



Anti-exceptionalism about logic: an overview

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Published online: 10 February 2023

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1 Anti-exceptionalism about logic

There is a common perception that logic as a discipline is *exceptional*, being epistemically, methodologically and metaphysically dissimilar from the recognised sciences. Whereas even the most fundamental laws of physics apply only to physical systems, those of logic are typically conceived as wholly *general*, applying to all domains and all entities. To this extent, logic is not concerned with the particular identity of any object or property. Indeed, logic is not concerned with the content of propositions at all, but only with their *form*. For this reason, the exceptionalist conception has it that logical laws are both *analytic* and *necessary*, in not being responsive to the peculiarities of events in the actual world. Furthermore, on the basis of these considerations, logical laws must be knowable in a wholly different fashion to those of mathematics and the empirical sciences. While in mathematics and the sciences we often presume the validity of certain logical inferences in order to establish results, within logic we cannot do this without begging the question. Accordingly, justification for logic must be *non-inferential*. And, given that no observable states of affairs directly demonstrate that a rule of inference is valid, or a law true, in virtue of the justification for logic being *non-inferential*, it must also be a priori. This has led to the long-standing view that logical knowledge must either be a product of direct *rational insight* into the truths of logic or a result of *epistemic analyticity*. Last, but not least, logic is considered an exceptional discipline in that it is *normative* for reasoning, providing reasoners with normative guidance as to what to believe or disbelieve when reasoning. Thus, both in terms of its epistemology and the content of its laws, logic is significantly different from the (other) mathematical and empirical sciences.¹

¹ Whether, and to what extent, this exceptionalist perception of logic coincides with historical conceptions of logic is a matter of open debate, and is discussed by several of the essays in the present topical collection (Rossberg & Shapiro; Martin & Hjortland, this volume).

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Anti-exceptionalism about logic (AEL) challenges this exceptionalist picture of logic, both calling into question the presumed exceptional nature of logic's epistemology, methodology, and subject matter, and drawing a close connection between logic and the sciences.

Particular attention has been paid recently to the degree that logic is *epistemically* exceptional. Contrary to the traditional view that we have some direct unmediated access to the truths of logic, it is becoming interestingly popular to suggest that logical justification is mediated, whether by showing that a given logic better accommodates certain relevant data and possesses to a greater extent certain theoretical virtues than its competitors (so-called *logical abductivism*), or that the logic is more predictively successful and explanatorily fruitful than its competitors (so-called *logical predictivism*).² These proposals themselves lead to further questions, such as what constitutes this suitable data against which logics (and their purported predictions) are tested (dos Santos, this volume; Martin, 2021b), how we should understand these proposed theoretical virtues of logic (Russell, 2019), and how much sense we can make of logics providing explanations of a given phenomenon (Martin, 2021a; Payette & Wyatt, 2018)?

As evidenced by the articles collected in this volume, questions concerning whether and to what extent logic should be considered exceptional bring to the fore a variety of issues at the intersection between the metaphysics, the epistemology, and the methodology of logic. In this respect, this topical collection offers a rich and valuable overview concerning recent debates on core issues in the philosophy of logic.

Given the prominence of the epistemological dimension of AEL in the literature, it is not surprising that the majority of the papers in this Topical Collection focus on the epistemology of logic. It is by no means the only dimension to AEL, however. Associated with the historical conception of logic's laws as essentially formal, necessary, and normative, it has been traditional to suppose that the *subject matter* of logic must be significantly different from those of the sciences. It is exactly the association of logic with these properties that led to the rejection of logical psychologism, the view that facts of logic supervene on some type of psychological facts (Pelletier et al., 2008). Yet, while psychologism itself is still unpopular (Hanna, 2006), there has been an increased tendency to diminish the difference between the subject matter of logic and the recognised sciences. Best summarized by Russell's (1919: 169) claim that "logic is concerned with the real world just as truly as zoology, though with its more abstract and general features", *metaphysical AEL* proposes that the laws of logic are about the world in the same way that those of the sciences are, though concerned with more "general" facts (Maddy, 2007; Sher, 2016; Williamson, 2017).³

2 Summaries of contributions

The papers in this Topical Collection range from proposals on how we should fruitfully understand AEL, to arguments about how anti-exceptionalist epistemologies of logic

² For discussions of *logical abductivism* see Hjortland (2017); Martin (2021a); Priest (2014, 2016); Russell (2015); Williamson (2017). For discussions of *predictivism*, see Martin & Hjortland (2021 & this volume).

