ORIGINAL RESEARCH

Does anti-exceptionalism about logic entail that logic is a posteriori?

Stephen Biggs[1] · Jessica M. Wilson[2]

Introduction

The debate between exceptionalists and anti-exceptionalists about logic is often framed as concerning whether the justification of logical theories is a priori or a posteriori (for short: whether logic is a priori or a posteriori). As we substantiate below (§1), this framing more deeply encodes the usual anti-exceptionalist thesis that logical theories, like scientific theories, are abductively justified, coupled with the common supposition that the epistemic value of abduction is a posteriori—that is, our justification for believing that abduction has epistemic value is (and, indeed, must be) a posteriori.[1] In past work, however, we have argued that this common supposition is incorrect: abduction is an a priori mode of inference—that is, our justification for believing that abduction has epistemic value is (and indeed, must be) a priori (Biggs & Wilson, 2017a, 2017b,

---

[1] A mode of inference M has epistemic value if necessarily, for any subject s, conclusion C, and premise(s) P: if s justifiably believes P and uses M to infer C from P, then (absent defeaters) s justifiably believes C. Nothing in what follows depends specifically on epistemic values involving justified belief; those taking knowledge, entitlement, warrant, or some other epistemic feature to enter more basically into what Beebe (2009) calls the "epistemic goodness of [a given mode of] inference" (619) can substitute accordingly.

Guest Editor: Dr. Fillipo Ferrari.

✉ Jessica M. Wilson
   jessica.m.wilson@utoronto.ca

   Stephen Biggs
   biggs@iastate.edu

[1] Department of Philosophy and Religious Studies, Iowa State University, 402 Catt Hall, Ames, IA 50011, USA

[2] Department of Philosophy, University of Toronto, 170 St. George St, Toronto, ON M5R 2M8, Canada

    ⌀ Springer

2019). After sketching our two main argumentative strategies for that conclusion (§2), we go on (§3) to consider the import of the a priority of abduction on the proper understanding of anti-exceptionalism about logic. In brief, the a priority of abduction means that whether logic is a priori or a posteriori, on an anti-exceptionalist view, ultimately depends on whether the data on which abduction operates is a priori or a posteriori. Moreover, since at least some anti-exceptionalists (e.g., Priest, 2016; Russell, 2014) allow that the data input into logical theorizing may be a priori, anti-exceptionalism is compatible with logic's being a priori. We follow up (§4) by offering an alternative characterization of what divides exceptionalists and anti-exceptionalists about logic, as reflecting disagreement about which mode of inference (broadly speaking[2]) is operative in logical theory choice. We conclude (§5) by drawing a general moral, according to which the justification of theories in every discipline has a broadly conditional structure, whereby an operative mode of inference takes relevant data as input and generates a preferred theory as output, and where the justificatory status of any such theory as a priori or a posteriori will be a function of both the justificatory status of the relevant data and the justificatory status of the operative mode of inference.

1 The framing of the exceptionalism/anti-exceptionalism dispute

The dispute between exceptionalists and anti-exceptionalists about logic is commonly framed as over whether belief in logical theories (e.g., theories of validity) can be justified a priori—again, for short, over whether logic is a priori. Hence Hjortland (2017) offers the following as "the tenets of anti-exceptionalism about logical theories":

> 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. (632)

Though various tenets are cited here, Hjortland goes on to say that "for our purposes the central exceptionalist claim is that the justification of logical theories is a priori" and that "anti-exceptionalists need an alternative story about how logical theories are supported" since they "reject apriorism" (633).

Even if the claim that logic is a priori is not *the* centerpiece of exceptionalism, it is clearly taken to be a central point of dispute between exceptionalists and anti-exceptionalists. Accordingly, exceptionalists Kant (1986), Bealer (1996), and Boghossian (2000) maintain that logic is a priori, while anti-exceptionalists Quine (1951/53), Putnam (1968), Priest (2016), and Hjortland (2017) maintain that logic is a posteriori.

Why is anti-exceptionalism so commonly seen as committed to logic's being a posteriori? To start, it's worth noting that this is not *just* a matter of a supposed anti-exceptionalist commitment to logical theorizing's being sensitive to empirical data of the sort that scientific theorizing aims to systematize. For (as we'll discuss further

---

[2] Here and throughout, we use 'mode of inference' broadly, as including, e.g., perceptual and rational intuitive modes of epistemic access in addition to more explicitly inferential routes to justified belief and knowledge.

below) while many anti-exceptionalists think that at least some of the data relevant to logical theorizing is empirical (e.g., Quine, Putnam), others allow that the relevant data might be a priori (e.g., Priest, Russell). Nor should the supposition that logic is a posteriori be seen as resulting from the anti-exceptionalist's usual commitment to logic's being revisable. For there are cases to be made that the conclusions of a priori modes of inference may be revisable (as per, e.g., Summerfield, 1991).

As we'll now substantiate, the operative line of thought is rather that encoded in what Russell (2014) describes as the anti-exceptionalist's "usual story":

> The logical anti-exceptionalist […] maintains that logic isn't special; like the sciences, logical theory choice proceeds by way of abduction, and the results of that methodology are—again, on the usual story—correspondingly a posteriori and revisable: the overall virtues of logical theories [are] an important part of the justification for adopting or rejecting a theory. (173)

This line of thought involves two assumptions:

1. The continuity of logical and scientific justification supports taking the justification of logical theories to proceed, more specifically, by way of abduction.
2. Abduction is an a posteriori mode of inference.

We'll now substantiate that anti-exceptionalists typically are committed, explicitly or implicitly, to these assumptions.

