# Logical Knowledge

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**Abstract.** I examine two apparently opposing views in the epistemology of logic: exceptionalism, whose hallmark is the idea that logic is a priori, and anti-exceptionalism, whose hallmark is the idea that the justification of logical theories is abductive. I also argue that they are less opposed than is usually thought.

## 1. Setting the Scene

Characterising logical knowledge *ab initio* is marred with difficulties. Whose knowledge are we talking about and what is it knowledge of exactly? We could be talking about logicians' knowledge of whole logical systems, such as classical, intuitionistic or paraconsistent logic; or we could be talking about ordinary, untrained thinkers' knowledge of individual truths and principles, such as Modus Ponens (which, like most, I will use as my main example). And how should we state these truths and principles? Many epistemologists of logic, me included, tend to state Modus Ponens in a lightly regimented manner, using a mixture of English and logical notation so as to obtain almost well-formed statements, such as, for instance, the following:

> P, and (if P, then Q), together entail Q.

This is not a principle that is discussed by logicians or that you will find in logic textbooks, neither is it a principle that can plausibly be the object of ordinary thinkers' knowledge. It is for instance very unlikely that these thinkers grasp logical principles in their full generality or have a good grip on a clear notion of entailment. These principles should probably be stated in the vernacular but it is a good question – and one relatively unexplored – how we should go about stating the contents of ordinary thinkers' logical knowledge.

Another problem concerning the nature of logical knowledge has to do with whether we are concerned with the *justification of our beliefs* – in logical systems or in single logical principles such as Modus Ponens – or whether we are concerned with the *justification of deductive reasoning* – with what justifies us in using Modus Ponens as a way of reasoning.

These initial questions about whose knowledge and what it is knowledge of inform my discussion of the various views on the epistemology of logic I address in this entry.

Now, there is a long tradition in epistemology of thinking that logic is exceptional, of thinking that the way we gain justification for basic logical principles such as Modus Ponens, is distinctive, and unlike the way such justification is gained in the natural sciences such as physics. Logic is special, so the view goes, in that it is a priori – where that fact might be grounded in other exceptional properties such as being analytic, necessary or normative. Exceptionalism has come under (renewed) fire recently as there is renewed enthusiasm amongst epistemologists of logics for anti-exceptionalism – a view that goes back to Quine (1951) but that has been significantly refashioned, notably by Graham Priest (2016) and Timothy Williamson (2017). On this view, the way we get to be justified in our logical principles isn't distinct from the way we are justified for our theories in the natural science.

This entry critically examines these two apparent opposing views. Section 2 discusses and compares two mainstream versions of exceptionalism; Section 3 discusses anti-exceptionalism especially in connection with the question of whether logic is a priori. Section 4 offers a broader comparison between exceptionalism and anti-exceptionalism.

Before starting, note that the views and arguments discussed here are often not confined to the epistemology of logic, but might concern other domains where a priori knowledge could perhaps be gained, such as arithmetic or philosophy. But I restrict my attention to the case of logic.

## 2. Logical Exceptionalism

Defenders of exceptionalism argue that we can have outright, non-inferential knowledge of basic logical principles in a way that vindicates that logic is a priori. The justification is taken to be non-inferential, because of the common worry that if justification for logical principles were inferential, we would presumably have to use the very principles that we are trying to justify in our justificatory process, thus rendering the justification circular, in a way that undermines it (see Boghossian 2000 for discussion and see Goodman (1954) who offers a circular account of the justification of logical principles through the method of reflective equilibrium).

### 2.1. Rational Insight

The first version of exceptionalism is a kind of rationalist foundationalist view, according to which we can have 'rational insight' into the truth of logical truths or the validity of logical principles. Laurence BonJour, a main exponent of the view, puts it like this (see also Bealer 1992):

> When I carefully and reflectively consider [an instance of Modus Ponens], I am able simply to see or grasp or apprehend ... that the conclusion of the inference must be true if the premises are true. Such a rational insight, as I have chosen to call it, *does not seem to depend on any particular sort of criterion or any further discursive or ratiocinative process, but is instead direct and immediate*. (BonJour 1998: 106–107. My italics.)

