adding that the fact that we *ought* to defer to the property we pick out with ‘metaphysical privilege’ is out there obviously does not help. Now the question is whether to defer to what we ought to defer to.

According to platonism, properties are as abundant as can be (setting aside the semantic paradoxes). According to nominalism, the question of whether some property ‘exists’ is just the question of whether to accept some vocabulary into our overall theory of the world (hence the scare quotes). It is hard to see why ‘is privileged<sub>Intuitionistic</sub>’ would be more objectionable than ‘is privileged<sub>Classical</sub>’. (Again, unlike the set-theoretic case, presumably *no one* denies that different consequence relations exist if any consequence relation does. They are just truth-functions.)

I suppose that some unprecedented (to my knowledge) version of Aristotelianism about properties could be true, according to which properties are sparse, but include *being privileged* (along with the strong force, the electro-weak force, and so on). If that were so, then at most one metalogic could be privileged, in the only privileged-like sense of ‘privileged’ that is satisfied (as Aristotelians would claim that only one strong-force-like sense of ‘strong force’ is satisfied). Logical monism would then at least have metaphysical interest, if the question of what is privileged does. But not even this account of properties would secure the *methodological* import of logical monism. *No matter what the details of metaphysical privilege*, it remains open *whether to defer* to the privileged logic (and corresponding sense of ‘ought’, ‘rational’, ‘logical’ and so on).

## VII. Monism as an Attitude

I have discussed logical monism, the view that there is ‘One True Logic’. I have argued that there is no factual analysis of the view that vindicates its metaphysical and methodological import. The claim that there is One True Logic cannot be the claim that some particular consequence relation uniquely matches our use of ‘valid’, that there is a weakest, or strongest,

notion of logical consequence, or way the world could have been, that one consequence relation is scientifically correct (as one geometry is), or even that one logic is metaphysically privileged.

Analogous considerations suggest that ‘monism’ about normative areas generally is misconceived.<sup>28</sup> Is there ‘One True Moral Theory’? Is there ‘One True Epistemic’ one? Such questions are widely thought to be both factual and substantive (Alston 2005, Chang 1997, Enoch 2011, Huemer 2005). But, metaphysically, normative areas at most ‘postulate’ peculiar properties. The sentence ‘we ought to kill the one to save the five’ is *about* (i.e. names or first-order quantifies over) us, not *ought-ness*. This distinguishes normative cases from the set-theoretic case, where ontology is at issue. And, yet, even if there were a serious question as to whether some ought-like property (or operator) ‘exists’, or was privileged, this would not settle questions of method to which practical, as opposed to theoretical, theories are supposed to speak. It would not settle whether to do what we ought, rather than ought\*, to do, for some ought-like concept (which may not be satisfied!), ought\*, according to which we ought\* not kill the one.

I have allowed that there is a *non-factual*, i.e. noncognitive, sense in which logical – or, better, inference – monism is importantly correct. Indeed, there is a non-factual sense in which monism about *all* methodological questions is. We must either infer the Goldbach Disjunction or not! Similarly, we must either kill the one to save the five, or not. Pluralism is not an option at the level of action (including inference), simply because we can only do one thing in a circumstance (and doing X precludes doing  $\sim X$ ). How we manage to deliberate over methodology, given that

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<sup>28</sup> Of course, the logical and modal collapse arguments have no application to monism about non-logical domains. Another difference with the logic cases is that there is no analog to the ‘logic isn’t normative’ response of Section I.

what to do is not settled by the facts, *even the normative facts*, is thus of considerable interest. Some kind of non-cognitivist treatment is called for. But deliberation need not be not a monolith. *Prima facie*, we can decide to do what we judge (to use the vulgar) we ought not do, morally, intellectually, or otherwise. My own view is that the accounts of Blackburn (1984), Brandom (1994), and Gibbard (2003) are, therefore, untenable. But I cannot defend this here.<sup>29</sup>

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<sup>29</sup> I am not sure where Wagner (1985) belongs in the taxonomy canvassed. On one interpretation, Wagner's project is one of conceptual analysis, in the spirit of that described in Section II, or the second quote from Priest in Section V. On another, he is making a policy recommendation, perhaps for good reason. Either way, nothing that I have said precludes that "[first-order logic] has interesting, important epistemic properties. Its choice [as logic, properly so called] follows from a natural elaboration of traditional ideas on logic and argument (Wagner 1985, 31)." (Note that Wagner is focused on the first-order/higher-order debate, whereas I have focused on rival first-order logics.)

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