To start, anti-exceptionalists typically explicitly endorse (1), claiming that logical theories, like scientific theories, are abductively justified. Consider, for example, the following passages from Williamson and Priest:

> [W]e can use normal scientific standards of theory comparison in comparing the theories generated by rival consequence relations. Thus the evaluation of logics is continuous with the evaluation of scientific theories, just as Quine suggested […]. [S]cientific theory choice follows a broadly abductive methodology. (Williamson 2017, 14)
> Given any theory, in science, metaphysics, ethics, logic, or anything else, we choose the theory which best meets those criteria which determine a good theory. Principal amongst these is adequacy to the data for which the theory is meant to account. In the present case, these are those particular inferences that strike us as correct or incorrect. […] Adequacy to the data is only one criterion, however. Others that are frequently invoked are: simplicity, non-(ad hocness), unifying power, fruitfulness. (Priest 2014, 217)

Although few anti-exceptionalists explicitly endorse (2), their assumption that logic is a posteriori precisely because (2) is true, along with (1), often emerges in their work. Consider Hjortland (2017) (especially 632 and following). He claims that "anti-exceptionalists need an alternative story about how logical theories are supported" because they "reject apriorism" (633). He then identifies abduction as the alternative offered by Priest and Williamson, saying that they have

> defended accounts of theory selection in logic that are remarkably similar, at least at the surface level. The short version is that theories of logic, not unlike

scientific theories in general, are chosen on the basis of abductive arguments, that is, inference to the best explanation. (632)

Hjortland's treating abduction as an alternative to apriorism makes sense only if he assumes that abduction is an a posteriori mode of inference. Moreover, Hjortland takes his supposition that "anti-exceptionalists reject a priorism" (633) to be supported by the fact that paradigmatic anti-exceptionalists endorse abduction as their "alternative story" (633)—a dialectical move that makes sense only if he assumes that abduction is an a posteriori mode of inference. More generally, throughout Hjortland's discussion, it is the appeal to abduction alone, as opposed to any a posteriori data upon which abduction might operate, that is taken to provide a principled basis for (what is taken to be) the anti-exceptionalist's rejection of a priorism. Hjortland's work, therefore, encodes the line of thought set out above.

And Hjortland is not alone. While developing "a general model for the rational resolution of disputes about logic" (347), Priest (2016) allows that "certain kinds of obvious things play the role of data" for logic and that "some of these may be a priori" [in that they] do not require sensory observation" (350). Priest thereby assumes that the mode of inference at issue in logical theorizing (i.e., abduction) delivers a posteriori justification irrespective of the justificatory status of the data. This only makes sense if he thinks of logic as a posteriori precisely because he accepts (2) as well as (1). Finally, as noted above, Russell (2014) suggests that anti-exceptionalists assume that logic is a posteriori (at least partly) because they think logical theorizing requires appealing to abduction and "on the usual story" the "results of [abductive] methodology" are a posteriori—again, independent of the justificatory status of the data on which abduction operates.

It is not especially surprising that anti-exceptionalists standardly assume that, since logical theory choice involves abduction, logic is correspondingly a posteriori. For abduction is commonly supposed to be an a posteriori mode of inference, often on grounds that whether abduction has epistemic value depends on contingent facts. As Beebe (2009) puts it, "practically everyone who works on abductive inference believes that such inferences are justified empirically and that the theoretical virtues are broadly empirical and contingent marks of truth" (625). And as Douven (2017) puts it, "all defenses [of the epistemic value of abduction] that have been given so far are of an empirical nature in that they appeal to data that supposedly support the claim that (in some form) abduction is a reliable rule of inference." Although the claim that "all" existing defenses are empirical overstates the case a bit (see §2.2 below), Douven's remark reflects the common view that abduction is an a posteriori mode of inference.

In sum, the anti-exceptionalist claim that logic is a posteriori is (at least often) based on the (explicit) claim that logical theory choice should proceed by way of abduction coupled with the (implicit) assumption that abduction is an a posteriori mode of inference, an assumption that is widely shared by those who explore the justification of abduction.

As we have argued, however (2017a, 2017b, 2019), the epistemic value of abduction does not rely on contingent matters of fact; and more generally, abduction is itself an a

priori mode of inference.[3] This result undercuts the usual reasons—the usual story—for taking anti-exceptionalism to entail that logic is a posteriori.

2 The a priority of abduction

In our previous work, we offer many positive and defensive motivations in support of abduction's being a priori. Here we briefly sketch two argumentative lines of thought found in our (2017b), and mention some historical and contemporary precursors of our view (as discussed in our 2016, 2017b, 2019). We direct those interested to our various papers for a more fullsome exposition.[4]

Note that in our argumentation we assume that belief in the epistemic value of abduction is justified, and aim to provide reasons for thinking that this justification is a priori. Most participants to the present debate—in particular, anti-exceptionalists—are happy to grant that abduction has epistemic value; in any case engagement with skeptics about abduction is beyond the scope of this discussion.

2.1 Abductive principles and ceteris paribus clauses

We first argue, by attention to a specific abductive principle as a case-in-point, that the epistemic value of abductive principles, hence the epistemic value of abduction as constituted by such principles, is not contingent on matters of particular fact. Consider Parsimony, according to which, ceteris paribus, one should choose the theory involving the fewest fundamental type-level ontological commitments. Why think that Parsimony's epistemic value (hence that of abduction, as partly constituted by Parsimony), depends on experience? To the extent that reasons are provided for thinking this, two lines of thought are on offer:

1. Parsimony's epistemic value depends on whether the world is parsimonious.[5]

---

[3] Of course, this is compatible with the conclusion of a given abductive inference's being a posteriori because the data upon which abduction operates is a posteriori—just as, e.g., the epistemic value of modus ponens might be justified a priori even if a given conclusion of a given modus ponens argument is justified a posteriori because one of its premises is justified a posteriori.

[4] Before proceeding, we pause to consider a reason for taking abduction to be a posteriori that we have not previously discussed, and which is not relevant to our enterprise—namely, that following Read's (2019) observation that medieval philosophers (e.g., William Ockham) introduced the terms 'a priori' and 'a posteriori' to capture Aristotle s distinction between demonstrations "explaining the effect by reference to its cause" (which are thereby a priori) and demonstrations "inferring the existence of the cause from the appearance of its effect" (which are thereby a posteriori) (300). Abduction can be thought of as a generalization of the latter—or, at least, as being much closer to the latter than to the former; hence given the medieval use of 'a priori' and 'a posteriori', abduction is likely a posteriori inference. The medieval use is far afield from contemporary use, however—for example, the medieval use would render any justification proceeding by way of perception as a priori. We have contemporary use in mind, and correspondingly, we do not take it to be definitional that abduction is an a posteriori mode of inference.