How does this work exactly? Consider the following instance of Modus Ponens: it is day, and if it is day, then it is light, together entail that it is light. According to BonJour, if you understand the concepts that occur in this instance of Modus Ponens, you can directly recognise the truth of such a fact of entailment – you can directly recognise the very necessity of that fact, and why it must be so. You are thereby justified in believing that: it is day, and if it is day, then it is light, together entail that it is light. Your belief is a basic belief, since states such as rational insight are not discursive. Moreover, rational insight gives you an a priori reason to believe that this instance of Modus Ponens must be correct since it has to do with understanding what the instance says and so doesn't require evidence from sensory experience. This justification is defeasible – basic beliefs are not infallible – but if undefeated it suffices for a priori knowledge.

### 2.2. The Understanding Account

The understanding account has it that knowledge of basic logical principles is grounded in semantic or conceptual understanding (See e.g. Boghossian (1996), Hale and Wright (2000) and Peacocke (2005)). Such principles, which are typically the introduction and elimination rules of the logical constants, are taken to fix the meanings of the logical constants, in the way inferentialism or conceptual role semantics suggests: the principles are taken to be implicit definitions or meaning-postulates. For instance, Modus Ponens, the elimination rule for the conditional, together with Conditional Proof, its introduction rule – according to which a derivation of Q from the supposition that P that is then discharged, entails that if P, then Q – are taken to together define the concept of

material implication.[1] Given their status as implicit definitions, basic logical principles are taken to be such that understanding them is sufficient for knowing them a priori.

Paul Boghossian, for instance, explains a priori knowledge of basic logical principles in terms of 'epistemic analyticity' (Boghossian 1996). Boghossian's analyticity is epistemic in that a statement is 'true by virtue of its meaning' provided that understanding its meaning alone suffices for knowing it a priori. Knowledge of Modus Ponens is a priori, according to him, in that it is grounded in understanding principles that stipulate the meanings of the logical constants—i.e., principles that are epistemically analytic. Because they are epistemically analytic, merely understanding them yields a priori justification.

Boghossian's preferred way of characterising a priori knowledge of basic logical principles is as a disposition: it is sufficient to have a disposition to infer according to Modus Ponens to count as knowing it a priori and as (partly) understanding the material conditional. Dispositions grounded in understanding explain, according to him, why logical reasoning can be 'blameless but blind' (see Boghossian, 2000, 2003). His focus is thus on how ordinary thinkers might be justified in reasoning deductively as opposed to how their beliefs in logical principles might be justified. Indeed, the dispositions explain why we are 'entitled' to 'rely' on Modus Ponens in reasoning …

> '… independently of having supplied a justification for the general claim that that rule is truth-preserving, so that we are able to use that reliance to supply that justification. What I am urging is that that entitlement is precisely what flows naturally from a conceptual-role account of the meanings of our logical words.' (2000: 250).

Thus, we get justification from epistemic analyticity but that justification does not require us to explicitly represent the relevant principle: for instance, we need not have any kind of belief about Modus Ponens, be able to state it, let alone explicitly justify it; we needn't 'see' that Modus Ponens is the principle we have a disposition about or that we are reasoning according to it nor have an intuition that it is truth-preserving.

### 2.3. Discussion

One key difference between the rational insight view and the understanding account is that the former appeals to a special cognitive faculty to explain why belief in Modus Ponens is justified, whereas the latter aims to derive justification from what is involved in (ordinary) understanding of implicit definitions – no special faculty is involved; what is special is the principle that is the object of the understanding. Another difference is that rational insight is an internalist foundationalist view whose aim is to explain how basic belief in a principle such as Modus Ponens could be internally justified: justified in a way that is cognitively accessible. The understanding account typically does not involve basic belief in Modus Ponens but a disposition to reason according to it. The justification arises from the fact that the principle one is disposed to reason according to is epistemically analytic, but this is not a fact that need be cognitively accessible. This is why we can be blameless but blind in reasoning according to Modus Ponens.