³ For more on the histories and motivations behind both *epistemological* and *metaphysical AEL*, as well as the distinction between them, see Martin & Hjortland (this volume).

impact wider debates in the philosophy of logic, from defences of unexceptional sources of logical knowledge to doubts over the viability of these sources.

To help the reader navigate the Topical Collection, we'll now provide a brief summary of the included papers under the themes of: (i) *How to Understand AEL*, (ii) *Challenges to AEL*, (iii) *Defences of AEL*, and (iv) *Extensions and Consequences of AEL*. While this is certainly not the only viable way of categorising the contributions, we think it is one that is instructive without being too restrictive. It should at least provide the reader with some wider picture of the current debates into the fruitfulness of the AEL research programmes.

2.1 How to understand AEL

We begin with the first category—namely, how to understand AEL. In their essay "Anti-exceptionalism about logic as tradition rejection", Hjortland and Martin take issue with what is currently the most common way of defining AEL, as the thesis that logic is *continuous with* the sciences (Hjortland, 2017). They argue that this conception of AEL is unhelpful due to the fact that it both lacks precision and fails to accurately reflect the relevant current debates in the philosophy of logic. They then put forward what they take to be a more promising way of characterising AEL as *tradition rejection*—or, more properly, as the rejection of certain traditional properties of logic (for example, logic's generality, apriority and epistemic foundationalism). One immediate advantage of conceiving of AEL in this way is that it is more faithful to the rather variegated landscape of positions that can be aptly categorized as anti-exceptional. In this respect AEL should not be taken as indicating one single view in the philosophy of logic but rather a cluster of different views which, though importantly connected, stem from a quite diverse range of motivations and aims. In order to prove the fruitfulness of their new conception of AEL, Hjortland and Martin distinguish between two prominent versions of AEL in the literature, a metaphysical and epistemological variety, and show how these variants need not stand or fall together.

Rossberg and Shapiro's "Logic and science: science and logic" expresses some deep scepticism over whether the label 'logical anti-exceptionalism' really captures a philosophically interesting and coherent account of logic that successfully opposes more traditional conceptions of logic, as advocates of AEL propose. Taking AEL to be the thesis, championed by Hjortland (2017), that there is a significant continuity between logical theories and scientific theories on a variety of levels, Rossberg & Shapiro complain that, at least understood in this way, AEL is a rather vague thesis and thus the position it is meant to characterise is too underdetermined to rule out much or explain anything. They subsequently conclude that the (anti-)exceptionalist debate is of little use in the project of advancing our understanding of the practice of logic and the nature of logical consequence. Their critical piece first examines the positions of three avowed anti-exceptionalists—Hjortland, Priest, and Williamson—together with those of two naturalists, Maddy & Burgess. They argue that disagreement looms large among these philosophers on many core questions, chief among them are the questions of what logic is about and how to conceive of the notion of logical consequence. They then turn their attention to three historical figures—Aristotle, Frege, & Carnap—whose

accounts of logic are sometimes cited by anti-exceptionalists as prime examples of logical exceptionalism. However, Rossberg & Shapiro argue that some of the anti-exceptionalist's core tenets can actually be understood in such a way as to fit the views of these historical thinkers. This, according to Rossberg & Shapiro, provides a further reason for doubting the distinction between (anti-)exceptionalist conceptions of logic as a reliable and philosophically informative taxonomical tool.