[5] This sort of consideration is reflected, e.g., in Chalmers's and Jackson's (2001) suggestion that Parsimony is a piece of "information" that might be entailed by base facts at a world.

2. Parsimony's epistemic value depends on whether parsimonious theories are more likely to be true.[6]

As we'll now argue, neither line of thought withstands scrutiny.

To start, (1) involves a kind of category error. How many fundamental kinds (for example) does a world have to contain in order to be unparsimonious? Two? Forty-two? A billion? Such a question is misguided, since Parsimony is a principle or a norm guiding theory choice, not a descriptive fact about the world. Even if there is a sense in which a world with a billion kinds is unparsimonious, this fact would be irrelevant to Parsimony's epistemic value. It would remain, in such a world, that in theorizing one should not posit more fundamental kinds (say, a billion and one, at that world) than are needed.

Re (2): Here the idea seems to be that we could gain empirical evidence about whether theories satisfying Parsimony were more likely to be true. That's incorrect, however. As we previously put it:

> [W]e could never gain empirical evidence, however 'indirect', to this effect. Parsimony, like all abductive principles, requires that 'other things be equal'. Consequently, no empirical evidence could, even in principle, distinguish between a world in which theories satisfying Parsimony were more likely to be true, and one where this was not the case. If there were such empirical evidence—if, for example, experiments were to indicate that the world contained more fundamental kinds than our best theory implies—then the ceteris paribus condition in Parsimony would not be met: one theory would be explanatorily better than the other (*vis-à-vis* another abductive principle). We could never be in empirical position to know, then, that the actual world is not cooperating with Parsimony. (2017b, 743–4)

Hence scenarios offered as showing that the epistemic value of Parsimony could be disconfirmed by experience, whereby at time t_1 Parsimony supports theory T over theory T^* given explananda E, but at t_2 we discover additional explananda E', which T^* explains better than T does, are misdescribed. A more accurate description of such cases is as follows: at t_1 we mistakenly believe that T and T^* are otherwise equal (because we are unaware of E'), but at t_2 we discover our mistake.[7] Accordingly, rather than the discovery of E' disconfirming a theory supported by Parsimony, that discovery reveals that Parsimony didn't *really* support the theory. And similarly, mutatis mutandis, for any cases that might be thought to figure in empirically confirming Parsimony.

Note that it is commonly recognized that failure to possess all the relevant data can lead to false belief via a priori modes of inference. For example, were one to initially apply modus ponens to some premises later revealed to be false, that would show not that modus ponens is a posteriori, but rather that one was working with faulty (incomplete or inadequate) data. Similarly, we maintain, for abduction: that

---

[6] This sort of consideration is reflected, e.g., in Bonjour's (1998) question, "Why, after all, should it be thought [...] that the world is somehow more likely to be simple than complex?" (91).

[7] This is not to say that the initial conclusion was unjustified. What position one takes on whether conclusions based on faulty data can be justified will depend on other of one's commitments.

new evidence might undermine the conclusion of a given abductive inference goes nowhere towards establishing that abduction is a posteriori. On the contrary, any new evidence would, at best, show that other things were not in fact equal as among the candidate theories.

There is more to say about this line of thought than we can reproduce here, but it may be worth mentioning what seems to us to be the most pressing objection—namely, that even granting that no empirical evidence could ever bear (in particular) on our belief in Parsimony's epistemic value, our justification for this belief might nonetheless be a posteriori, in depending on a contingent but empirically inaccessible fact. Perhaps, the objector suggests, some kinds have hidden fundamental metaphysical essences, even though an application of Parsimony given all the in-principle empirically accessible facts would deem them non-fundamental. In this case, the objector claims, Parsimony would lead us astray, and belief in the epistemic value of Parsimony would be a posteriori unjustified, even if we never could be in position to know this.

We have two responses. First, rather than interpret the case as showing that belief in Parsimony's epistemic value is justified a posteriori, in depending on how the world contingently is, one can rather interpret the case as showing that belief in Parsimony's epistemic value, while justified a priori, is defeasible. As Casullo (2003) argues, there is no experiential indefeasibility condition in the concept of a priori justification; and Summerfield (1991) and Thurow (2006) argue, more strongly, that a priori justification is generally defeasible by experience. Indeed, these defeasibility claims are stronger than our alternative interpretation requires, since by hypothesis the worldly contingencies at issue here are beyond the reach of any experience. Second, supposing that there is some principled non-empirical motivation for thinking that the metaphysical facts at issue are in place, then the proper accommodation of these facts would be part of the ceteris paribus conditions under which Parsimony would be properly applied, such that the presence of such distinctions could not, even in principle, undermine justified belief in the epistemic value of Parsimony. After all, the ceteris paribus condition in abductive principles such as Parsimony doesn't advert only to the proper accommodation of empirical facts, but more generally adverts to any facts that we have reason to believe obtain. And if the purported metaphysical facts are in-principle inaccessible not just to empirical but to rational investigation, then they can simply be rejected as useless posits.

We conclude that justified belief in the epistemic value of Parsimony—which again, we are assuming to be in place—does not depend on contingent facts; hence is not a posteriori; hence is a priori.

Considerations similar to those just canvassed for Parsimony hold, mutatis mutandis, for other abductive principles, which also include ceteris paribus clauses holding other explanatory considerations constant, rendering it the case that no empirical evidence, direct or indirect, could disprove these principles.[8] Insofar as abduction is

---

[8] A familiar dilemma for ceteris paribus clauses holds, in brief, that the list of interfering factors in a ceteris paribus clause is either definite, in which case it's not a genuine ceteris paribus clause, or indefinite, in which case the clause trivializes any claim to which it's attached. We embrace the first horn of this dilemma, treating the ceteris paribus clauses that appear in abductive principles as shorthand for a definite list of interfering factors, with the list fixed by other abductive principles. Since our aim is to use clauses

constituted by abductive principles, we conclude that the epistemic value of abduction is a priori.[9]

2.2 Four roles for experience in justification

Our second line of argument in support of abduction's being a priori proceeds by attention to the roles experience may play in inferential reasoning.