One worry that is regularly raised against the rational insight view is that it is mysterious. For instance, it is mysterious how we could come to know a priori that an instance of Modus Ponens is valid – how we could grasp the necessity of the entailment in a way that is direct – i.e., does not involve any reasoning or discursive process (see Boghossian, 2001) or how we could really be in a state of direct apprehension of abstract properties such as that of entailment. But the proposal to ground such justification on conceptual understanding is not without its difficulties either. Some have questioned the appeal to implicit definitions or epistemic analyticity: for instance, Williamson (2003, 2007) takes it to be possible to counts as understanding (e.g.) the material conditional but rejects Modus Ponens as invalid (see Van MacGee (1985); Wright

(2001) argues that meaning-constitutive dispositions are not sufficient for blamelessness; and Besson (2009) claims that the understanding account is susceptible to Gettier cases.

Another key difference between the rational insight view and the understanding account is that, while, according to the former, it is a basic belief in the relevant basic logical principle that is a priori justified, for the latter, at any rate, for Boghossian, it is primarily a 'blind' disposition to reason according to it. Of course, some of us get to form explicit beliefs about the principle, by reflecting on their dispositions, and get to explicitly recognise its validity; be that as it may, the dispositions come first in the justificatory order (Boghossian 2001: 230).

Why prefer blind dispositions over basic explicit beliefs? One reason has to do with conceptual sophistication: many of those who (arguably) know Modus Ponens could not grasp the relevant concepts: unlike dispositions, explicit beliefs seem to demand such a capacity. How good this reason is turns on how we characterise the contents of these beliefs. If rational insight first and foremost operates on instances of principles articulated in the vernacular which do not essentially involve the concept of entailment, then there might be a way around some of the problems to do with conceptual sophistication. (See Besson 2019 for discussion.)

Another reason often given for preferring dispositions to explicit beliefs has to do with Lewis Carroll's (1895) famous regress argument, which suggests that elementary deductive reasoning is impossible. According to mainstream interpretations of the regress, elementary reasoning is impossible if one adds one's deductive principle as a premise to one's reasoning. Boghossian, for instance, worries that a basic belief in the validity of Modus Ponens might effectively act as a premise in one's reasoning, thus making reasoning impossible (Boghossian 2001). (See my entry on The Epistemological Significance of Carroll's Regress, for a review where I also suggest that such explicit basic beliefs, as rational insight would have them, do not lead to Carroll's Regress.) In general, dispositions as a way of articulating knowledge of basic logical principles are meant to be better at underwriting the fact that such knowledge is meant to explain why we are justified in using them in reasoning.

But many have argued against having blameless but blind dispositions as the foundations of logical knowledge. Besson (2012), for instance, argues that dispositions do not have the right causal structure to do this, so they are not apt to explain how reasoning with logical principles is justified. One might also worry about how, from a first-person perspective, reasoning according to Modus Ponens (say) is at all reasonable if the disposition is blind – if one need not have any Modus Ponens related thoughts to be justified in reasoning according to it; one might be blameless in reasoning in this way, but perhaps this is of little epistemological significance (See Zalabardo (2011), Wright (2001) and Wedgwood (2002) for this line of argument). On the rational insight view, the fact that one has a basic belief in Modus Ponens makes it entirely explainable why reasoning according to Modus Ponens is justified or reasonable for a first-person perspective: such reasoning is in part rationalised by that belief.

## 3. Logical Anti-Exceptionalism or Abductivism

Anti-exceptionalism or abductivism about logic is the view that adopting and revising a logic is done abductively – using the method of inference to the best explanation – just like scientific theories. As Williamson (2017: 14) puts it:

> [W]e can use normal scientific standards of theory comparison in comparing the theories generated by rival consequence relations…We make the standard assumption that scientific theory choice follows a broadly abductive methodology. Scientific theories are compared with respect to how well they fit the evidence, of course, but also with respect to virtues such as strength, simplicity, elegance and unifying power. We may speak loosely of

> inference to the best explanation, although in the case of logical theorems we do not mean specifically causal explanation, but rather a wider process of bringing our miscellaneous information under generalisations that unify it in illuminating ways.