2.2 Challenges to AEL

The second group of papers in the topical collection puts forward challenges to particular components of AEL, or to prominent instances of AEL in the literature. Schurz's essay "Why classical logic is privileged: justification of logics based on translatability", is primarily concerned with how we can justify logics from a general epistemological standpoint. The main issue Schurz raises is that, seemingly, we lack external standards with which to assess the adequacy of a logic. We cannot rely upon demonstration or observation since doing so would lead to circular reasoning, and further we cannot depend upon intuitions since they are usually unreliable. In this specific sense, the epistemology of logic is exceptional. In the context of this challenge, Schurz investigates some of the motivations for (and concerns with) four non-classical families of logic: (i) three-valued logics and their generalizations to further many-valued logics, (ii) intuitionistic logic, (iii) paraconsistent logics, and (iv) quantum logic. Schurz argues that any reasons that could be given in favor of these non-classical logics can be accommodated within classical logic, based primarily on the fact that non-classical logics can be translated into classical logic in a meaning-preserving way. This, according to Schurz, provides a justification of classical logic based on its representational optimality. The essay ends by showing that although a few non-classical logics are likewise representationally optimal, classical logic is still preferable to these non-classical rivals in virtue of having important *ceteris paribus* advantages as a unifying metalogic.

Biggs & Wilson's contribution "Does anti-exceptionalism about logic entail that logic is a posteriori?" investigates what may be taken as the chief epistemological question at the core of the (anti-)exceptionalism debate—namely, whether the justification of logical theories is a priori or a posteriori. Anti-exceptionalists typically claim that since logical theories (like scientific theories) are justified by means of abductive methods, and since the epistemic value of such methods are supposed to rely upon a posteriori considerations, the entire justification of logic based on abductive methods turns out to be a posteriori. Biggs and Wilson, building on arguments developed in earlier works, argue that such a supposition is incorrect. For them, abduction as well as its epistemic value are a priori, and thus the question whether logic is a priori or a posteriori, within the anti-exceptionalist debate, ultimately relies on whether the data on which abduction operates is a priori or a posteriori. This means that anti-exceptionalism, as the claim that logical theories are abductively justified, should not be seen as incompatible with logic's being a priori. The core of the disagreement between exceptionalists and anti-exceptionalists is then not on the question whether logic is a priori or a posteriori but on the issue of which mode of inference is operative

in logical theory choice. The essay closes with a sketch of an account of justification of scientific (*latu sensu*) theories based on a conditional structure.

In her paper "Logic as a Methodological Discipline", Sagi argues for the view that logic is a methodological discipline, and for that reason it can be seen as exceptional. The first part of the paper portrays a conception of logic as a methodological discipline from the perspective of the traditional project. According to this traditional project, pursued historically by logicians such as Tarski and Frege, logic is taken to provide the tools for good reasoning. To such an extent, logic can be considered a normative discipline. Sagi focuses in particular on deductive reasoning, which plays a prominent role in mathematics and is ubiquitous in every inquiry. The second part of the paper goes on to clarify the notion of a methodological discipline, and does so in a way that is compatible with naturalistic leanings. A methodological discipline, on Sagi's proposal, is one that provides tools, methods or a methodology for some practice and/or discipline. In the case of logic, the target is every theoretical discipline, including logic itself. The paper ends by discussing the case study of model theory, where it's argued that although the foundational aspect present in the traditional project is abandoned in the modern development of model theory, the methodological role of logic is retained.