Consider a claim p. There are, we suggest, four ways in which experience might play a role in the course of a particular belief in p coming to be justified. Experience might play a role in …

1. acquiring the concepts required to entertain p,
2. acquiring the evidence required to justify belief in p,
3. justifying belief in the epistemic value of the mode of inference used to justify belief in p, or
4. acquiring or learning to deploy the mode of inference used to justify belief in p.[10]

Can a belief for which experience plays an ineliminable role along one or more of (1)–(4) be justified ('entirely') a priori? As we discuss in our (2017b), it depends on which role is at issue.

Re (1): it is commonly maintained that belief in p can be justified a priori even if experience is needed to acquire the concepts required to entertain p. For example, belief in 'sisters are siblings' can be justified a priori even if we need experience to acquire the concepts expressed by or the meanings of 'sister' and 'sibling.'

Re (2): it is commonly maintained that belief in p cannot be justified a priori if experience is (at all) needed to acquire the evidence supporting p. This is the sense in which any reliance on experience or empirical facts suffices to render the associated justification a posteriori. For example, belief in *water is H_2O* is commonly taken to be justified a posteriori, on grounds that justifying this belief requires, among other things, acquiring empirical evidence to the effect that water and H_2O are spatiotemporally coextensive.

Re (3): it is commonly maintained that belief in p cannot be justified a priori if experience is needed to justify belief in the epistemic value of the mode of inference

---

Footnote 8 continued

consisting of a definite list of interfering factors, not to support the claim that there are 'genuine' ceteris paribus clauses, embracing this horn is unproblematic here.

[9] Again, there is more to say here—in particular, about the source of weightings of the epistemic principles. See Biggs & Wilson, (2017b), 747–8 for discussion.

[10] If theory choice in some domain D is invariably contrastive (cf. van Fraassen (1980); Garfinkel (1981) on theory choice in science), and p is a theory in D, then talk of justifiably believing that p should be replaced with talk of justifiably believing that (theory) p is superior to (theory) q. Those taking theory choice to be invariably contrastive in a given domain should replace our 1–4 with 1*–4*, such that experience might play a role in (1*) acquiring the concepts required to entertain p and the concepts required to entertain q; (2*) acquiring the evidence required to justify the belief that p is superior to q; (3*) justifying belief in the epistemic value of the mode of inference used to justify the belief that p is superior to q; or (4*) acquiring or learning to deploy the mode of inference used to justify the belief that p is superior to q. The points we make below about 1-4 can be made about 1*-4*. More generally, everything we say below can be reframed to accommodate the view that theory choice is contrastive. We do not generally carry that reframing through here, though see comments in note 19.

required to justify belief in p.[11] (As above, it is this role which is typically supposed to be operative in claims that abduction is a posteriori.)

Re (4): although the role of experience in an agent's acquiring or learning how to deploy a given mode of inference is not much discussed, it seems reasonable to maintain that this role is relevantly similar to that of (1): in each case, experience contributes to belief (or supposition) formation, not to justification per se. For example, students often need encouragement to think in an appropriately imaginative way about what is possible; but that such imaginative 'training up' is required in order to engage in suitably competent conceiving is not taken to undermine the status of conceiving as an a priori mode of inference.[12]

Correspondingly, only (2) and (3) are such that the playing of this role in the justification of a given belief p would render that justification a posteriori. It follows that whether an abductively justified belief p is justified a priori turns on whether experience enters into its justification via either role (2) or role (3).

Following our previous discussion, experience does not enter into abductively justifying the belief in p via role (3): contra common assumption, (justification for belief in) the epistemic value of abduction does not rely on experience.[13]

Nor does abductive justification require that experience enter via role (2). To start, notwithstanding that abduction can and often does operate on empirical evidence (e.g., *water and H_2O are spatiotemporally coincident*) to produce a claim (e.g., *water is H_2O*) that is a posteriori justified, the underlying inferential transition can be encoded

---

[11] Casullo (2012) rather contends that whether a mode of inference is justified a priori or a posteriori is irrelevant to whether beliefs justified using that mode of inference are themselves justified a priori or a posteriori: all that matters, he thinks, is the role experience plays along our role (2). Accordingly, he claims, a belief can be justified a priori even if the mode of inference used to justify it is justified a posteriori. This disagreement, while in principle substantive, is insubstantive in the present dialectical context, since Casullo's view leads trivially to our conclusion that whether a given abductive inference is a priori or a posteriori ultimately depends on the justificatory status of the data at issue.

[12] Role (1) is often called an 'enabling' role; role (2) is often called an 'evidential' role. Williamson (2007, 2013b) and Sgravatti (2020) argue that experience typically plays a further (i.e., non-enabling, non-evidential) role in acquiring knowledge—a role that might be captured by our (4). Moreover, they think that properly accounting for that further role renders the distinction between a priori and a posteriori knowledge epistemically insignificant. If they are right, then our claim that abduction is an a priori mode of inference is at best overblown. Adequately exploring their views requires more space than can be given here. Still, two brief dialectical points are in order. First, their stance implies our negative conclusion that the dispute between exceptionalists and anti-exceptionalists should not be framed as a dispute about the a priority (or not) of logic, and is moreover consistent with our positive conclusion that the dispute should rather be framed as about the mode of inference at issue in logical theorizing. Second, we doubt that their reasons for positing a non-evidential, non-enabling role for experience extends from their examples (e.g., all crimson things are red) to the kinds of propositions at issue here (e.g., Parsimony). (In brief, the extension is blocked by two key differences between how we know the former and how we know the latter—viz., imagination plays a crucial role in knowing the former but not in knowing the latter, and the bar for concept-acquisition is much lower for the ordinary concepts that occur in the former than for the quasi-technical concepts that occur in the latter.) Accordingly, our account can be complete qua account of the roles experience can play in coming to know abductive principles, which is what matters here, even if it's incomplete qua fully general account of the roles experience can play in coming to know an arbitrary proposition.