As the quote suggests, change in logic is justified through inference to the best explanation only when the new logic fares better than the old one in terms of standard scientific *theoretical virtues*, such as fit with the evidence or data, strength, simplicity, elegance and unifying power. (See also Priest 2016: 135 who adds, for instance, ontological leanness (Ockham's Razor) to the list).

The best logic or 'logical theory'[2] by the lights of these theoretical virtues may change as the field develops. To fix ideas, consider classical logic. Some of its basic principles and truths are: Modus Ponens, The Law of Excluded Middle, Double Negation Elimination, and *Ex Falso Quodlibet*. Rival logics reject some of classical logic's principles or truths: for instance, intuitionistic logic rejects Double Negation Elimination and paraconsistent logics endorse dialethism (i.e., the view that some truths have true negations) and thus rejects *Ex Falso Quodlibet*. According to anti-exceptionalism, whether we are justified in preferring one of these logics over the others is determined by a process involving evidence and argument, guided by the theoretical virtues.

What anti-exceptionalism has going for it is that it makes good sense of the fact that there are logical disputes and rival logical systems competing to explain roughly the same data. It makes also good sense of the fact that some logical systems (e.g., Aristotelian Syllogistic) have been supplanted by others (e.g., contemporary logic as inaugurated with Frege's logic (1879)) and of the fact that the considerations used in the process were very much in line with those put forward by anti-exceptionalists – simplicity, strength, unifying power, etc.

Now, many anti-exceptionalists about logic think it to be incompatible with much of what exceptionalists say about it, in particular with its apriority:

> Logic isn't special. Its theories are continuous with science; its method continuous with scientific method. Logic isn't a priori, nor are its truths analytic truths. Logical theories are revisable, and if they are revised, they are revised on the same grounds as scientific theories. These are the tenets of anti-exceptionalism about logic. (Hjortland 2017: 631)

Where does the threat to the apriority of logic come from? One possibility is that it comes from the commitment to an abductive methodology. However it is not obvious that inference to the best explanation is a method of reasoning that could not yield a priori justification and indeed some argue that judgements that a logical theory satisfies this or that theoretical virtue (simplicity, elegance, strength, etc.) are a priori judgements. (See Biggs and Wilson (2022 for a defence that abductive methodology is a priori.)

Another possible threat to the apriori might come from Hjortland's suggestion that, according to anti-exceptionalism, not only is the method of theory-choice the same in logic and other sciences, but also logical 'theories are continuous with science'. However, notice that this is a different, *logically independent*, claim from abductivism *per se*, which an anti-exceptionalist need not subscribe to. This claim actually suggests two possible threats to the apriority of logic. The first has to do with empirical revisability: if logic is continuous with science, then it is empirically revisable. The second has to do with positive justification: if logic is continuous with science, then in principle, any modification to a claim belonging to a given theory can affect any other claim belonging to any other theory – if justification is holistic in this way, logic cannot be a priori. Concerning the first threat, some defenders of the a priori (e.g., Casullo 2009) claim that a proposition/belief may be both empirically revisable and a priori. It is merely *positive empirical support* that apriority is not compatible with. Positive empirical support is exactly what the second threat is about, and so on this version of anti-exceptionalism, logic is not a priori. This version goes

back to Quine, but it has for instance been adopted by Williamson who suggests that 'well-established principles of physics' might be relevant to deciding which logic is the right logic (2017: 13).[3]

It thus seems that the threat to the apriority of logic does not come so much from the methodology of anti-exceptionalism itself but from considerations that have to do with which data or evidence we are willing to consider in adopting or revising a logic. Thus, the incompatibility between anti-exceptionalism and the a priori is perhaps not as direct as it initially seems.[4]

## 4. Exceptionalism versus Anti-Exceptionalism

Many see stark, irreconcilable tensions between exceptionalism and anti-exceptionalism, not just when it comes to the question of the a priori. For instance, on neither exceptionalist view considered in Section 2 is logic a theory whose acceptability is determined by a process involving weighing evidence and inference to the best explanation; both views take justification for basic logical principles to be non-discursive.