The aim of dos Santos's essay "Intuitions, theory choice and the ameliorative character of logical theories" is twofold: first, to show that both abductivism and predictivism are inadequate accounts of theory choice in logic; second, to outline an ameliorative model of theory choice that fares better than abductivism and predictivism. According to dos Santos, the core of the problem for both abductivism and predictivism is their reliance on laypeople's pre-theoretical intuitions about validity as the relevant data to be explained. Drawing from the psychology of reasoning literature, dos Santos argues that laypeople are significantly unreliable when it comes to detecting the validity and invalidity of arguments in natural language. They seem to be reasoning predominantly non-monotonically when they are expected, from the point of view of deductive logic, to reason monotonically. One obvious way to tackle this issue is to consider exclusively the intuitions about validity of logicians and philosophers of logic. Although the reliability issue is significantly assuaged, dos Santos argues, in line with MacFarlane (2004), that logicians and logic-trained philosophers' intuitions are post-theoretical. This means that their intuitions are influenced by their training and philosophical background and, as such, significantly biased. In the last part of the essay, dos Santos outlines an alternative account of theory choice in logic which aims to be capable of dealing with the problems affecting abductivists and predictivists accounts. According to this account, logical theories are not representational but rather ameliorative, and thus the primary aim of logical theorising is to provide an understanding of validity in relation to a set of investigative goals which is an improvement upon our pre-theoretic understanding. In this respect, logical theorising is not that different from engineering (and in this sense, anti-exceptional): they both aim at improving human practices in response to certain needs.

Shapiro's "What is logical deflationism? Two non-metalinguistic conceptions of logic" compares two deflationary and fundamentally non-metalinguistic conceptions of logical inquiry. The first is Williamson's view, which the author takes to be instrumentalist in nature. The second is Shapiro's own view, which he labels "expressive

device deflationism". Both deflationary views reject the thesis that logical expressions serve to represent the layout of a domain of linguistic or conceptual reality. However, Shapiro argues, while Williamson's instrumentalism has it that superficially metalinguistic logical predicates (such as those attributing logical truth and logical consequence to (sets of) sentences) are merely instruments for constructing theories, Shapiro's own *expressive device deflationism*, following in the footsteps of expressive device deflationism about truth (Horwich, 1998), holds that metalinguistic logical predicates are merely expressive devices that allow speakers to generalize easily over instances of logical claims. Thus, according to Shapiro's view, attributions of logical truth and consequence allow speakers to express generalisations over fundamentally non-metalinguistic claims. With this in hand, Shapiro argues that his own expressive device deflationism is a more suitable theory for a broadly anti-exceptionalist conception of logic than Williamson's instrumentalist proposal, in virtue of fitting better with an abductive methodology of theory choice. Moreover, Shapiro claims that expressive device deflationism is more deserving of the "deflationism" tag and yields a more convincing explanation of why we use logical properties than Williamson's instrumentalist deflationism.

2.3 Defences of AEL

Papers within our *Defences of AEL* category aim to either defend anti-exceptionalist from a particular prominent challenge in the literature, or to argue in favour of a particular version of AEL.

Carlson defends anti-exceptionalist epistemologies of logic from the challenge of so-called *basic* logical principles, such as *modus ponens*, which putatively require a special epistemology. According to anti-exceptionalist epistemologies of logic, just as with scientific theorizing, we do not have unmediated access to the truths of logic. Rather, although potentially motivated by certain intuitive cases, establishing the correct logical laws requires formulating and subsequently testing whole theories, i.e. logics. The challenge from basic logical principles aims to call into question the viability of this anti-exceptionalist epistemology by showing that certain logical principles are required in order to both establish what can be proved within a given logic and also what would constitute evidence for and against the given logic. Consequently, our knowledge of these so-called basic logical principles must be antecedent to the evidencing of logical theories, contra anti-exceptionalist epistemologies of logic. Carlson goes about answering this challenge by distinguishing between *systematically* basic and *epistemically* basic laws. While the former are laws which are presupposed within a logic in order to prove results, the latter are laws for which we have immediate non-inferential justification. Carlson then argues that while the existence of *epistemically* basic laws would constitute a challenge to anti-exceptionalist epistemologies of logic, *systematically* basic laws do not, and further we only need to posit the latter form of basic laws to get the project of formulating and evidencing logics off the ground.