[13] Again, we are assuming that (belief in) the epistemic value of abduction is justified, and arguing that this justification is a priori, not a posteriori. It's a further interesting question what the ultimate source of abductive principles, and of abduction as constituted by those principles, might be. We are inclined toward a broadly Kantian view, on which abduction and associated abductive principles are constitutive of good reasoning for creatures like us, but development of this line of thought must await another occasion.

in conditionals—e.g., 'if water and H_2O are spatiotemporally coincident, then water is H_2O'—which are justified by means of a hypothetical form of abduction. Such hypothetical abductive inference is akin to suppositional reasoning in conditional proof, enabling identification of what would be the best explanation of the antecedent state of affairs were it to obtain/be true. Since such conditional beliefs may be justified without the antecedent's being believed or true, abduction here operates independently of any claim justified through experience. Accordingly (and given that the epistemic value of abduction does not rely on experience, as previously), such abductively justified conditional beliefs are 'entirely' a priori.[14]

It follows that abduction is an a priori mode of inference, even when it operates on (non-hypothetical) empirical evidence. To be sure, when abduction operates on empirical evidence, it does not produce beliefs with (completely) a priori justification, any more than modus ponens does. But the contribution of empirical evidence in such cases of abductive inference is simply to discharge the antecedent of a conditional whose justification is entirely a priori.[15]

It is worth registering that the view that abduction is a priori has both historical precursors and contemporary advocates. As we discuss in our (2019), Kant took synthetic a priori truths (including most philosophical claims) to be justified via an ampliative mode of inference—plausibly, abduction, and Carnap took knowledge of conceptual content to proceed via explicitly abductive 'explication' (see also Biggs & Wilson, 2016). And in addition to Hawthorne (2002), Cohen (2010), and Wedgwood (2013), several contemporary philosophers, including Bonjour (1998), Swinburne (2001), and Peacocke (2003), have offered reasons (different from ours; see the comparative discussion in our 2017b) aiming to establish the a priority of certain ampliative modes of inference or abductive principles.

Summing up: although it has commonly been taken for granted that abduction is a posteriori, there are cases to be made (again, for more fullsome expositions, see our other work) that abduction is a priori; and this view is not as unusual as it might first appear.

3 The compatibility of anti-exceptionalism and the a priority of logic

Let's return to whether anti-exceptionalism about logic entails that logical theories are justified a posteriori. To start, it is useful to observe that, notwithstanding the usual story, Russell (2014) says that she is undecided about whether anti-exceptionalism really does entail that logic is a posteriori:

> [W]hile Quine took apriority to be lost with holism, this is not inevitable. It depends on what kinds of consideration one uses to assess a theory. Perhaps the

---

[14] Hawthorne (2002, 252) makes a similar point, suggesting that abduction can deliver a priori justification for belief in a conditional whose antecedent describes an 'experiential life history' and whose consequent is whichever theory best explains some aspect of that life history; see also Cohen (2010), 152–3 and Wedgwood (2013).

[15] This line of thought is familiar from discussion of the conditional a priori basis of a posteriori modal claims. See, e.g., Chalmers (2006) and Biggs & Wilson (2017a).

best theory in logic is the one that provides the most elegant explanation of a set of a priori data. Is elegance a property that can be assessed independently of experience? I don't know, but if it is, and if the data is really a priori, then logic could retain its apriority […]. (174)

Here Russell registers sensitivity to the two ways (associated with roles 2 and 3, above) in which empirical considerations might render the justification of logical theories a posteriori: first, if the mode of inference itself is a posteriori; second, if the data upon which the mode of inference operates is a posteriori.[16]

If we are right, then that anti-exceptionalists take logical theories to be abductively justified provides no basis for taking this justification to be a posteriori. Rather, there is only one route to the a posteriori abductive justification of logical theories—namely, if the data upon which abduction operates is a posteriori.

Now, beyond the usual story about abduction, many anti-exceptionalists are inclined to think that the data relevant to the justification of logical theories is itself properly empirical. For example, Quine, perhaps the original anti-exceptionalist, suggests in his (1951/53) that quantum phenomena might motivate a non-classical logic—a position that Putnam (1968) later develops. Supposing that the data relevant to logic is empirical, the associated abductive justification of that logic will be a posteriori. But as previously discussed, some paradigmatic anti-exceptionalists maintain that the data relevant to logical theorizing either is (Priest) or might be (Russell) a priori.[17] Supposing so, the justification of the resulting logic would be a priori. It follows that (such an) anti-exceptionalism about logic is compatible with logical theories' being justified a priori.

4 Reconceiving the exceptionalism/anti-exceptionalism debate

If anti-exceptionalism is compatible with logical theories' being justified a priori, then what, if anything, generally distinguishes exceptionalists from anti-exceptionalists about logic? Here we consider some strategies for reconceiving of this dispute.

One strategy might be broadly modal, as follows:

The exceptionalist maintains that logic is always (necessarily) a priori, whereas the anti-exceptionalist maintains that logic is sometimes (possibly) a posteriori.

There's a distinction here, but it's not especially interesting or illuminating. Not much better is the following, notwithstanding that it is sensitive to the data/mode of inference distinction:

---

[16] Although talk of data being a priori (or not) is common in the literature on anti-exceptionalism (see, e.g., the above quotations from Russell and Priest), it is never analyzed. We suggest the following analysis: a datum is a priori if and only if belief in the corresponding proposition can be justified a priori—where the corresponding proposition either is the datum (if data are propositional) or is the proposition that best captures the datum (if data are not propositional). Although this characterization requires elaboration, the idea is clear enough for our purposes.

[17] See also Martin and Hjortland's (forthcoming) version of logical anti-exceptionalism—'logical predictivism'—which "opens up the possibility that a priori evidence does indeed play a role within logical theory choice".