One difficulty in comparing exceptionalism and anti-exceptionalism is that they take quite different starting points and aim to explain quite different things: the focus of exceptionalism is typically on the way an untrained, ordinary thinker can be justified in believing a logical principle or using it in reasoning, with little interest on how whole logical theories might be rationally adopted or revised by logicians; the latter is the focus of anti-exceptionalism, which is not particularly concerned with what justification untrained thinkers might have for particular logical principles or how well justified in reasoning with these principles they might be.

Thus, the justification of basic logical principles is approached in a piecemeal manner by exceptionalists, as they aim to make sense of how thinkers might be justified in using them one at a time, not as part of logical systems. And really discussions are often confined to a handful of principles deemed particularly obvious such as Modus Ponens, Conjunction Elimination, Disjunctive Syllogism or Universal Instantiation – principles that can be taken to be basic in our cognitive economies. Justification is wholesale for the anti-exceptionalist, as they aim to make sense of the way whole logical theories can be evaluated, appealing to the full gambit of logical and metalogical principles and procedures, and where the notion of a basic logical principle is theory-relative, referring to whatever principle is underived in a given logical system, and not aiming at signaling something that is cognitively basic.

My sense is that the abductive methodology is incompatible with the understanding account sketched in Section 2.2: if logical principles such as Modus Ponens are genuinely revisable, and if there are genuine logical disputes, then such principles cannot spell out the meaning of the logical constants, unless we are content to take logical revision to constitute some kind of linguistic revision as well, and logical disagreement to involve some kind of verbal dispute. So, I think that analyticity – and in particular the epistemic analyticity discussed in Section 2.2 – is incompatible with anti-exceptionalism.

Concerning rational insight, I find the matter less clear, and this has to do with the fact that contemporary foundationalists are fallibilists: justification obtained through rational insight is meant to be defeasible. Now anti-exceptionalists do not deny that there is a role to play for folk intuitions, judgments, and insights in determining which logic is the right logic. Otherwise, where would we even start? It is rather that they take this evidence to be 'soft' in that it can be 'overturned' by theoretical considerations (e.g. to do with paradoxes such as the Liar or the Sorites or the interaction between logic and other disciplines such as quantum mechanics, etc.) (See Priest, 2016: 42). So, our pre-theoretic intuitions may have *limited epistemic authority*. But this is perhaps something that the moderate foundationalist can live with if their claim is that rational insight

provides us with defeasible a priori justification for basic logical principles. Those insights are then part of the 'miscellaneous information' that logicians consider in their deliberations about which logic is the right logic – about where logical knowledge proper is to be found. If so, it may be that the rational insight view can be integrated with an anti-exceptionalist view of logic, and that, to this extent, there is no real tension between this version of exceptionalism and anti-exceptionalism.

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**Notes**

[1] The view can also be formulated in terms of definition of the meaning of the word, e.g., 'if', rather than concepts, e.g. material implication.
[2] Anti-exceptionalists prefer using 'logical theory' to make it clear that they do not take a logic to be a mere syntactic system of rules for the manipulation of symbols, but to be a substantive theory which has a subject matter (e.g. logical facts, or facts of validity).
[3] Notice here that this claim need not entail holism. One might claim, like Williamson, that in deciding which logic is the right logic, we need to look at which logic is required by, say, our best physics, without suggesting that the justification of all propositions is interdependent.
[4] Some, like Williamson (e.g. 2007), offer arguments independent from their anti-exceptionalism about logic for the view that the distinction between the a priori and the a posteriori is of no epistemological significance.