Winstanley, by contrast, focuses on what constitutes *evidence* for logics of validity. Within the anti-exceptionalist literature it has been common to propose multiple sources of evidence that inform logical theories, including: judgements over the

acceptability of concrete arguments or inferences; the inferential moves that mathematicians make within informal proofs; important results within mathematics; and logico-semantic paradoxes. Appealing to Piaget's work in the psychology of reasoning, Winstanley argues that in order to fully understand logical evidence we should also include psychological theories of reasoning as a source of such evidence. Additionally, once we embrace psychological theories of reasoning as a source of logical evidence, not only is further support provided for a broadly anti-exceptionalist epistemology of logic, but some of the problems which were thought to dog anti-exceptionalism seem less compelling, in particular the *background logic problem* (Wright, 1986). If Winstanley is correct, then not only does recognising psychological theories of reasoning as a potential source of logical evidence provide further grist to the anti-exceptionalist's mill, but it solves certain recognised live problems within the research programme while providing motivation for a particular anti-exceptionalist account of logic's subject matter, in the form of *psychologism* (Pelletier et al., 2008).

Peregrin & Svoboda also address logic's subject matter in their contribution. One of the challenges facing AEL is being able to provide an account of logic's subject matter which is both consistent with the underlying epistemological picture outlined by anti-exceptionalism while addressing the historically prominent normative role that logic has been thought to play for reasoning (Steinberger, 2020). Peregrin & Svoboda aim to meet this challenge by proposing what they call a form of *moderate anti-exceptionalism*, which exists within a broadly naturalistic framework. According to this moderate anti-exceptionalism, formal languages (i.e., logics) are formulated and proposed in order not only to describe features of existent natural languages, but to build on and improve these existent languages for certain purposes, such as reasoning within the sciences and rational communication more generally. To this extent, logic has both a descriptive and normative element. The proposal raises several important questions for the anti-exceptionalist. For instance, firstly, whether there can be *one correct logic*, given that on this account logics serve as tools in order to improve upon our existent natural languages for a given purpose. Further, to what extent the methodology needed to formulate and assess logics relative to these purposes can be effectively captured by existent anti-exceptionalist accounts of logic's methodology, such as abductivism and predictivism.

2.4 Extensions and consequences of AEL

Papers in our final category, *Extensions and Consequences of Anti-Exceptionalism about Logic* aim either to explore the consequences of anti-exceptionalism for wider topics within the philosophy of logic or science, or to extend anti-exceptionalist theses to novel areas of logical theorizing. An example of the latter is Priest's paper on non-deductive reasoning, in which he argues that anti-exceptionalist treatments of deductive logics can and should be extended to theory-choice for non-deductive logics. Exploring the wider consequences of an anti-exceptionalist account of logic, McSweeney shows how a combination of logical realism, the thesis that logics aim to reflect genuine metaphysical features of the world, and an anti-exceptionalist epistemology of logic call into question two often assumed claims within the philosophy

of science. Firstly, that logically equivalent theories are theoretically equivalent and, secondly, that theories are closed under logical consequence. In contrast, Barrio, Pailos and Calderón in their contribution apply a broadly anti-exceptionalist methodology of logic to argue in favour of a family of logics, comprising the **ST**-hierarchy as the best solution to the alethic paradoxes. Finally, Tajer considers to what extent an anti-exceptionalist methodology of logic allows for methodological pluralism within logic, as is found within the sciences (Ruphy, 2016). Appealing to three distinct debates within philosophical logic—namely, (i) which logic constitutes the foundations of mathematics, (ii) which logic best provides a solution to the logico-semantic paradoxes, and (iii) which logic provides the best account of the semantics of indicative conditionals—Tajer argues that the methodological norms used within each of these debates are slightly different, supporting a form of methodological pluralism within logic.

As this brief summary of the papers within the topical collection shows, AEL is a lively and multifaceted area of research, of interest not just to those working within the philosophy of logic, but to researchers in the philosophy of science and mathematics, philosophy of language, epistemology, metaphysics, and logic itself. Our hope for this collection is that in addition to highlighting these features of the area, and providing researchers with an overview of the current state-of-the-art, it leads to researchers from across the various research areas actively engaging with AEL, producing new fruitful research questions and studies.

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