> The exceptionalist maintains that the relevant data is always a priori, whereas the anti-exceptionalist maintains that the relevant data is sometimes a posteriori.

Indeed, it's not clear that an anti-exceptionalist taking the relevant data to be a priori must agree that the data relevant to logical theories is ever, or even possibly, a posteriori. The above characterizations would misclassify such an anti-exceptionalist (Priest, or a close cousin of Priest?) as an exceptionalist.

One might see these considerations as lending support to Williamson's (2013a) claim that, while genuine, "the a priori-a posteriori distinction does not cut at the epistemological joints" (294). In any case, it seems to us, the dispute between exceptionalists and anti-exceptionalists can only *really* be about what operative mode of inference at issue, consonant with encoding whether logical theory choice is taken to be continuous or discontinuous with scientific theory choice. One strategy for reconceiving the dispute along these lines simply draws on the contrast between abductive and non-abductive inference:

> The exceptionalist maintains that the justification of logical theories proceeds non-abductively, whereas the anti-exceptionalist maintains that such justification proceeds abductively.

A problem here is that some non-abductive modes of inference (e.g., perception or enumerative induction, by some lights) may result in a posteriori justification. Correspondingly, the contrast needs to be more specific about which non-abductive mode(s) of inference are at issue in exceptionalism, perhaps as follows:

> The exceptionalist maintains that the justification of logical theories proceeds by way of conceiving/rational intuition/rational insight/conceptual analysis, whereas the anti-exceptionalist maintains that the justification of logical theories proceeds by way of abduction.

As a final refinement, intended to avoid the pitfalls of the "usual story", it might be made explicit that the exceptionalist's preferred mode of inference always eventuates in a priori justification (with both data and mode of inference being a priori), whereas the anti-exceptionalist's mode of inference admits of either a priori or a posteriori justification, depending on the status of the relevant data:

> The exceptionalist maintains that the justification of logical theories proceeds by way of conceiving/rational intuition/conceptual analysis operating on a priori data (hence is always a priori), whereas the anti-exceptionalist maintains that the justification of logical theories proceeds by way of abduction (hence will be either a priori or a posteriori, depending on whether the relevant data is taken to be a priori or a posteriori).

Anti-exceptionalists who deny that the data relevant to logical theorizing is ever a posteriori can simply suppose that only one of the disjuncts in the last clause is ever satisfied.

5 The conditional structure of theoretical justification

We close with some broader morals.

The exceptionalist/anti-exceptionalist dispute has often been framed as one turning on whether the justification of logic is a priori or a posteriori, where a theory is justified a priori/a posteriori if its justification does/does not (in the relevant sense) 'depend on experience'. But such a general classification glosses two distinct potential sources of empirical dependence. First, the justification of a theory may depend on experience in virtue of its appealing to a posteriori data. Second, the justification of a theory may depend on experience in virtue of its appealing to an a posteriori mode of inference. The usual anti-exceptionalist story assumes that the operative mode of inference (abduction) is itself a posteriori, but as we have argued, this is incorrect. Moreover, the possibility of the relevant data's also being a priori shows that anti-exceptionalism is, after all, compatible with logic's being a priori. Correspondingly, the framing of the dispute must be reconceived, as more foundationally pertaining to a supposed difference in the specific modes of inference operative in the justification of logical theories.

This is not to suggest, however, that questions of the justificatory status of logic as a priori or a posteriori are irrelevant to this dispute. On the contrary (at least, modulo Williamson-esque skepticism about the usefulness of the a priori/a posteriori distinction) these questions may reflect interesting differences between the available positions—for example, as between anti-exceptionalists who take the relevant data to be a priori (e.g., Priest) and those who take it to be a posteriori (e.g., Quine, Putnam). So the moral we draw is a constructive one, according to which the understanding of the justificatory status of logic must be sensitive both to the justificatory status of the relevant data and to the justificatory status of the operative mode of inference.

More generally, we suggest that the understanding of the justificatory status not just of logic, but of any theoretical discipline, must be sensitive to the fact that theoretical justification has a two part, broadly conditional structure, whereby the relevant data (which may be either a priori or a posteriori) operates as antecedent or input into a mode of inference (which may be either a priori or a posteriori) which (at least potentially) outputs as consequent the theory so justified. Schematically, the conditional structure of justification in the theoretical disciplines can be represented as follows:

Conditional Theoretical Justification (schematic): if [relevant data], then$_{\text{mode of inference}}$ [theory].[18]

The assessment of whether the justification of a given theory is a priori or a posteriori must then take into account the justificatory status both of the relevant data and the mode of inference. In particular, and given that any a posteriori contribution to the justification of a theory suffices to render it a posteriori:

---

[18] Applications of *Conditional Theoretical Justification* are effectively instances of modus ponens. Accordingly, by suggesting that one should choose among competing logical theories by deploying *Conditional Theoretical Justification*, we are presupposing that modus ponens has epistemic value. We are not, however, presupposing that modus ponens is valid. If we were, then we would, in effect, be unacceptably assuming that modus ponens must be valid if we are to choose a logic. Thanks to an anonymous reviewer for pointing this out.

- A given theory output from an instance of *Conditional Theoretical Justification* is justified a priori just in case *both* the relevant data input to the mode of inference, and the mode of inference itself, are a priori.
- Equivalently, a given theory output from an instance of *Conditional Theoretical Justification* is justified a posteriori just in case *either* the relevant data input into the mode of inference, or the mode of inference itself, is a posteriori.

As previously, such an understanding of the conditional structure of justification in theoretical disciplines provides a basis for capturing, first, what divides exceptionalists from anti-exceptionalists about logic, as located in the operative mode of inference, and second, what divides certain anti-exceptionalists from others, as located in the relevant data. It also makes good sense of certain 'clear case' judgments about the justificatory status of certain disciplines.

For example, *Conditional Theoretical Justification* preserves the standard assumption that the natural sciences are justified a posteriori—notwithstanding that (or, for the unconvinced, even if) the operative abductive methodology is a priori—since the relevant data is itself empirical, in ultimately relying on actual instances of sense perception (among other actual experiences). *Conditional Theoretical Justification* can also encode specific instances of scientific theorizing. Some such instances might, like exceptionalism vs. anti-exceptionalism, be presented as competitors:

- if the relevant physical $data_{perceptual/experimental}$ are classical, $then_{abduction}$ the correct physical theory is as per Newtonian mechanics.
- if the relevant physical $data_{perceptual/experimental}$ are non-classical (as per, e.g., the results of the double-slit experiment), $then_{abduction}$ the correct physical theory is as per quantum mechanics.[19]

Others might be presented as compatible, in being associated with different special sciences, each taking different swathes of natural phenomena as the relevant data:

- if the relevant $data_{perceptual/experimental}$ pertain to the atomic goings-on, $then_{abduction}$ the correct theory is as per atomic physics.
- if the relevant $data_{perceptual/experimental}$ pertain to the molecular goings-on, $then_{abduction}$ the correct theory is as per chemistry.
- if the relevant $data_{perceptual/experimental}$ pertain to the biological goings-on, $then_{abduction}$ the correct theory is as per biology.

Indeed, to revisit the case of logic: that different scientific theories may target different batches of relevant data suggests a natural way of framing the dispute between so-called logical monists and pluralists—namely, as reflecting a dispute over the range of data relevant to logical theorizing. More specifically: the monist maintains (more or less) that the relevant data float free from any specific goings-on, whereas the pluralist maintains (more or less) that the relevant data vary between different domains of investigation, with some data (e.g., that associated with Newtonian mechanics and ordinary experience) supporting a classical logic, and others (e.g., that associated

---

[19] On a contrastive view of theory choice, the consequent of the first conditional might rather be 'Newtonian mechanics is superior to quantum mechanics' and the consequent of the second conditional might rather be 'Quantum mechanics is superior to Newtonian mechanics'.

with quantum mechanics or semantic indeterminacy, on some views) supporting a non-classical logic.[20] Here again explicit recognition of the conditional structure of justification proves useful, both in providing the resources for capturing the main distinction between monists and pluralists, and perhaps also in pointing towards what might be an associated difference in justificatory status (with, perhaps, the monist's relevant data evoking a traditional conception of the a priori as that which floats free of any contingent goings-on, and the pluralist's relevant data rather appearing to be sensitive to contingent empirical phenomena).

Understanding theoretical justification as having a broadly conditional structure also makes room for theoretical disciplines treating a given subject matter to bifurcate into sub-disciplines with different justificatory statuses—some a priori, others a posteriori. The case of mathematics, which admits of both 'pure' and 'applied' theories, is a case-in-point. Consider the case of geometry. Pure geometers might aim to identify and justify geometrical theories suited for diverse potential forms of space-time:

- If space-time conforms to Aristotelian mechanics, then the correct geometry of space-time is Euclidean.
- If space-time conforms to Newtonian mechanics, then the correct geometry of space-time is affine.
- If space-time conforms to special relativity, then the correct geometry of space-time is Minkowskian.
- If space-time conforms to general relativity, then the correct geometry of space-time is Lobachevskian.

Here the relevant data is hypothetical, not actual, and so plausibly a priori. And the operative mode of inference is also plausibly a priori—perhaps abduction, perhaps some other a priori mode of inference. In any case the theories of pure geometry are likely justified a priori. But the concern of the applied geometer is (or at least could be) with identifying and justifying the geometrical theory that is best suited for describing space-time (or some other kind of space) as it actually is. Correspondingly, for the applied geometer the relevant data is actual and empirical, not hypothetical—and as above, this is enough to render the associated theory a posteriori.

One last case-in-point of the usefulness of *Conditional Theoretical Justification* is worth mentioning—namely, the case of metaphysics. Historically, it has been supposed that metaphysical theories are justified a priori: metaphysics, unlike science, was an activity one could engage in from the armchair, via rational reflection or the like. But of late it has been common to characterize metaphysics as having a broadly abductive methodology, as on Sider's (2009) characterization of 'mainstream metaphysics':

> Competing positions are treated as tentative hypotheses about the world, and are assessed by a loose battery of criteria for theory choice. Match with ordinary usage and belief sometimes plays a role in this assessment, but typically not a dominant one. Theoretical insight, considerations of simplicity, integration with other domains (for instance science, logic, and philosophy of language), and so on, play important roles. (358)

---

[20] Our own view is that quantum mechanics—and in particular, the value indeterminacy associated with superpositions and other quantum phenomena—does not require a non-classical logic. See Calosi & Wilson, (2018) and (2021) for discussion.

Does it follow that metaphysics, like science, is a posteriori? Not necessarily, as the dispute between exceptionalists and anti-exceptionalists about logic illustrates. For even if the operative mode of inference in metaphysics is abductive, the justification of metaphysical theories will be a posteriori only if the data relevant to metaphysical theorizing is a posteriori—again, since abduction is a priori. Moreover, one might maintain that the data relevant to metaphysics pertains to what is possible as opposed to what is actual, with any appeals to perception or other empirical goings-on serving only an enabling function (as when experience is required for gaining certain concepts, without undercutting the a priority of justification of associated beliefs). Supposing so, then the status of metaphysics as a priori, and an associated relevant contrast with the natural sciences, could be preserved, even granting that metaphysics proceeds by way of abduction. That said, if it turns out that metaphysics, or some branches thereof (say, the metaphysics of science) are best seen as operating on actual empirical data, then this can be accommodated on the present conditional framework.

The question of how to best characterize anti-exceptionalism about logic, and the related question of what really distinguishes exceptionalists from anti-exceptionalists, might seem somewhat narrow; but like many questions in philosophy, a closer look reveals broader implications. We have here offered reasons to reject the common characterization of the exceptionalist/antiexceptionalist dispute as over whether logic is or is not a priori, and the related supposition that anti-exceptionalism, in taking abduction to be operative in logical theory choice, entails that logic is a posteriori. Rather, we have argued, insofar as abduction is a priori, the justificatory status of logic ultimately hinges on the status of the relevant data. Moreover, and more generally, there is a case to be made that theoretical justification has a broadly conditional structure, whereby an operative mode of inference takes relevant data as input and generates a preferred theory as output, and where the justificatory status of any such theory will be a function of both the justificatory status of the relevant data and the justificatory status of the mode of inference.

References

Bealer, G. (1996). A priori knowledge: Replies to William Lycan and Ernest Sosa. *Philosophical Studies, 81*, 163–174.

Beebe, J. R. (2009). The abductivist reply to skepticism. *Philosophy and Phenomenological Research, 79*, 605–636.

Biggs, S., & Wilson, J. M. (2016). Carnap, the Necessary A Posteriori, and Metaphysical Anti-realism. In Stephen Blatti and Sandra LaPointe, editors, *Ontology After Carnap*, 81–104.

Biggs, S., & Wilson, J. M. (2017a). Abductive Two-Dimensionalism: A New Route to the A Priori Identification of Necessary Truths. *Synthese, 197, 59–93.*

Biggs, S., & Wilson, J. M. (2017b). The a priority of abduction. *Philosophical Studies, 174,* 735–758.

Biggs, S., & Wilson, J. M. (2019). Abduction vs. Conceiving in the Epistemology of Modality. *Synthese, 198,* 2045–2076.

Boghossian, P. (2000). Knowledge of logic. In: Paul Boghossian and Christopher Peacocke, editors, *New Essays on the A Priori*.

Bonjour, L. (1998). *In Defence of Pure Reason*. Cambridge: Cambridge University Press.

Calosi, C., & Wilson, J. (2018). Quantum Metaphysical Indeterminacy. *Philosophical Studies, 176*, 2599–2627.

Calosi, C., & Wilson, J. M. (2021). Quantum indeterminacy and the double slit experiment. *Philosophical Studies, 178*, 3291–3317.

Casullo, A. (2003). *A priori justification*. Oxford: Oxford University Press.

Casullo, A. (2012). Articulating the a priori–A posteriori distinction. In A. Casullo (Ed.), *Essays on a priori knowledge and justification* (pp. 289–327). New York, NY, USA: Oxford University Press.

Chalmers, D. J. (2006). The Foundations of Two-Dimensional Semantics. In M. Garcia-Carpintero & J. Macia (Eds.), *Two-Dimensional Semantics: Foundations and Applications* (pp. 55–140). Oxford: Oxford University Press.

Chalmers, D. J., & Jackson, F. (2001). Conceptual Analysis and Reductive Explanation. *The Philosophical Review, 110*, 315–360.

Cohen, S. (2010). Bootstrapping, defeasible reasoning, and a priori justification. *Philosophical Perspectives, 24*, 141–159.

Douven, I. (2017). Abduction. In E. N. Zalta (Ed.), *The Stanford Encyclopedia of Philosophy*. Metaphysics Research Lab, Stanford University, summer 2017 edition.

Garfinkel, A. (1981). *Forms of explanation*. New Haven, CT: Yale University Press.

Hawthorne, J. (2002). Deeply contingent a priori knowledge. *Philosophy and Phenomenological Research, 65*, 247–269.

Hjortland, O. T. (2017). Anti-exceptionalism about Logic. *Philosophical Studies, 174*, 631–658.

Kant, I. (1786). *Metaphysical Foundations of Natural Science*. Translated and edited by Michael Friedman. Cambridge: Cambridge University Press.

Martin, Ben, & Hjortland, Ole, forthcoming. Logical Predictivism. *Journal of Philosophical Logic*.

Orman Quine, W. V. (1951/53). Two Dogmas of Empiricism. *The Philosophical Review*, *60*, 20–43.

Peacocke, C. (2003). *The realm of reason*. Oxford: Oxford University Press.

Priest, G. (2014). Revising Logic. In P. Rush (Ed.), *The Metaphysics of Logic* (pp. 211–223). Cambridge: Cambridge University Press.

Priest, G. (2016). Logical Disputes and the A Priori. *Logique et Analyse*. http://virthost.vub.ac.be/lnaweb/ojs/index.php/LogiqueEtAnalyse/article/view/1850.

Putnam, H. (1968). Is logic empirical? *Boston Studies in the Philosophy of Science*, *5*.

Read, S. (2019). Anti-exceptionalism about Logic. *Australasian Journal of Logic, 16*, 298.

Russell, G. K. (2014). Metaphysical analyticity and the epistemology of logic. *Philosophical Studies, 171*, 161–175.

Sider, T. (2009). Ontological Realism. In D. J. Chalmers, D. Manley, & R. Wasserman (Eds.), *Metametaphysics: new essays on the foundations of ontology* (pp. 384–423). Oxford: Oxford University Press.

Summerfield, D. M. (1991). Modest a Priori Knowledge. *Philosophy and phenomenological research, 51*, 39–66.

Swinburne, R. (2001). *Epistemic justification*. Oxford: Oxford University Press.

Thurow, J. (2006). Experientially defeasible a priori justification. *Philosophical Quarterly, 56*, 596–602.

van Fraassen, B. (1980). *The scientific image*. Oxford: Oxford University Press.

Wedgwood, R. (2013). A priori bootstrapping. In A. Casullo & J. Thurow (Eds.), *The a priori in philosophy* (pp. 226–246). Oxford: Oxford University Press.

Williamson, T. (2007). *The philosophy of philosophy*. Oxford: Blackwell.

Williamson, T. (2013). How deep is the distinction between a priori and a posteriori knowledge? In A. Casullo & J. C. Thurow (Eds.), *The a priori in philosophy* (pp. 291–312). Oxford: Oxford University Press.

Williamson, T. (2013). *Modal logic as metaphysics*. Oxford: Oxford University Press.

Williamson, T. (2017). Semantic paradoxes and abductive methodology. In B. Armour-Garb (Ed.), *Reflections on the liar* (pp. 325–346). Oxford: Oxford University Press.